XVI WORLD CONGRESS OF THE UNION INTERNATIONALE DE PHLEBOLOGIE

Monaco, 31 August - 4 September 2009

E-ABSTRACT BOOK

Sponsored by:
Legend

Example: PP1.1-1

ROOMS:
- PP = PRINCE PIERRE
- AP = APOLLINAIRE
- GE = GENEVOIX
- BO = BOSIO
- CB = CAMILLE BLANC
- SC = SCOTTO

DAYS:
- 1 = MONDAY
- 2 = TUESDAY
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- 5 = FRIDAY
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<td>UIP Consensus Venous Malformation &amp; Lymphoedema</td>
<td>PP5.4</td>
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<td>Venous Malformations and Lymphoedema</td>
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<td>Venous symptoms and clinical assessment</td>
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Venous malformation (VM) is the most common congenital vascular malformation (CVM). Its majority exist alone as an independent lesion but infrequently the VM exists together with other CVMs; this combined condition with lymphatic malformation (LM) often known as Klippel-Trenaunay Syndrome. When AV malformation (AVM) should exist as an additional CVM component, its condition (Parkes-Weber Syndrome) becomes most difficult and confusing diagnostic and therapeutic challenge among the CVMs. It has therefore, notorious reputation on extreme variety in its clinical presentation and clinical behavior; its pathognomonic/embryological characteristics of the ‘extratruncular’ lesion as an embryonic tissue remnant leads totally unpredictable course. Its erratic response to the treatment with high recurrence/persistence gave notorious reputation as an enigma among many vascular disorders; ‘recurrence’ became a trademark of VM leading to erroneous prejudice: curse to the physicians. Through earlier decades, cavalier but often overaggressive approach mostly led by surgeons alone resulted in disastrous outcome due to limited knowledge and information on such critical and complexed condition. Such poor outcome added more confusion on the management of VM leading to erroneous prejudice: curse to the physicians. Through last two decades a new concept on the management of the CVM in general was established based on ‘multidisciplinary team approach’, the only lesion with justified indications is now accepted as a treatment candidate by the multidisciplinary team and no longer is every VM lesion considered for the treatment. Traditional open surgical/excisional therapy is fully integrated with endovascular therapy as the most effective means to control the VMs. Endovascular therapy is now implemented as an independent therapy to surgically inaccessible lesion to non to poor surgical candidate (e.g. diffuse infiltrating extratruncular lesions); conventional surgical/excisional therapy is further improved with preoperative endovascular therapy combined to surgically accessible lesions as supplemental therapy.
PP1.3-2
New nomenclature of embryological veins
A. Caggiati
Dept. of Anatomy, University Sapienza, Rome, Italy

In the recent years, IUP has successfully cooperated with the International Federation of Anatomical Association (IFAA) and the Federative International Committee on Anatomical Terminology (FICAT) to simplify and make uniform anatomical terminology of the veins of the lower limbs (see: J Vasc Surg. 2002; 36:416-22. J Vasc Surg, 2005; 41: 719-24). FICAT is currently at work on the revision and simplification of embryological nomenclature. Members of IUP have been called to furnish their opinion with regard of the terms used to indicate embryological veins present in the maturation stage of the limbs. Primitive vascular channels in the limb first appear in the third week of gestation. During Stage 1 of its development (undifferentiated stage) only a capillary network is present. Stage 2 is the reformat stage when large plexiform structures can be seen, while in Stage 3, by the third week of gestation, the maturation stage includes development of large channels, arteries, and veins. On the basis of suggestions furnished by IUP, the chapter on veins has been reworked. Terms concerning the veins of the developing lower limb are here reported in their final version. FICAT only asks to persuade the Phlebologists to drop the Lateral before Marginal vein. Using it breaks more than one rule of terminology!

PP1.3-3
Comparative, prospective study between volume and low and high interface pressure under short stretch compression bandages in the treatment of breast cancer lymphedema
R. Damstra, H. Partsch
Private Practice, Vienna, Austria

Multilayered, short stretch bandages are recommended as the basic therapy in the intensive treatment-phase for lymphedema patients. However, the deciding question how firmly such bandages should be applied was never investigated before. Aim. To compare the efficacy of mild and strong compression bandages in patients with postmastectomy arm lymphedema.

Methods. 36 patients with one-sided lymphedema of the arm were randomized into two groups: Group A (n=18) received short stretch bandages (Rosidal lymphset®, Lohmann Rauscher, Germany) applied with a pressure between 20-30 mm Hg, group B (n=18) with a pressure between 44-55 Hg. The sub-bandage pressure was measured using air-filled transducers on the distal and proximal lower limb. The bandages were renewed after 2 and 24 hours. Arm volume was measured by waterdisplacement volumetry before bandage application, after removal of the bandages at 2 and 24 hours.

Results. The arm volume reduction (mean + SD) after 2 and 24 hours respectively was in group A 117.7 + 135.7 ml (-2.7%; p<.0001) and 212.1 +137.0 ml (-4.8%; pc.01) and in group B 60.2 + 126.5 ml (-1.4%; n.s.) and 210.7 + 212.0 ml (-4.8%; p<.01). There were no significant differences between group A and B. Bandages in group A were better tolerated. The sub-bandage pressure drop in the first 2 hours was 41.9% in group A and 41.3% in group B. The corresponding percent decrease after 24 hours was 63.4% and 57% respectively.

Conclusion. In contrast to the legs, where a dose-response relationship between compression pressure and volume reduction could be demonstrated, in arm lymphedema light short stretch bandages (20-30 mm Hg) are able to achieve the same decrease of the arm size as strongly applied short stretch bandages after 24 hours. Whether these different results are caused by the various pathophysiological situations is open yet and will be discussed.

PP1.4 - Guest lecture: Phlebology in the last 50 years: varicose veins and venous ulcers

PP1.4
50 years of phlebology
C. Jeanneret-Gris-bel 1, K. Burnand 2
1 Med. University Clinic, Department of Angiology, Basel Bruderholz, Switzerland
2 Academic Surgery, St Thomas Hospital, London, United Kingdom

50 years ago, varicose vein diagnosis was made by clinical investigations. The early definitions emphasized the description of the tortuous dilated vein. In the year 1989 Van Bemmelen et al introduced Duplexsonography measurements of the venous reflux as a parameter of venous insufficiency (JVS 1989). Somewhat later Portier et al (JVS 1995) introduced the CEAP classification, adding to the well known Widmer classification. Coleridge Smith et al and Caviezzi et al (EVJES 2006) with their consensus statement initiated a common definition of venous vein diseases. For therapeutic interventions the gold standard since more than 100 years is crossectomy and stripping operation (Hach Phleb 2005) in addition to the well studied compression therapy (Partisch et al JDSO 1991). The very high postoperative recurrence rate described by Fischer et al (JVS 2001) studied over a very long follow-up time, gave way to the evolution of new endovascular techniques: the sclerotherapy of the trunc varices and the endovascular catheter techniques (Laser, VNUS closure). However these techniques have not been studied in large randomized controlled trials with a long term follow-up. Many large epidemiology studies have been achieved in the last 50 years, to mention in the first place is the Basler Study with an overwhelming source of important data (Widmer et al 1969/1982). The Edinburgh study performed by Ruckley et al. gave us the first insights into the epidemiology of duplexsonographic findings in varicose veins (JVS 2001). A very interesting long term study initiated by Schultz-Ehrenburg et al. (Bochum study, Phlebol 1992) investigated children for vein disease. Last but not least our president Eberhard Rabe and his coworkers (Phlebol 2005) investigated the Bonner population clinically and with Duplexsonography over time. Phlebology studies need long follow-up times, lucky who can pass along his knowledge to the next generation. 50 years ago it was not known how venous hypertension caused venous ulceration. A number of hypotheses had been put forward but none was acceptable. In the last 50 years there have been a number of new theories on the aetiology of ulcers, but the mechanism of ulceration is still not known. The development of the duplex scanner by Gene Strandberg on the aetiology of ulcers, but the mechanism of ulceration is still not known. The development of the duplex scanner by Gene Strandberg gave way to the evolution of new endovascular techniques: the sclerotherapy of the trunc varices and the endovascular catheter techniques (Laser, VNUS closure). However these techniques have not been studied in large randomized controlled trials with a long term follow-up. Many large epidemiology studies have been achieved in the last 50 years, to mention in the first place is the Basler Study with an overwhelming source of important data (Widmer et al 1969/1982). The Edinburgh study performed by Ruckley et al. gave us the first insights into the epidemiology of duplexsonographic findings in varicose veins (JVS 2001). A very interesting long term study initiated by Schultz-Ehrenburg et al. (Bochum study, Phlebol 1992) investigated children for vein disease. Last but not least our president Eberhard Rabe and his coworkers (Phlebol 2005) investigated the Bonner population clinically and with Duplexsonography over time. Phlebology studies need long follow-up times, lucky who can pass along his knowledge to the next generation. 50 years ago it was not known how venous hypertension caused venous ulceration. A number of hypotheses had been put forward but none was acceptable. In the last 50 years there have been a number of new theories on the aetiology of ulcers, but the mechanism of ulceration is still not known. The development of the duplex scanner by Gene Strandberg allowed venous valvar reflux to be assessed in patients with ulceration, but quantification of the stress stimulus and quantification...
of reflux is still open to interpretation and error. The ability to measure reflux has overshadowed the role of venous obstruction in the development of ulceration and the post-thrombotic limb. The lack of a good method of measuring venous obstruction, both dynamic and fixed, hampers further advance. There is still no accurate method for separating venous ulceration from other types of leg ulcer. Typical appearances combined with evidence of some reflux in the saphenous, perforators or deep veins is taken to be diagnostic, but the errors inherent in this diagnostic pathway are obvious. New diagnostic techniques such as the presence of haemosiderin in the urine of patients with venous ulcers must be sought. Venous ulcers are still managed by compression bandaging. Multi-layer bandaging systems which are replaced on a weekly basis have been shown to be effective in healing 80% of a mixed population of venous ulcers within a year. That still leaves fifth of patients with ulcers that remain unhealed at one year and these ‘hard to heal’ ulcers require more study. It would be helpful to establish which ulcers do not heal with compression in order that more radical techniques such as tangential excision and mesh split skin grafting or the use of skin substitutes can be applied at an earlier stage. There is no evidence that abolishing superficial venous reflux by surgery enhances ulcer healing (the ESCAR Trial) and of all the drugs and dressings that have been applied to ulcers, only Trental has provided marginal benefits in reducing ulcer healing time. There is now clear evidence that abolishing superficial reflux and regularly wearing compression stockings does reduce ulcer recurrence, but the evidence that these measures reduce ulcer development is still lacking. In the last 50 years the management of venous ulceration has come on a long way, with level one evidence now available for a number of investigations and treatments. It is, however, clear from this short review that a number of areas still require much more investigation.

PP1.5 - Venous symptoms and clinical assessment

PP1.5.1
Venous symptoms: evolution of the concept
P. Carpentier
Dpt of Vascular Medicine, University Hospital, Grenoble, France

Venous symptoms are most often described as aching, sensations of heaviness or swelling, tiredness, cramps, pruritus or restless legs, influenced by orthostatism and environmental temperature. Although they are the most frequent motive for seeking medical help in patients with chronic venous disorders, their interpretation remains a matter of conjectures and debates, mainly fueled by the biases of patients series and cultural prejudices. Whereas in English speaking countries, the relatively poor association of these symptoms with the presence of varicose veins was overinterpreted as their absence of specificity for venous disorders, by contrast, in Latin countries the presence of these symptoms without varices was even considered a warning indication of their subsequent occurrence! These quite conflicting misconceptions were clarified thanks to a thorough epidemiological approach of the associations using unbiased samples of subjects and comprehensive operational definitions of the symptoms taking into account not only their type, but also their other circumstances. Such approaches showed that it is possible to characterize the venous symptoms with a substantial specificity, that they seem to be mostly associated with venous edema, and can be improved by drugs targeting the inflammation of the microvascular and venous system. However, a lot remains to be done in order to better characterize these symptoms, and to use the information they provide in clinical decision making in patients with chronic venous disorders.

PP1.5.2
Pathophysiology of pain in chronic venous disease
N. Danzeiger
Department of Clinical Neurophysiology and Pain Center, Pitié-Salpêtrière Hospital, Paris, France

Current hypotheses on pain mechanisms in venous disease are focused on a local inflammatory origin, related to venous stasis. The starting point for these mechanisms may be local hypoxia associated with capillary stasis, which has been shown to activate endothelial cells. Such activation is manifest by elevation of calcium concentrations in the cytoplasm of endothelial cells, which itself is responsible for an increase in phospholipase A2 activity. Activation of phospholipase A2, in turn, leads to the synthesis and local release of proinflammatory mediators such as bradykinin, prostaglandins E2 and D2, platelet-activating factor (PAF), and leukotriene B4. PAF seems to play a pivotal role: first, it enhances local release of serotonin and histamine; and, second, it produces abnormal adherence of neutrophils to the venous endothelium, prior to their infiltration of the venous wall itself, and stimulates the synthesis of leukotriene B4 by activated neutrophils. Evidence for such an inflammatory reaction in patients with varicose veins has accumulated dramatically over the last five years, and the biochemical changes identified suggest that endothelial cells and neutrophils are the source of this local inflammation. In addition, several recent studies using an experimental model of acute venous occlusion in the rat have shown the specific role of the increase in microvascular pressure in triggering an inflammatory reaction characterized by infiltration of neutrophils in the endothelium and adjacent tissues. The alteration of friction forces on the endothelium (shear stress) produced by blood flow is another essential factor that can promote local inflammation of the venous wall. Some proinflammatory mediators released locally can activate nociceptors located in the venous wall (between endothelial cells and smooth muscle cells of the media) and in the connective tissue that forms the perivenous space, in close contact with the microcirculation.

PP1.5.3
Our obligation to follow clinical outcomes in venous disease
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The time has come for universal acceptance of outcome assessment in venous disease. Outcome studies promote understanding of the diseases we treat and the results of treatment. The choice of a valid and reliable assessment tool is crucial. Patient-generated quality-of-life tools include generic instruments and disease-specific instruments. Disease-specific instruments relate to a particular disease state. They are popular in venous disease reporting and have high sensitivity. The Chronic Venous Insufficiency Questionnaire, the Venous Insufficiency Epidemiological and Economic Study, the Aberdeen Varicose Vein Questionnaire, the Charing Cross Venous Ulceration Questionnaire and the Specific Quality of Life and Outcome Response-Venous are such devices. Physician-generated measurement tools are used to evaluate and classify the consequences of venous disease. The CEAP (Clinical-Etiology-Anatomy-Pathophysiology) classification is a popular descriptive platform for chronic venous disease. The Venous Severity Scoring (VSS) system was derived from the CEAP classification and provide evaluative capabilities. The 5 elements of the VSS are the venous disability score, the venous segmental disease score, and the venous clinical severity score (VCSS). The VCSS responds to features of venous disease that change with treatment. Each of these outcome tools has been validated, and each has strengths and weaknesses. Maintaining the dynamic nature of assessment with periodic review and revision is the way forward to generating universal applicability. VCSS is in the process of revision incorporating the language of quality-of-life tools. Although the choice of instrument is debatable, our obligation is to improve treatment outcomes by examining our results and sharing them in a meaningful way.
The need for an accurate classification system in venous disease is fundamental to understanding of the clinical disease processes and to inter-institutional communication about the separate entities. The imprecise diagnoses that were the norm in venous disease throughout the ages have been replaced by accurate imaging studies since the introduction of non-invasive ultrasound scans in the 1980s. Once presented with the ability to make accurate diagnoses of the cause and mechanism of chronic disease in the individual segments of the lower extremity veins, it was necessary to devise a classification system capable of organizing the data in a meaningful way. In 1994 the American Venous Forum convened a subcommittee of world experts in chronic venous disease to address this challenge. Recognizing that a modern classification of chronic venous disease (CVD) must now embrace more than just the clinical state of the patient, this committee created the ‘CEAP’ classification which provides a system where the multiple variations of CVD can be communicated in a clinically and scientifically meaningful manner, allowing analysis and comparison of treatment modalities for like conditions. Because identical clinical presentations of CVD spring from different etiologies, and the distribution of specific pathologic processes have different implications for treatment and long-term prognosis, the CEAP classification organizes these elements into the methodology. In the CEAP system the Clinical state is amended by the Etiologic basis for the disease in each case and this is described in terms of the Anatomic distribution of the Pathophysiologic process throughout the axial venous drainage from the calf to the diaphragm. This organization of information has been successfully promulgated around the world by the international representation that devised it. Its wide acceptance has become fundamental to inter-institutional communication and to the description of chronic venous disorders. Development of the ceap classification. The CEAP classification that was introduced in 1994 provides a framework around which the clinical manifestations found in CVD are paired with key pathologic elements of causation and physiologic mechanism in specific anatomic locations of the lower extremity. Specifically, for each clinical condition it distinguishes: - Primary from secondary and from congenital causes of the problem; - Reflux from obstructive patho-physiology. And identifies the precise anatomic segments affected by reflux or obstruction through 18 named segments of the lower extremity venous tree. In this way, clinical manifestations are coupled with the precise pathological entity from which the natural history of the pathologic processes and the effects of management alternatives for like clinical states can be identified and studied. The classification describes the status of the disease process at a point in time; these details can change over time with the introduction of interval treatments and with the natural history of the disease process. By interval CEAP examination the longitudinal changes that occur over time or after interventions can be documented. This classification addressed the considerations imposed by modern diagnostic and treatment capabilities. It was incorporated into the updated Reporting Standards for Venous Disease in 1995 and became known as the CEAP classification. Its acceptance was engendered around the world by venous authorities in America, Asia, Australia and Europe, now having been published in at least eleven languages on five continents (Chinese, English, French, German, Greek, Italian, Japanese, Polish, Portuguese, Spanish, and Swedish). The fact of worldwide dissemination addresses the need for a universal classification to enable accurate communication between institutions and countries about the details of CVD and the results of different forms of treatment. The CEAP classification was originally intended as a dynamic document with the intent that it be amended in the future light of experience with its usage. During this period several evaluations of the Clinical categories and of the appended scoring systems that were based upon CEAP were published and provided both validity and critique to their content. After the first 10 years, CEAP’s validity and usefulness underwent its first critical review with the intent to make needed revisions in 2004 by a new international subcommittee of the American Venous Forum. In this revision the fundamental structure of the CEAP categories was affirmed and retained; additions to the Classification included specific definitions of terms, clarification of details within the C Class, and improvements in the method of recording the findings to render the classification more complete in its long form, and more user friendly in its short form. With improvement in diagnostics and treatment there will be continued demands to adapt the CEAP classification to better serve future developments. A better differentiation of symptoms such as pain is suggested. There are several conditions that are not included in the CEAP classification but that can influence the management of the patients: - Combined arterial/venous etiology; - Postthrombotic lymphedema; - Ankle anklylosis with atrophy of the calf; - Venous aneurysms; - Venous neuropathy; - Corona phlebectatica; - Pelvic congestion syndrome; - Morbid obesity. The role of corona phlebectatica (CP) has been discussed during many meetings and the Atlantic Ocean was a clear divider. In parts of Europe CP has been used as an early indicator of advanced CVD. Its scientific significance is now under investigation, particularly in France. There is a need to incorporate appropriate new features without too frequent disturbances of the stability of the classification. Frank Padberg stated in our deliberations: ‘It is critically important that recommendations for change in the CEAP standard be supported by solid research. While there is precious little that we are recommending which meets this standard, we can certainly emphasize it for the future. If we are to progress we should focus on levels of evidence for change rather than levels of investigation. While a substantial portion of our effort will be developed from consensus opinion, we should still strive to achieve an evidence-based format.’

PP1.7 - Endovenous procedures 1: Diagnosis and anesthesia

PP1.7.1 Apport de la mesure echodoppler du diamètre de la grande veine saphène pour le calcul d’energie au cours des traitements endoveineux

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Au cours d’un traitement endoveineux, le générateur Closure ou Laser doit fournir une quantité d’énergie adaptée à la morphologie et au diamètre de la veine cible pour faire disparaître efficacement la grande veine saphène (GVS). Tous les paramètres doivent être considérés avec une extrême exactitude. L’équation générale de la LEED E=10 X diamètre par cm de veine qui calcule l’énergie efficace délivrée par un générateur montre clairement que l’énergie doit être proportionnelle au diamètre. Pour nous, la fluence réelle (F) ou énergie surfacique est un facteur de référence incontournable qui correspond à un niveau de puissance et d’efficacité d’un système donné. Une fois le niveau de fluence connu, on peut ensuite définir harmonieusement les interdépendances entre les 3 paramètres qui interviennent dans le calcul de la fluence: le diamètre de la veine, la puissance et le temps de tir. D’abord, l’échographie mesure précisément les diamètres de la veine tout le long de son trajet. Ceci permet d’obtenir une série de données anatomiques de la GVS et de réal-

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is a reconstruction graphic and informatize of the large vein saphene who can be enregister (course informatize of the GVS). At moment of the treatment endovenous, on realize a plan virtual of cirurgery which conclude by operator the energy theoretique to deliver in the saphene and the power of the generator for each segment of vein of 6 cm and who is calipage on the course anatomique informatize of the GVS. Après avoir défini la puissance, la vitesse de tir est ensuite calculée et enregistrée ce qui implique l’utilisation d’un moteur de tracion bien réglé pour obtenir une vitesse lineaire pendant l’intervention.

PP1.7-2
Ultrasound signals to control the closure process in real time in endovenous ablations
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LASER Intravenous ablations are now widely used in the treatment of varicose disease. Tumescent Local Anesthesia (TLA) which is mandatory in blood absorbed LASERs because provides good anesthesia, buffer to prevent damage in the surrounding tissues and direct contact between the fiber tip and the vein wall but has some inconveniences: Painful application, Pose operative bruising and difficult to see in real time the closure process. The introduction of water absorbed LASERs (1470, 1500) allows to perform this procedure without TLA. The authors presents US specific signals which appear immediately when the closure process is completed.

PP1.7-3
Endovenous laser ablation of incompetent saphenous veins. Inclusion criteria by preoperative duplex examination
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Several devices, wavelengths and techniques were proposed for endovenous laser ablation (ELA) of incompetent greater (GSV) and lesser saphenous veins. Our studies concerning the venous pathophysiologic changes after 808 nm wavelength laser, led us to better understand advantages, limits and indications for the procedure.

Methods. 73/412 limbs with GSV and incompetent saphenofemoral junction (SFJ), selected by duplex (C.E.A.P 2-6) were subjected to ELA by Diode 808 nm laser (Eufoton -Trieste, Italy) was employed with: 2-15 Watt, variable pull-back velocity 1-3 mm/sec (30-40 J/cm). 34 venous fragments were studied under light microscopy at: 5 min (29), 1 and 2 months (5). 44 cases were followed-up by duplex and clinical examination at 7 days, 1-2-6-12 months.

Results. In all limbs incompetence and dilated GSV segments of thigh (70) and leg (2) were detected. The best histological, duplex and clinical outcome was found in cases with venous segments <10 mm. A higher rate of uncompleted occlusion (15.9%) and complications such as GSV painful phlebitis (15,6%) in GSV >10 mm. Thrombus tendency to recanalization after 6 months was not related to GSV diameter (2 recurrences). No DVT, skin burns or neovascularization (thanks to small incisions) at the groin occurred.

Conclusion. The mechanism of action of ELA (808 nm) is represented by blood vaporization, thermal damage of the inner venous wall, followed by thrombosis, fibrosis and atrophy. The inclusion criteria and techniques for SFJ surgical interruption still remain the traditional ones except for the need of small incisions. Limbs affected with phlebitis, saphenous aneurysms, congenital venous malformations and deep venous insufficiency should be excluded. An echoguided preoperative cutaneous map of the dilated GSV segments is necessary in order to deliver the optimal amount of energy by variabale pull-back retraction in relation with the variable extension of the surface.

PP1.7-4
Auto-fill syringe for echoguided tumescent local anesthesia during endovenous laser procedure in the treatment of lower limbs varicose veins
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Surgical treatment is to be considered the most effective radical therapeutic treatment in presence of lower limbs varicose veins with valvular incompetence of the saphenous systems. This statement is daily confirmed after the introduction and the worldwide largest use of endovenous laser techniques. The aim of the anesthetic techniques is to eliminate pain to the patients undergoing endovascular as well as every other surgical procedures, and local anesthesia is the gold standard for most of them. Echoguided tumescent local anesthesia performed with a new auto-filling device represents the most updated method of choice in endovenous laser surgery for the treatment of lower limb varicose veins due to valvular incompetence of greater or lesser saphenous vein. The aim of this selective infiltration is to isolate the vein from surrounding tissues, particularly increasing the space between vein, skin and nerve, in order to avoid superficial and neurological thermal damage. The new refilling device is represented by a syringe provided, at the top, with a valvulated system connected both to the bottle containing the sterile anesthetic solution, by means of a long, flexible thin tube, and the needle: it will allow an easy and sterile syringe refilling for a fast, continuous mode tissues infiltration. Further advantage of the echoguided infiltration is represented by the use of an extremely diluted solution with lesser risks of side effects, but with the same anesthetic efficiency thanks to the possibility of verifying, through the echographic screen, the selective distribution of the solution around the vein.

PP1.7-5
Selective nerve block under ultrasound guidance to perform endovenous laser ablation
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Endovenous ablation using axial emission fibers and blood absorbed LASERs (810, 940, 980nm) under US control is established as a safe and effective option to treat Varicose Disease involving saphenous trunks. According with the International Endovenous Laser Working Group (IEWG) protocol, this technique should be done under Tumescent Local Anesthesia (TLA) which provides good anesthesia, direct contact between the fiber tip and the vein wall, and buffer to prevent damage in the surrounding tissues. Recently water absorbed LASERs was introduced as a new option in the phlebologic armoury. These devices compared with blood absorbed lasers are painless, use less amount of energy, and present less pain and bruising after the procedure. Concomitant, a new generation of fibers with radial emission was presented. One inconvenience of TLA is the difficulty to observe with US the closure process of the treated vein. General and spinal anesthesia have unacceptable risks to treat a benign disease such as Varicose Veins. To these reasons, we present our experience in Selective Nerve Block under Ultrasound Guidance discussing technical aspects, advantages and results.
The endoluminal laser ablation (ELA) has emerged as a new method of treatment of insufficiency of great saphenous vein. However, this is not a pain free procedure and requires realization of tumescent anesthesia. The purpose this study was to determine the safety and efficacy of ultrasound guided femoral nerve block in patients undergoing ELA of great saphenous vein. Two consecutive groups of 25 patients that underwent ambulatory ELA of GSV were studied. In the patients from group 1 tumescent anesthesia only was performed. In the group 2 prior to realization of tumescent anesthesia ultrasound guided femoral nerve block with 20 ml of 1% lidocaine was performed by the anesthesiologist. The pain during the realization of tumescent anesthesia and ELA was evaluated by the patients according to the 5-point scale. The heart rate and blood pressure were monitored. The postoperative stay in recovery area was recorded. The results were statistically analyzed.

Conclusion. A high proportion of patients undergoing ELA and phlebectomy still prefer GA, particularly if they are younger, having a bilateral procedure or are troubled by aching varicosities rather than ulceration. From direct questioning this reflects their desire to avoid peroperative discomfort and may also reflect a desire to achieve optimal cosmesis.

PP1.7.8

Maximum safe lidocaine dosage for tumescent anaesthesia without liposuction is 45 mg/kg
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Tumescent anesthesia (TA) consists of large volumes of very dilute lidocaine (<1mg/L) and epinephrine (<1mg/L) infiltrated subcutaneously. TA is safe and effective for endovenous laser ablation (ELVA) procedures. Current estimates of the maximum Safe Dosage (Dmax) of tumescent lidocaine are based on liposuction studies. Liposuction may reduce lidocaine bioavailability. An estimate of Dmax for ELVA should be based on non-liposuction patients. Lidocaine concentration = 6 mg/L is associated with mild toxicity.

Methods. This IRB-approved research involved 13 female volunteers, each of whom had 5 separate 24-hour studies, totaling 39 separate 24-hour studies. For each patient, the first two studies only involved tumescent infiltration. The third study liposuction was done one hour after TA infiltration. Infiltration of tumescent local anesthesia containing at lidocaine 700 mg/L to 1000 mg/L, epinephrine 0.5 mg/L to 1.0 mg/L, and sodium bicarb 10 mEq/L was assisted by peristaltic infiltration pump using blunt-tipped infiltration cannulas. Peak serum lidocaine concentrations (Cmax) was determined by taking serum samples at hours 0, 2, 4, 6, 8, 10, 12, 14, 16, 18 & 24 after infiltration. Lidocaine concentration was determined by HPLC.

Results. Liposuction significantly reduced the bioavailability of tumescent lidocaine. At a lidocaine dosage of 45 mg/kg, without liposuction the measurements of Cmax approximates normal distribution N (µ, σ2), where µ = 3.07, σ2 = 0.48, σ = 0.695 and the probability Pr (Cmax>6 mg/L) <0.0004 or 1 chance in 2500. There is a linear relationship between the mg/kg dosage of tumescent lidocaine and the Cmax. For 35 mg/kg, the Pr (Cmax>6 mg/L) <0.000004 or 1 chance in 2,500,000.

Conclusion. 45mg/kg is an appropriate estimate of the maximum safe dosage of tumescent lidocaine without liposuction, and the probability of lidocaine toxicity Pr (Cmax >6 mg/L) <0.0004 or less than 1 per 2500.
Endovenous laser treatment: a morphological study in an animal model

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Aim. The destruction induced during endovenous laser treatment (ELT) of the saphenous vein and the perforating tissue in an animal model (goats) was analysed. Differences in vein wall destruction produced by two laser types: the 980 nm and 1500 nm diode lasers were evaluated histologically.

Methods. In 14 goats, 28 lateral saphenous veins were treated with ELT. In 14 veins we used the 980 nm diode laser and in the remnant a 1500 nm laser. Postoperatively the veins were removed at different stages and sent for histological examination.

Results. Immediately removed veins after ELT show an uneven destruction of the vein wall. Veins harvested 1 week postoperatively show inflammatory tissue at their periphery. Two and three weeks postoperatively, organization is very extensive. In some cases a recanalization begins in a semilunar manner at the contralateral side of the laser hit. Ulcers in the veins treated with a 980 nm laser are deeper (1.05 mm versus 0.88mm) (p<0.001) but affect a smaller part of the circumference (19.72% versus 24.42%) (p=0.01). In the veins harvested one week postoperatively and later, we measured the part of the circumference where complete destruction was found and expressed it as a percentage of circumference of the vein wall. The depth was measured at the point of the direct contact. Again we find a significant difference comparing both wavelengths: in veins treated with a 980 nm laser the ulcers are much more penetrating (0.89mm versus 0.65mm) but the circumferential destruction is significant lower (33.4% versus 62.2%) (p<0.001).

Conclusion. ELT of veins produces an unevenly distributed damage. The cell necrosis is far more extensive than expected. Uneven vein wall destruction can lead to recanalization. Using a 1500 nm laser correlates with less penetrating ulcerations and more circumferential damage.

Clinical comparison of long pulse nd: yag laser versus foam sclerotherapy in the treatment of leg veins

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Treatment of leg veins is one of the most challenging fields in the area of aesthetic dermatologic procedures. There are many ways to treat same lesions. Sclerotherapy has been traditionally considered the gold standard treatment. The use of laser and other light sources has also been widely executed. More recently, foam injection sclerotherapy was classified as the new method to be followed. However many practitioners are mentioning more side effects and complications with this technique.

Aim. To compare the clinical efficacy and side effects of leg veins treatment with polidocanol foam sclerotherapy to 1064nm long pulse Nd: YAG laser.

Methods. A study has been carried out with 20 patient with size and type matched superficial leg veins randomly assigned to receive treatment with 1064nm long pulse Nd: YAG laser in one leg and with polidocanol foam sclerotherapy on the other. Comparison is made through before and after standardized digital photography two weeks after a single session and one month after a second session. The pictures are being evaluated by a masked physician and stratified in 4 progressive groups of clearance (0-25%; 26-50%; 51-75%; 76-100%).

Results. Preliminary data demonstrate that after a single session the clearance obtained with foam sclerotherapy is superior to laser. After a second session it tends to become similar. Skin hyperpigmentation is clearly a more often side effect with foam sclerotherapy. No major complications such as ulcers or embolic events were observed in both groups.

Conclusion. Both sclerotherapy and laser showed to be safe and effective in this study. But, because there are hypothetical risks of anaphylaxis, embolism and neurological symptoms when using foam, it's worth seeking for new methods or the association of techniques to avoid these complications.

Reflexions sur l’inclusion sociale par la mousse scléro- sante

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La maladie veineuse chronique est une maladie évolutive chronique qui atteint 20 à 30% de la population. Les ulcères des jambes touchent 1,5% de la population. Ils ne sont pas contrôlés par les traitements médicamenteux. Les résultats du traitement compressif sont fonction de l’observance du traitement qui est variable. L’exploration écho-doppler objective que le tronc saphène n’est pas toujours atteint, alors que dans de nombreux cas ce sont les collatérales qui le sont. Nous disposons actuellement de nombreuses techniques interventionnelles (ablations) pour traiter la maladie veineuse chronique: la phlébectomie, la crossectomie isolée, les valvuloplasties, et le stripping. Jusqu’à ces dernières années, toutes ces techniques étaient entre réalisées sous anesthésie générale ou péridurale et ceci excluait un certain nombre de malades du traitement interventionnel. Les patients exclus des systèmes de soins classiques présentent souvent les formes les plus sévères de l’Insuffisance Veineuse Chronique (stades: C4, C5 et C6). Ce sont généralement des patients pauvres et/ou âgés ou porteurs de graves dysplasies veineuses. L’échosclérothérapie guidée à la mousse a révolutionné notre pratique car presque tous les malades peuvent en bénéficier, même les patients très âgés ou qui présentent une pathologie associée sévère. L’échosclérothérapie guidée à la mousse est une méthode qui associe sécurité et efficacité. Cette méthode peut donner à un segment de la population abandonné, un espoir de guérison. Nos résultats sont corréllés avec ceux publiés dans la littérature internationale. Mots-clefs: Insuffisance veineuse superficielle, varices, sclérothérapie, ulcère.

Proposition of a mathematical model to calculate the efficacy of the sclerosing foam by analogy with the laser biological effect

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Since the development of the first Laser in the 1960s, many works have contributed to imitate a theory of the action of the delivery of highly energetic photons on biological media. A laser is defined by irradiance (I= P/S, Watt/cm²) and Fluence (I* time, Joules/cm²). The action on biological media is conditioned by the Beer-Lambert equation: 1(LX) = I0 (L) e - aXr The action of molecules, with a sclerosing effect on varicose veins walls, which purpose is to provide a disappearance of varicose veins, was mainly studied on a clinical basis according to a methodology failure/success. The similitude of some actions of the laser and the sclerosing foam bring us to propose an equivalence of Irradiance and Fluence – the signature of any Laser – by the sclerosing Efficiency and the sclerosing power respectively. We define a Sclerosing Efficacy: SE = Concentration/Surface (like Irradiance) and a Sclerosing Power = Con-
Foam physics is a well known topic of soft matter physics, but its application to producibly foam for life sciences obscure areas. A better comprehension of physical phenomena could be useful in order to enhance applied medical knowledge, facing the constant collateral effects reported in foam therapy of venous diseases.

Methods. In vitro experiments were performed with polidocanol and sodium-tetradecyl sulphate. An optical microscope, a Burkert chamber and a videocapillaroscope with/without polarised light were used to collect measures. Images were digitised and saved in common graphic format files. Ad hoc tailored C++ language programs were written to perform the digital analysis of gathered data.

Results. Foam structure in a free environment follows the general rules of the Weaire-Phelan model. In a completely drained liquid phase, foam constrained between two glasses shows a geometrical regularity. Visualisation variability instead depends on the observational method.

Discussion. Gathered data allow the formulation of a geometrical model of spatial bubble organisation in a constrained liquid phase.

Conclusion. These results are a first step of a wider research project.

AP1.7-5

In vitro effects of detergent sclerosants on antithrombotic mechanisms

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Aim. To investigate the in vitro effects of detergent sclerosants on antithrombotic pathways.

Methods. Proteins C, S and antithrombin (AT) were assayed in normal plasma spiked with increasing concentrations of sodium tetradecyl sulphate (STS) and polidocanol (POL). Activated protein C (APC) was investigated by mixing normal plasmas with sclerosants and testing with the activated partial thromboplastin time (APTT) and dilute Russell’s viper venom time in the presence and absence of APC. The effect on factor Xa (FXa), heparin and enoxaparin was investigated using chromogenic anti-FXa and APTT methods.

Results. High concentration (>0.6%) STS significantly destroyed protein C, S and AT whereas POL only caused mild reduction in AT and AT and a moderate (60%) reduction in PS levels. STS potentiated the anticoagulant effect of APC while POL increased APC resistance. STS mimicked AT and demonstrated significant anti-Xa and anti-Ha activity. STS demonstrated a similar anticoagulant profile to heparin but was 1000x weaker. It also significantly potentiated the anticoagulant effect of heparin while POL had less effect.

Conclusion. STS and POL demonstrated quite distinct and sometimes opposite effects on the antithrombotic mechanisms assayed. These effects were concentration-dependent and in general, STS had the greatest effect on antithrombotic proteins.

AP1.7-6

Effect of a 5 micron filter on CO2 sclerosant foam stability

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Recent research has suggested that sclerosant foam created with CO2 produces fewer side effects and complications than air based foam. However, CO2 foam tends to deteriorate more quickly in the syringe prior to injection, thus creating a barrier to its widespread acceptance. This study compares the syringe half-life of foam solutions composed of sodium tetradecyl sulphate (STS) 2% or polidocanol 2% mixed with CO2 and assesses the effect of utilizing a 5 micron syringe filter in CO2 foam production. 1 ml of liquid STS 2% or polidocanol 2% was mixed with 4 ml of CO2 using a 3 ml syringe and a 5 ml syringe connected by a 3-way stopcock. CO2 foam was also mixed using a 5 micron syringe filter interposed between syringe and stopcock. Foam half-life was determined by measuring how long it took for 0.5 ml of the original 1 ml of liquid sclerosant to reform in an upright syringe of foam. STS 2%+CO2 foam half-life was 32.6 seconds and polidocanol 2%+CO2 foam half-life was 42.6 seconds. (P=0.000). The foam half-life of STS 2%+CO2 foam filter increased to 74.8 seconds (P=0.000) and the half-life of polidocanol 2%+CO2 filter improved to 90 seconds (P=0.000). If trace air (about 0.3 ml) was carefully removed from the stopcock, CO2 foam half-life (no filter) deteriorated to 22.7 seconds (STS 2%) and to 50.1 seconds for polidocanol 2%. With a fine trace air removed, STS 2% foam half-life increased to 35.9 seconds (P=0.005) and polidocanol 2% foam half-life improved to 48.9 seconds (P=0.000). Foam stability is low when 2% STS or polidocanol is mixed with CO2. CO2 foam stability improves when it is produced using a 5 micron syringe filter even when small traces of air are removed. Polidocanol 2% appears to be more stable than STS 2% when mixed with CO2.
AP1.7-7

"Tessari method for foam sclerotherapy" (10 years of history of technology that changed the world of phlebology)
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In phlebology, in the last years varicose vein sclerotherapy has undergone radical developments and changes. In 1944 Orbach introduced the air-block method. In 1989 Knight and Vin proposed an ultrasound guided sclerotherapy method. In December 1997, in Paris, Cabrera showed the 5 years sclerotherapy results, using his micro-bubbles foam. Later on other authors (Montfreux, Garcia-Mingo, Benigni-Sadoun and Grondin) set up new methods more or less complicated for the sclerosing foam production, whose spreading is still limited so far. In December 1999, in Paris, Tessari presented the Tourbillon Method (Tessari- method); it was studied to satisfy the demand of a cost-effective and easy-to-use and cheap, which was able to maintain the typical features of sclerosing foams (adhesiveness, compactness, durability, echo visibility). Many clinical studies have validated this technique in recent 10 years in the field of varices sclerotherapy, sclerotherapy of the hemorrhoidal veins, sclerotherapy of varicose and pelvic congestion syndrome, oesophageal varicose veins sclerotherapy in their bleeding. In these last times, Tessari's sclerosing foam satisfied, in our experience, the typical features of sclerosing foam. Finally yet importantly, the recanalization of sclerosing vessels is not a failure of the therapy, in consideration of the easy repeatability of the ultrasound guided sclerotherapy. Now a new technical procedure (mixtures of gas) for the production of the Tessari's sclerotherapy foam is emerging: it consists in using a mixture of soluble and biocompatible gas (CO2 + O2) to make sclerotherapy foam instead of air. Such mixtures of gas allow a greater safety and favour the trans-endothelial liberation of these self maintaining and facilitating the homogeneous contact of the sclerosant with endothelium for more time. The best effectiveness of complex foams with CO2+ O2 is probably the capability of paring the blood from the foam itself completely.

AP1.7-8

Variables in foam sclerotherapy with Tessari method: experimental data
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Aim. to assess a few variables in foam sclerotherapy based on Tessari method.

Methods. an experimental study was performed by means of a pre-calibrated balance “Sartorius R200”, an electronic chronometer, an optical microscope and a dedicated computer software (Image PRO plus®). Sclerosant foam (SF) was formed with 3% Sodium Tetradecylsulfate (STS) or 3% Polidocanol (POL), together with room air or with CO2 and/or O2, different brands of syringes and different sizes of the needles were tested as well. A reproducibility test was also performed.

Results. density of Tessari SF was 0,16-0,20 g/l for STS foam and of 0,18-0,24 g/l for POL foam. Half life of SF was 150°-180° for STS SF and 180°-240° for POL SF. SF formed with room air at 60° had mean bubble radius of 35μ and 38μ for STS and POL respectively and at 10°-30° radius figures were about halved, CO2-based SF had smaller radius (STS SF having smaller bubbles and POL SF having longer duration); CO2+O2 based SF was more durable and had slightly larger bubbles than the CO2-based SF. The reproducibility test (20 subjects) showed no statistically significant difference in the resulting SF as to density, half-life and bubble size. SF passage through 27-30G needles altered the original SF (larger bubble size and lower SF duration), which was not the case for larger needles; 40-50% reduction of the hole area inside the three way-valve resulted in a slightly denser SF. A few low-silicone syringe brands produced much more durable and denser SF.

Conclusion. Tessari method has a good reproducibility; bubble size also depend upon the type of drug and gas which are used. SF duration and density permit a good manageability of the injections in the first 10°-60° after the SF formation. Low-silicone syringes and large needles are preferable to form and inject SF.

AP1.7-9

Recommendations on the endovascular treatment of varicose veins by echo-guided injections of sclerosing foam: the grenoble consensus of expert 2008 version
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For a long time, the basic treatment of saphenous varices has been surgical but the development of endovascular techniques in phlebological practice, particularly with the use of sclerosing foam has profoundly changed the situation. In the face of this radical change in practice, it seemed essential to elucidate recommendations defining the scientific and medico-legal background of this technique in response to the HAS (Haute Autorité de Santé = Higher Health Authority), AFSSPS (Agence Française de Sécurité Sanitaire des Produits de Santé = French Agency of Safety Security of Health Product), the CNAM (Caisse Nationale d’Assurance Maladie = National Fund for Health Insurance), The CNO (Conseil National de l’Ordre = General Medical Council), the patients associations, the insurance companies, etc. To colleagues wishing to learn this method, it provides a text of reference born of the cumulated experience of the authors and of up to date scientific facts. Furthermore, it will form the basis of Assessment of Professional Practice (APP). This guide of good practice is the result of a collective work of a group of vascular physicians experienced in phlebology, mostly members of the Foam Club which is thus its promoter. This consensus document has been formulated in accordance with the criteria used by the HAS. The different chapters deal with the training, the equipment, the manufacture of the foam, the indications/contra-indications, the echo-Doppler investigations, the injections, the follow-up, the safety precautions, the reports and the legal aspects, particularly concerning information and patient consent. The 2008 version is now available on the net.

AP1.7-10

The SOV concept: An easier safer method for abolition of Great Saphenous incompetence with echo guided sclerotherapy
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Echo-guided foam sclerotherapy is becoming the standard treatment for varicose veins. Foam is usually injected in the terminal part of the great saphenous vein (GSV) in order to obliterate the length of the GSV. The SOV (Save Our Veins) CONCEPT treats anatomical varicose (distended with major reflux) while saving functional varicose that potentially can return to normal function (normal aspect, reflux due to siphon effect under or excess of pressure above). The SOV CONCEPT is not a pre-defined strategy but adjusted to every configuration of varicose veins. The aim of this study is to evaluate the SOV concept (siphon effect part), a new strategy of treatment for varicose veins secondary to great saphenous incompetence using echo-guided foam sclerotherapy. In the SOV procedure the GSV is injected at the knee level which is easier and safer, which results in obliteration of the trunk, but leaving the terminal part of the GSV which becomes
compete by the suppression the siphon effect. Fifty patients were included. All patients had axil axil great saphenous reflux. All patients had echo-guided injected in the knee area with 1% foam and 6 weeks later clinical and duplex examination. The obliteration of the GSV trunk, the length and the return to competence of the upper part of the GSV indicated success of the treatment. All GSV trunks were occluded. Most of the sapheno-femoral junctions remained open but became competent. Echo-guided foam sclerotherapy is an effective and safe treatment. This study demonstrates that there is no need to inject the GSV in the upper thigh because usually the terminal part of the GSV will become competent when the siphon effect is abolished by occlusion of the distal trunk vein. The SOV concept strategy preserves competent tributary veins, reduces required foam volume while making the injection easier and safer.

AP1.7-11
Obliteration of varicose veins by hyperheated steam
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Endovenous thermal techniques have been in use for 10 years. Their efficiency is proven, but their cost is a limiting factor. Obliteration of bulging varicose veins and perforators is not easily obtained by existing techniques. Steam injection obviates these disadvantages.

Methods. Sterile waterpressurized at 600 Atlm. is pushed through a microtube of 0.1 inimmternal diameter heated by electrical current. Pulses of steam are emitted at 150°C. A stainless steel catheter of 1.2 mm is connected and introduced in the vein. Steam leaves the catheter at 120°C, each pulse delivers 45 J of energy into the vein. The vein is entered through a 16G infusion catheter and the steam cat pushed toward the junction under echo control. Tumescent anesthesia is given. The cat is slowly withdrawn, 2 pulses per centimeter are emitted into the vein.

Results. Animal studies on the ewe confirmed the safety of the technique with no modification of vital parameters, no lesion of adja-
cent tissues. Obliteration of the veins was achieved in all cases where 90 J/cm² were applied. Human studies began 2 years ago on 10 pa-
tients. No complication was seen, excepted a small skin burn due to the hot catheter being in contact with the unprotected skin of the leg, post-operative course was painless. All veins were obliterated at 2 years. Obliteration of tributaries and perforator veins was easily achieved even in large bulging veins of the leg. A multi center clinical study is being performed in France.

Conclusion. Steam obliteration offers the potential of an ‘all-in-one’ cheap technique for treating varicose veins.

GE1.7 - Compression treatment: Pressure measurements

GE1.7-1
Superiority of short-stretch bandages to improve venous pumping function
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Aim. To study the influence of elastic* and inelastic** bandages on the venous pumping function in patients with severe venous incompetence.

Methods. Ejection fraction as a very meaningful parameter characterizing venous pumping function was measured in 30 patients affected by severe venous reflux in the great saphenous vein (CEAP C2-C5) and in 15 healthy volunteers as a control. Long-stretch* and short-stretch** (cohesive) on top of a padding layer*** were used as models for elastic and inelastic bandages (multilayer, multi-component system). Both types of bandages were applied with different stretch in order to exert a comparable supine and standing pressure. The interface pressure was measured continuously during the test (Picopress®, b1-point). In a second series measurements were repeated after wearing the bandages for one week.

Results. Short stretch compression increases ejection fraction significantly more than elastic bandages being applied with the same resting pressure. If we apply elastic bandages with high stretch in order to achieve a standing pressure comparable with that of inelastic bandages, this is hardly tolerated and induces only a minimal increase of the ejection fraction. The improvement of ejection fraction correlates significantly with the working pressure and with the pressure amplitudes during exercise. These pressure amplitudes characterize the so-called massaging effect of a bandage. After wearing bandages for one week it could be demonstrated that hemodynamic effects were still maintained.

Conclusion. Short stretch bandages applied with a pressure of more than 60 mm Hg in the standing position improve venous pumping function up to one week.

GE1.7-2
Superposition of two light stockings. Measurement of interface pressure and stiffness in vivo and in vitro
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Superposition of two compression stockings has been recommended in order to facilitate donning and to improve compliance. Reports on the resulting consequences concerning interface pressure and stiffness are sparse.

Aim. To compare pressure and stiffness of two light compression stockings (class I) applied over each other with a class III stocking, both by in vivo- and in vitro measurements.

Methods. In 12 healthy volunteers interface pressure and stiffness of the following stockings and stocking-combinations were assessed at different points of the leg using in vivo measurements (Picopress®, MST tester®) and textile laboratory tests (wooden leg model, HOSY®, MST-Professional®): A) class I, B) class I silver, C) class III, D) A+B, E) B+D, F) A+B. Stiffness as defined by the pressure increase achieved by an increase of the leg circumference of 1 cm was measured using the new MST-Professional® and compared with the static stiffness index assessed by in vivo measurements.

Results. The highest values of interface-pressure and of stiffness were found in group E), both by in vivo and by in vitro measurements. The pressure in group E) measured in vivo at B1 was significantly higher than in group C) (p<0.01). Friction between the stocking layers increases stiffness depending on the gliding property of their surfaces.

Conclusion. Two class I stockings applied on top of each other reveal higher interface pressure and stiffness than one class III stocking (F+B+D). This result has practical importance when stronger compression stockings are indicated in patients who have difficulties to put them on.

GE1.7-3
Superimposition of MCS in vivo: interface pressure and stiffness index measurements
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In vitro, the pressure and stiffness of 2 superimposed stockings are the sum of each stocking measured separately. (1)
Aim. To compare the pressure in vitro given by the company to the interface pressure and stiffness index of MCS used separately or superimposed on different healthy legs.

Methods. MCS of 10-15 mmHg and 15-20 mmHg made in cotton (Venoflex City - Thûsson) have been used. Interface pressures were measured at the reference point B1 with a small Kikuhime® probe in 3 different positions: lying at rest, and during muscular contractions then in standing position. The Static Stiffness Index (2) was computed (difference of pressure between standing and lying position) and the Dorsi Flexion Stiffness Index (difference of pressure in lying position between rest and contraction).

Results. 810 pressure measurements have been performed on 3 healthy subjects, with a variation coefficient less than 2.5%. It was found that, in vivo the resulting pressure is lower (~11%) than the sum of the pressures of each stocking put separately. The result is the same for the stiffness index (~15%).

Conclusion. The pressure in vitro for all MCS was between the resting and the working interface pressure of the real leg. The interface pressure and the stiffness index of superimposed stockings is a little bit lower than the addition of the stockings taken separately.

References

GE1.7-5
Which is the minimal compression pressure to improve venous pumping function in patients with venous insufficiency?
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Too high resting pressure of compression devices may be poorly tolerated and even cause skin defects, especially in patients with comitant arterial occlusive disease.

Aim. To define a minimal pressure range for compression devices, which will improve venous pumping function in patients with venous incompetence.

Methods. Venous pumping function was assessed in 20 patients with severe reflux in the great saphenous vein by measuring ejection fraction using strain-gauge plethysmography. Measurements were repeated after application of knee-high medical compression stockings and of inelastic bandages wrapped on with a pressure of 20, 40 and 60 mm Hg in the supine position.

Results. Ejection fraction was significantly reduced compared to healthy controls. Compression stockings exerting a median pressure of 27 mm Hg (IQR 25-29) in the supine and 30,5 mm Hg (IQR 28,25-34,25) in the standing position showed a moderate, non-significant improvement of ejection fraction by 17%. Inelastic bandages applied with a resting pressure of 20,5 mm Hg (IQR 20-22) in the supine position resulting in a standing pressure of 36 mm Hg (IQR 35-40,75) led to a significant increase of ejection fraction by 61,5%/ (p<0,01). A further increase of the resting pressure to 40 mm Hg and 60 mm Hg achieved an increase of the ejection fraction by 92% and by 98% respectively (p<0,001).

Conclusion. In patients with chronic venous insufficiency inelastic bandages exerting a low resting pressure of 20 mm Hg in the supine position lead to a significant improvement of the venous pumping function.

GE1.7-4
Interface pressure of three different multi-layer bandage systems in healthy volunteers; results of a prospective randomized clinical study
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Aim. To compare the evolution of the interface pressure in different positions, namely supine, sitting, active standing and the working pressure during exercise, over a 7 days period, between three compression systems: a four-layer and a cohesive short stretch two-layer bandage (known 4LB and SSB respectively) compared to an innovative two-layer one (2LB, KTtwo).

Methods. 24 volunteers were bandaged with one of the three compression systems on both legs. The interface pressures were measured at inclusion, after at Day 1, Day 3 and at Day 7 by the ELCAT air sensor system (placed in position B1 above the inner ankle). Volumes of the legs were also analysed (measurements were taken before and after the trial period with the Bauerfeind Image 3D system).

Results. The performance (based on the loss of interface pressure compared to baseline) of the 2LB are partially better than the SSB regarding the maximal working pressure and the loss of volume. Otherwise both systems, 2LB and SSB, are equivalent if considering interface pressures in supine, sitting and active standing position. No difference was observed between the 2LB and the 4LB for the maximal working pressure. However a better effect of 2LB against the two other bandage systems was noted when considering parameters of comfort (25% of the patients treated with the 4LB discontinued the treatment after 3 days with the 4LB in place, because of pain).

Conclusion. This new two-layer bandage system KTtwo demonstrated that after one week it maintained a level of sub-bandage pressures similar to a known 4LB and partially better than a SSB, with a better comfort profile versus the two other compression system therapy.

GE1.7-6
Hemodynamic effects of medical compression stockings in varicose veins
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Aim. As far as we know there is no study measuring flux, reflux and venous diameter under different pressures of Medical Compression Stockings (MCS) in varicose veins. The aim of our observation is to study the venous effects of below-knee MCS of different pressure by Duplex.

Methods. A clinical and duplex assessment of the Great Saphenous varicose vein is performed at the joint of the upper and middle thirds of the thigh - In order to create a flow followed by a reflux a squeezing-releasing maneuver of upper third of the calf is done - An 'initial' report is obtained with diameter, flux's amplitude and reflux's amplitude-duration - During the initial run no MCS is put on - Then these measurements are repeated with one then two and three bk-MCS, one upon the other in order to obtain more pressure [1].

Results. A reduction of amplitudes and durations of the flux and reflux during these handlings have been observed. Without any MCS the reflux amplitude was 55cm/s; with one 35mmHg MCS the reflux amplitude got down to 35cm/s, with two 35mmHg it got down to 15cm/s and with three 35mmHg MCS (+/-100mmHg) neither flux nor reflux was detectable.

Discussion. It is shown that the curves of flux and reflux decrease and even disappear depending on the MCS pressures.

Conclusion. We could imagine to delay the evolution of the varicose veins disease by using MCS.
The influence of different interface pressure values on venous leg ulcers healing when treated with compression therapy

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Compression therapy is the most widely used treatment for venous leg ulcers (VLUs). It has been suggested that interface pressure of 40-50mmHg provides best treatment results.

Methods. An open, randomized, prospective, single-center study was performed in order to determine healing rates of VLUs when treated with different compression systems and different interface pressures. 151 patients (72 women, 59 men; mean age 65±9 years) with VLUs were randomized into 3 groups: Group A) 42 patients treated using a heelless open-toed elastic class III compression device (Tubulcus® Laboratoires Innothera, Arcueil, France); Group B) 46 patients treated with multi-layer bandaging system comprised of (Tubulcus®) and one elastic long stretch bandage (15cm wide and 5m long, Niva, Novi Sad, Serbia), and Group C) 43 patients treated with multi-layer bandaging system comprised of (Tubulcus®) and two elastic bandages.

Results. IP was measured under the three different compression systems at four different sites on the lower leg and with the patient in different body positions. The median resting values in the supine and standing position were as follows: Group A-36.2mmHg and 43.1mmHg; Group B-51.9mmHg and 59.9mmHg; Group C–61.3mmHg and 69.9mmHg. The healing rate during the 26 weeks treatment period was 25% (13/42) in group A, 67.4% (31/46) in group B, and 74.4% (32/43) in group C. The success of compression treatment in group A was strongly associated with the small ulcer surface (<5cm²) and small calf circumference (<35cm). On the other hand, repeated donning and doffing caused no significant change. A continuous distal-to-proximal descending pressure gradient was found in 66% of MCS.

Conclusion. Resting pressure exerted on the lower leg by this MCS was in line with the expected ankle interface pressure and the distal-to-proximal pressure gradient along the lower leg in 62% of cases.

GE1.7-9
Is the pression of compressotherapy after a deep venous thrombosis influence the importance of the post-thrombotic syndrome?

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Compression with stocking or by hand makes integral part of the treatment of the deep venous thrombosis (DVT). Except an anticoagulation treatment which has an immediate interest to avoid the extension of the clot, it is necessary to facilitate a premature repermeabilisation and to avoid as much as possible the post-thrombotic syndrome, characterized by a reflux, and in more or less long term the appearance of skin changes, ulcer, hypodermitis. Different studies had shown the interest of compression therapy, but we don’t know the influence of the strength to avoid post thrombotic syndrome.

Aim. We wanted to know if the strength of compression used prematurely during a deep venous thrombosis could have an incidence either not on the appearance and / or on the importance of the post-thrombotic syndrome.

Methods. we follow-up 30 patients who had a DVT treated by anticoagulation, three different strengths of compression (class 2, class3 and class 4). All patients had a femoral or a popliteal thrombosis. We control after 1, 3 and 5 years with duplex scan and photopleysmography.

Results. after one year, there is no significant difference between the various classes of compression. After three years, there is a difference, the post-thrombotic syndrome is more important with class 2 than class 3 and more with class 3 than class 4. After 5 years the post-thrombotic syndrome is always more present for the class 2, but the profits is identical between the class 3 and the class 4.

Conclusion. there is no doubt on the interest of the compression in the prevention of the post-thrombotic syndrome. On the other hand, while in France we use most frequently a class 2 compression, it seems more useful to prefer a class 3 compression which decreases the frequency and the importance of the post-thrombotic syndrome.
clinicians. However, they may be difficult to put on, uncomfortable and cause complications.

**Aim.** This study aimed to evaluate patient compliance and complications with the use of compression hosiery for chronic venous disease.

**Methods.** Pubmed, Cinahl, Embase, Cochrane and Medline were searched using the terms 'compression stockings', 'compression hosiery' and 'elastic stockings' to identify prospective clinical studies of patients with chronic venous disease (C2-C5). Studies of thrombophrophylaxis and acute deep vein thrombosis were excluded. Articles were reviewed to identify compliance rates with compression therapy and associated complications.

**Results.** 1562 abstracts were reviewed and 25 clinical studies (5048 patients) were included. This included 12 randomised clinical trials and 13 prospective observational studies with follow-up of 1-60 months. In 6 studies, compliance was not assessed and in a further 2, it was expressed as an undefined percentage. In the remaining 17 reports, good compliance with compression stockings was achieved in 2190/4548 (48.1%) patients. Only 6 studies assessed reasons for non-compliance. Discomfort, difficulty putting the stockings on and lack of perceived benefit were commonly cited. The methods for assessing compliance were direct questioning by clinical staff (14/17 studies), diary books (2/17) and detailed compliance interview (1/17). Good compliance with stockings applying an ankle pressure of less than or equal to 25 mmHg was reported in 344/416 (82.7%) compared to 507/690 (73.4%) in those greater than 25 mmHg (p=0.0004, Chi-Square test). Complications of compression stockings were not mentioned in 2190/4548 (48.1%) patients. In the remaining 17 studies, complications of compression stockings were reported in 56/416 (13.5%) patients.

**Discussion.** MRI shows narrowing of leg veins by compression depending on exerted pressure and body position

**Aim.** to investigate the influence of different compression devices on the cross sectional area of leg and thigh veins in different body positions.

**Methods.** The lower extremities of 10 patients with CEAP C2-C5 were scanned by MRI in different body positions: supine, prone and standing without and with different compression devices: compression stockings, inelastic bandages, wedge shaped eccentric compression device to compress the great saphenous vein (GSV) on the thigh. The exerted pressure was recorded.

**Results.** In the supine position the cross section of superficial and deep veins can be reduced by light compression stockings (pressure of 6 mm Hg at thigh level). In prone position light compression leads to a more pronounced effect in the deep compared to the superficial leg veins. In the standing position only strong inelastic bandages exerting very high pressure (80 mm Hg) lead to a nearly total occlusion of leg veins. Muscle sinus easily collapse under lower external pressure more than superficial and deep axial veins. Eccentric devices do compress the GSV even at the sapheno-phenoral junction. In the standing position, fixed with crosswise applied tapes and a thigh length compression stocking they exert a pressure around 60 mm Hg.

**Discussion.** A reduction of venous diameters is necessary for the hemodynamic efficacy of compression therapy in thrombophrophylaxis, improvement of venous pumping function, reduction of venous reflux. For the experiments elastic and inelastic material was intentionally applied with high stretch in order to obtain a very high standing pressure. Such high and effective pressure is tolerated only with short stretch material because elastic material keeps the high pressure also during rest while inelastic material shows an immediate pressure reduction.

**Conclusion.** MRI scans clearly show compression of leg and thigh veins in the lying and standing position depending on the sub-bandage pressure used.

**GE1.7-12**

**Observational study of the venous disease evolution during pregnancy with or without class 2 compression stockings**

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The worsening of venous disease during pregnancy is well known but has practically never been statistically described nor the effect of a class 2 compression stocking on its evolution.

**Aim.** to describe the evolution of the venous disease in pregnant women wearing or not class 2 compression stockings.

**Methods.** observational study conducted in pregnant women between 4 and 28 weeks of amenorrhoea presenting a CAF C0 to C5 venous disease. Class 2 compression stockings (BSN medical Radiante-Jobst 20 mmHg) were proposed to them and those who accepted as those who refused them were follow-up till the end of the pregnancy. Functional symptoms and oedema were evaluated at the beginning of their pregnancy and at the end.

**Results.** In women not wearing class 2 compression stockings, venous disease is significantly worsened with an increase of the frequency of heaviness from 60,9% à 70,6%, of pain from 21,7% à 41,2% and of oedema from 2,3% à 12,2% while pain on visual analogic scale was rising from 46,1 à 53,7 (p<0,05) and discomfort from 18,9 à 30,4. In women wearing compression, we observed a stabilization or a reduction of the frequency of heaviness from 73,9% à 75,5%, of pain from 56,9% à 46,1% and of oedema from 14,9% à 9,6% while pain on visual analogic scale was decreasing from 58,4 à 52,1 and discomfort stay stable from 30,9 à 32,1.

**Conclusion.** These results confirm the worsening of the venous status of the women during pregnancy and show the interest of wearing a class 2 compression stockings during pregnancy to stabilize or even to improve their venous status.

**AP1.10 - Max Ratschow medal session (Collegium Internationalis Angiologiei)**

**AP1.10-1**

**Pelvic venous disorders: the desperate plea of women with the nutcracker syndrome**

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Disorders of the Pelvic Venous circulation produce disabling symptoms that constitute a challenge for the physician and a nightmare for the patient. Chronic pelvic pain in the left flank and gluteal areas,
dyspareunia, dysuria, dysmenorrhoea and often hematuria are the result of hemodynamic derangement of the renal, and pelvic venous circulation. We describe the diagnosis and treatment options in 21 patients studied in our institutions.

Methods. We studied a group of 67 female patients with symptoms of pelvic venous congestion. Among them were 21 with left-sided flank pain, hematuria and dyspareunia, Mesoaoetric left renal vein compression was clinically suspected and confirmed by CT scan, duplex ultrasound and retrograde video-angiography with renocaval gradient determination. Normal gradient is 0-3 mmHg. All patients had gradient >5 mmHg (range 4 to 15 mmHg). Left renal vein compression relief was achieved by external goretex stents in 2 patients, internal stents in 7, gonado-caval bypass in 4, reno-cava reimplantation in 2, left gonadal coil embolization in 3 and observation for 3 patients. Mean follow-up was 1-9 years.

Results. Renocaval gradient was normalized in all stented patients resulting in marked improvement of symptoms in 90%. Hematuria disappeared in all patients. Gonadiocaval bypass resulted in residual 3 mm gradient total of 12 patients and no gradient in 2. Renal vein internal stents normalized the gradient in all and produced complete relief of symptoms in 4 and moderate improvement in 3. Renal vein reimplantation resulted in complete alleviation of symptoms. Gonadal coil embolization resulted in symptom relief in 2 out of 3 patients.

Conclusion. Clinically suspected nutcracker syndrome must be thoroughly investigated particularly if pelvic congestion symptoms are accompanied by hematuria. CT scan and retrograde phlebography are best diagnostic tools. Laparoscopic and endovascular techniques are effective in the management of the syndrome in the majority of patients.

PP1.11 - Endovenous procedures 2: Comparative studies

PP1.11-1
Clinical comparison of radiofrequency ablation (RFA) versus endovenous laser ablation (EVLA) in great saphenous vein insufficiency treatment

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Endovenous treatment of saphenous veins is well supported by previous studies with either EVLA or RFA. For several years EVLA with different wavelength (810nm, 980nm, 164nm, 1320nm and more recently 1470nm) was more accepted by phlebologists compared to RFA. A new RFA catheter (Venus ClosureFast) promises to control better the temperature damages in surrounding tissues, no need for tumescent anestheisa and a quicker procedure with same efficacy and more patient comfort.

Aim. To compare clinical efficacy and side effects of treating GSV insufficiency with EVLA and RFA.

Methods. A total of 24 limbs with GSV insufficiency are being randomly assigned to receive treatment with RFA or EVLA from the groin to the lower point of insufficiency detected by Dupplex Scan. The laser was used with an 810nm Diodo with standard tumescent anesthesia. For the RFA procedure a ClosureFast catheter was used with no tumescent anesthesia. Symptoms improvement, varicose veins resolution or recurrence in the legs, leg swelling, pros-procedure hypooesthesia, skin hyperpigmentation and patient satisfaction is being assessed after one week of treatment.

Results. At this point, 14 limbs were treated; 8 with EVLA and 6 with RFA. We did not observed difference between the two treatments in concerning to symptoms improvement, varicose veins resolution or recurrence in the legs and leg swelling. Patient satisfaction appears to be slightly better in RFA group, mainly because of less bruising and temporary hypoesthesia. Final results with total number of limbs treated are expected.

Conclusion. EVLA and RFA are both effective and safe. The new RFA catheter (ClosureFast) is a promising technique to be added to the phlebologists' treatment options.

PP1.11-2
980nm laser vs. radiofrequency for endothermal venous ablation of the GSV: are the recovery results similar?

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Aim. The purpose of this randomized, prospective, single center pilot study was to compare the new covered-tip laser fiber to the radiofrequency catheter to determine if there was a difference in treatment outcomes for endovenous thermal ablation of the GSV.

Methods. 90 patients (54 limbs) were retrospectively reviewed for ablation of the GSV, pain and bruising in the recovery period. 20
limbs were treated with 980nm endovenous laser and 34 patients were treated with radiofrequency. The same surgeon performed all procedures. Patients were monitored within 72 hours to one week after the procedure with a duplex ultrasound and a postoperative visit to the physician at 1 week. Patients were required to fill out an analogue pain score for the first seven days (scored by patients on a 10-point analogue pain scale) and have a digital picture of the thigh taken at the postoperative visit. Digital pictures were used to analyze the degree of ecchymosis on a 5-point graded scale. Analysis and de-identification of the bruising score was performed by a nurse who was blinded to the device used.

Results. The 49 patients: laser -20 patients (18 female and 2 male; average age, 54.1); radiofrequency- 30 patients (22 female and 8 male; average age: 58) completed treatment and follow-up examination. There was no statistical significance for efficacy, analogue pain or bruising scores.

Conclusion. Both the cover-tip fiber and radiofrequency electrode were effective in treating GSV insufficiency. Comparing recovery sur-rogate markers, closure rates, pain and bruising, there is no difference in outcomes. A multicenter, prospective, randomized study is planned to further evaluate these initial findings and to look at venous severity scores and quality of life changes.

Closed GSV Laser (100%) Radiofrequency (100%)
Bruising score Laser (1.0) Radiofrequency (1.0)
Pain Laser (0.96) Radiofrequency (0.96)

PP1.11-4
Prospective randomized trial comparing endovenous laser ablation and surgery for treatment of primary great saphenous varicose veins - 2 years follow-up
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Endovenous laser therapy (EVL) for ablation of the great saphene-ous vein (GSV) is thought to minimize postoperative morbidity com-pared with high ligation and stripping (HL/S). Only a few randomized trials have reported early results. This prospective randomized trial compares EVLT (980nm) and HL/S results 1 and 2 years following the intervention.

Methods. Patients with symptomatic varicose veins due to GSV insufficiency were randomized to either HL/S (100 limbs) or EVLT (104 limbs). Four EVLT failed and were excluded. Phlebectomy and ligature of incompetent perforators were performed whenever indicated. Patients were examined by clinical examination and Duplex ultrasound scanning preoperatively, at 12 days, 1 year and 2 years postoperatively. Complication rate, length of sick leave, AVSS, VCSS and Medical outcome study SF-36 scores were recorded.

Results. There was no difference regarding patient demograph-ics, CEAP-class, Widmer class or severity scores between the groups. Simultaneous interventions did not differ between the groups and sick leave time and postoperative pain was reported the same. No major post-treatment complications were recorded. HL/S induced significantly more postoperative hematomas than EVLT, while EVLT patients reported more bruising. Follow-up at 1 year was 100 and 99% respectively (HL/S and EVLT). There were 2 EVLT-GSV reopened and 3 partially reopen. HL/S revealed open GSV. Ninety-eight per cent of the limbs in both groups were symptom-free. VCSS, AVVSS and SF-36 did not reveal any group differences. At 2 years preliminary results on 83 and 71 limbs respectively (HL/S and EVLT) showed one more EVLT-GSV that was found partially opened.

Conclusion. Abolition of GSV reflux and improvement in quality of life was similar following HL/S and EVLT. Two great saphenous veins were found completely reopen and 4 partially reopened following EVLT at 2 years, which was significantly more than following HL/S.

PP1.11-5
Comparison of radiofrequency and laser treatment in saphenous veins
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Aim. Endovenous radiofrequency (RF) and Laser (L) seem to be competing in the treatment of saphenous veins. However, the meth-ods are technically different and not any diseased vein will be eligi-ble. We performed a study comparing both modalities.

Methods. 150 consecutive cases (1-2/08, f: 95, m: 55, 26-81 yrs., vein diameter 4.8-21.5 mm), were randomized to RF (Celon 18 W) and L (810 nm, 10-20 W, 50-200 J/cm). While the RF system consists of a flexible probe, introduced via F5 sheath, the laser energy was applied via 600 my fiber using a over-a-ter-wire technique for catheter positioning. All patients received a coaxial periveneous tumescence anaesthesia (CPTA) according to angioclinic®-standards, postinterventional excentric compression for at least 3 days and follow-up examinations including ultrasound after treatment, one week, eight weeks and 2, 6 and 12 months.

Results. The intended procedure was feasible in 64/75 cases of RF and 75/75 of laser. Technical interruptions of procedures oc-curred in X/75 of RF and 0/75 of laser. Mean application time (punc-ture to termination) was 18.8 min. (RF) versus 14.7 min. (L). The primary success rate (elimination of reflux) was 98% in RF and 75/75 (100%) of laser procedures. No patient had major postinterventional complaints. There was one major complication (fever, followed by wound hematoma) in RF due to termination) was 18.8 min. (RF) versus 14.7 min. (L). The primary success rate (elimination of reflux) was 98% in RF and 75/75 (100%) of laser procedures. No patient had major postinterventional complaints. There was one major complication (fever, followed by wound hematoma) in RF and another (fever with pulmonary embolism) after RF. During 12 months follow-up, recanalization was present in 6/75 cases of RF and 1/75 cases of laser.

Conclusion. The Celon RF system seems to be easy to use for investigators with surgical background because of its probe-like prop-erties, and it is rather safe and effective. However, it seems to perform below the safety and power of even older laser systems. All results depend greatly on the proper use of ultrasound – guided CPTA.

PP1.11-6
Randomized clinical trial of endovenous laser ablation (980 nm) versus high ligation combined with stripping of the great saphenous vein with tumescence anaesthesia
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Aim. To study the short and long term effects (10 year) of endovenous laser ablation (EVLA) versus high ligation combined with stripping (stripping) of the great saphenous vein (GSV) using local anaesthesia regarding clinical outcome, Quality of Life-assessment, recurrent varicosities and neovascularisation. Midterm analyses show the following results.

Methods. One-hundred and twenty patients were included and 131 legs randomized in the study from June 2007 till 20 January 2009: Patients scored pain (VAS), mobility, daily activities and daily living. Duplex scanning was performed each visit. CEAP classifica-tion was determined every year. Complications were followed and analyzed.

Results. Stripping was performed in 69 legs and 62 legs were treated with EVLA. Both groups were homogenous for age, sex and BMI and CEAP (range C2-C5). All procedures were completed successfully. A higher significant post-operative pain score (VAS) in the EVLA group was seen after one and two weeks (p<0.05). After one week there was an impediment in daily activities (p=0.007), mobility (p=0.000) and self-care (p=0.053) in the EVLA group. Cos-metic results as judged by the patients (VAS) were significantly...
improved and similar in both groups after six months (p<0.05). Duplex showed complete recanalisation and renewed reflux of the GSV in one patient treated with EVLA. In both groups two patients had reflux in the groin of a side-branch originating from the femoral vein. Two patients had a post-operative bleeding after stripping. After one year CEAP improved evidently and equally for both groups.

**Discussion.** EVLA or stripping can be done safely under tumescent anaesthesia. In the second post operative week EVLA is significantly more painful and shows an impediment of daily activities, mobility and self-care compared with stripping. Only one real recurrence was observed in the EVLA group. All recurrences were seen before 6 months and there were no new cases after one year.

**PP1.11-8**

**Bipolar radiofrequency obliteration of varicose veins compared to endovenous laser treatment: a prospective study emphasizing on occlusion rates, side-effects and stability of the resulting stump**

Radiofrequency obliteration (RFO) and endovenous laser treatment (EVLT) are leading techniques in endoluminal varicose treatment. A new RFO technique was presented in 2007 using a bipolar electrode catheter (bRFO, Celon method). Comparative studies of bRFO and EVLT have not been reported so far.

**Aim.** To compare bRFO with EVLT emphasizing on occlusion rates, side-effects and stability of resulting stumps as stump length is considered to be a risk factor for recurrent varicosis after stripping.

**Methods.** A prospective study was performed to assess safety and efficacy of bRFO compared to EVLT (810nm) 120 patients with incompetent GSV or SV were treated with bRFO or EVLT using tumescent anaesthesia. bRFO catheter and Laser fiber tip were positioned 1 - 1.5 cm beyond sapheno-femoral/-popliteal junction. Follow-up at day 1 and 7 and month 3 and 12 assessed occlusion rates and side-effects, measuring stump length with duplex ultrasound, and performing light reflexion rheography (LRR).

**Results.** Patients’ groups were well balanced due to age, sex, BMI, C-classification, LRR and proximal GSV / SV diameter. At 1-year follow-up occlusion rates of bRFO and EVLT were equal (95.5% vs. 97%) although significantly less energy had been applied by bRFO (LEED: 27.9 vs. 42.6 J/cm). Functional outcome by LRR did not differ significantly (28.7 vs. 31.5 s). Side-effects as dyspigmentation (1.5% vs. 3%) were even, but patients treated with EVLT suffered more pain in the first week (0% vs. 16%). In contrast dysesthesies were more frequent in bRFO population (SV:6% vs. 0%). Residual stumps were stable (12.5 vs 14.3 mm) after 12 months without significant differences.

**Conclusion.** After one year bRFO is as effective and save as EVLT in treating varicosis of GSV and SV in tumescent anaesthesia. Even less pain is induced by treatment with bRFO. Both methods deliver stable residual stumps. Conflict of interest: none.

**GE1.11 - Venous anatomy and epidemiology**

**GE1.11-1**

Brief historical excursus on the discovery of the blood circulation

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In this article we will briefly summarize the discoveries of anatomy and physiology at the historical ‘Studium’ in Padua. In this University founded in 1222 men like Galileo, Alexander Benedetti, Pietro d’Abano, Realdo Colombo, Andrew Vesalio, Fabrizio d’Acripendente, Falloppio and Morgani held lessons and famous physicians such as Harvey graduated here. Each of them wrote important pages on the scientific method and on the circulation of the blood. They described the role of aristotelismo, of the attempt to reconcile philosophy and astrology with medicine, of the birth of the modern scientific method based on observation, experience and reproducibility of the experimental results.
ment up to the discovery of the circulation of the blood considered a real revolution in the field of thought. All this thanks to the anatomical discoveries of the sixteenth-century, passing through the anatomical thought of the Sixteenth Century up to the experimental physiology and to the pathology of the Seventeenth Century to come to the clinical diagnosis of the Eighteenth Century. In conclusion it must be underlined that the actual knowledge of the anatomy and the physiology of the blood circulation which appears to us as something given for granted, is the result of many centuries of discussion and research where the role of the libertas cogitandi at the Studium, in Padua but also of other universities has been fundamental.

GE1.11-2

The thigh extension – From Giacomini’s observation to clinical anatomy of the present

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In 1873 Giacomini described a connection between the small saphenous vein (SSV) and the great saphenous vein (GSV). The incidences of both the thigh extenson (TE) and especially the Giacomini variant (GV) given in literature differ formidably. Additionally, it is unclear in which direction the blood in TEs flows. During the dissection course in winter 2008 at Innsbruck Medical University we investigated macroscopically 64 healthy veins from 35 bodies. Due to varices (2), inadvertently dissection (2), surgery (1) and a totally doubled SSV (1) six legs could not be documented. In 96.88% (62/64) cases a TE was present. From those TEs, 61.29% (38/62) presented as GV opening into the GSV; 66.15% (41) had a connection to the perforating veins of the deep femoral system. 20.77% (13) ended subcutaneously. 3.25% (2) communicated with the inferior gluteal system and in 8.00% (5) the type of ending was uncertain. Only two TEs could be opened from which one contained no valves and the other one had two valves directing the blood flow proximally away from the saphenopopliteal junction (SPJ). According to the UIP-criteria, the SPJ was classified as Type A in 42% of cases, in 20% as type B and in 23% as type C. Additionally, in 13% a venous web was found at the popliteal fossa and in 2% a doubled SPJ. We now have a good overview about the different types of SPJs and the incidence of the TE and their different types of communications. Hence, our data supports the hypothesis that the SPJ should not meant to be the ending of the SSV. Considering the high incidence of GVs, the embryological development of the SSV should be reconsidered. Again, keeping our data in mind, reflux as primary cause of varicose degeneration must be doubted.

GE1.11-3

The ostial valve of the great saphenous vein

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Venous valves have been classified into parietal and ostial valves. Most of the literature deals with the parietal valves (PVs), which are situated within the lumen of the veins, whereas ostial valves (OVs) are situated directly at the confluence of two veins. OVs occur less frequently, and they consist usually of a single fold, sometimes of two folds. Within the common femoral vein (CFV), the most prominent PVs are the suprasaphenous and infrasaphenous valve, within the great saphenous vein (GSV) these are the terminal and preterminal valve. Especially in French literature, the terminal valve is called ‘valvule ostiale’. While PVs were well studied, there is almost no literature on the OVs, especially on the OV of the GSV. Ninety-eight isolated specimens consisting of the CFV and the attached tributary veins including the GSV, were investigated for the presence of OVs. All specimens derived from bodies bequested by informed consent to our Division. From these 98 specimens five possessed an OV consisting of a single fold (5.1%), six had an OV with two folds (6.1%); additional ten specimens showed remnants of an OV (10.2%). An OV directs the blood-stream form the tributary into the main veins; a large one, if flattened over the orifice, would prevent regurgitation into the tributary, but it would act in exactly the opposite way if at the moment its free border extended out into the main stream. The distinction between PVs and OVs is not always clear in literature, and in consequence misinterpretation may occur. Very often the terminal valve of the GSV, a PV, is called ‘ostial valve’. We therefore suggest adding the term ‘ostial valve’ with a proper description to the UIP-consensus-documents. Furthermore, OVs can also be identified in sonography, sometimes mimicking a TV situated immediately at the orifice. Thus, misinterpretation of findings may occur.

GE1.11-4

Anatomic causes of the varicose vein disease development in lower extremities

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Despite advances in our understanding of varicose veins the underlying etiology remains uncertain. The deep veins (DV) play a big role in haemodynamics of the lower extremities and it is logically clear that the pathological changes of the superficial veins may be a reflection of the disturbed hemodynamics in the DV.

Aim. To study DV variants and their communication particularities.

Methods. We have studied DV structure of 53 lower extremities in anatomic material. The used method included an injection of veins with latex and a layer by layer section.

Results. We have found 18 venous structure variants, which reflect different types of multiple trunk, main trunk, and their similar forms of vein structures of a thigh and a calf. The anterior tibial vein in 18 (35.8%) of 53 cases, posterior tibial in 20 (37.7%) of 53 had multiple trunk structures. In 7 (13.2%) of 53 cases both veins in one and the same case were of the multiple trunk structure. Femoral vein in 12 (22.0%), Deep femoral vein in 24 (45.3%) of 53 cases were presented by two trunks at one or another level. In 25 (47.2%) cases a single trunk of the femoral vein was also accompanied by accessorial veins from 1 to 5, which looked like bypass shunts. In other cases DVs were characterized by main trunk structure or combinations of the main trunk and multiple trunk structures.

Conclusion. Morphological bases, providing adequate phlebohaemodynamics are not the same in different individual forms of the DV structure. A lack of a compensatory possibility of the DV in case of their main trunk structure could explain the DV hypertension, deep and perforator veins wall distension by pressure and appearing the perforator reflux into the great and small saphenous vein systems leading to varicosity.

GE1.11-5

Venous Perforators in normal lower limbs – Ultrasound characterisation and comparison with resin caste anatomy

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The ultrasound characteristics of perforators of the normal lower leg have not been well defined since the availability of equipment with better resolution. Not all perforators may behave the same and the traditional view of a unidirectional flow from the superficial to deep system has been challenged.
Methods. Lower limbs in 20 normal subjects were examined for the distribution of perforator veins. Detailed characterization of location, size, flow direction and velocity and response to augmentation, in different postures and after exercise was carried out. The US patterns of perforator function were compared with appearances of resin casts of perforators made in 3 amputated limbs without venous disease.

Results. Each limb had 14 (7-21) perforators on US with diameter 1.3mm (0.4-3.5). In the medial calf, perforator size, number of valves seen and direct connection to Posterior Tibial vein and peak volume flow increased significantly more distally in the leg. Three patterns of perforator response to distal augmentation were observed. While at rest with different postures flow was often not detectable but following exercise flow was continuous and inward (mean peak velocity 10.0±8.8 m/sec and flow volume 2.7±4.5 ml/sec) with a regular periodicity. Bidirectional flow could be induced with different augmentation manoeuvres. These findings were contrasted with the anatomical features and the appearances of valves in the perforator veins as revealed in the resin casts.

Conclusion. Normal lower limb venous perforators are diverse and vary in function with their location. This should inform our understanding of venous hemodynamics and pathophysiology of venous disease. Ultrasound interrogation of perforators has improved but resolution of anatomical detail is still limited. The relevance of standard distal and Valsalva augmentation to reflect normal perforator function during ambulation is questioned.

GE1.11-6

Echographic sural nerve visualisation: method and anatomical aspects
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And Objective: Lesions of Sural Nerve (or Small Saphenous Nerve) (SN) have been reported to complicate surgical or thermal avulsion of SSV. We aim to visualize the SN and its spatial relationship with SSV. Type of study: Ultrasound anatomical research.

Methods. SN is easily identified with high definition 15 MHz probe. It is well visible within the Saphenous compartment and in proximity to the SSV only in the distal third of the limb, where the two components of the Nerve (the SaphenousTibial Nerve- STN (branch of the Tibial Nerve) and the Saphenous Peroneal Nerve -SPN (branch of the Common Peroneal Nerve)) join together. In a transverse scan the nerve appears then like a round echogenic formation containing small anechogenic spots (the nerve’s fibers). The relationship with the SSV is variable, the nerve running separately or in strict contact with the vein for different lengths, all the combinations being possible. Once the nerve has been identified, proceeding proximally, the point of separation of the two components is easily detectable. It is then possible to follow the two different nerves observing the STN (inside the “triangle” of connective tissue below the SSV) joining the Tibial nerve and the SPN joining the STN running inside a tiny fascial duplication (and thus more difficult to be followed).

Conclusion. The SN visualisation may be clinically useful to define pre-operatively the “dangerous” point of contact between the nerve and the SSV, when this vein must be avulsed or thermically occluded.

GE1.11-7

Risk factors for incident chronic venous disorders: results from the basel follow-up study
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Although chronic venous disorders (CVD) are widespread in the general population and represent a major health problem, their pathogenesis remains unclear, which explains the difficulties encountered in the long-term management of CVD patients. As CVD appear as a multifactorial condition, the epidemiological approach is mandatory for a better understanding, and data from follow-up studies are crucial for the validation of statistical associations found in cross-sectional studies. In the Basel study, Leo Widmer and his team followed the venous status of a large cohort of subjects over a 11 years time course (1971-1982) and we reanalysed their data with the aim of investigating the risk factors for the occurrence of varicose veins, venous edema and skin trophic changes.

Methods. 3992 subjects working in the chemical industry of Basel were clinically evaluated (history, physical and standardized photography) in 1971, and a subset of them were asked to participate in a follow-up examination in 1982. 1441 subjects participated in this follow-up. Statistical analysis were both univariate and logistic regression analysis, performed with a case-control design; cases were defined as subjects with respectively varicose veins, venous edema or skin changes in 1982, but not in 1971, controls were all subjects who did not show the analyzed disorder both in 1971 and 1982.

Results. Only age is a significant risk factor for the onset of all three analyzed CVD subsets. Sedenarity at work (OR=3.4) and male sex (OR=2.8) are the most significant risk factors for incident varicose veins. For venous edema, the most relevant ones are a varicose great saphenous vein (OR=5.4), venous symptoms (OR=4.6) and female sex (OR=2.9). For skin changes, the main risk factors are a corona phlebectatica (OR=10.6) and a history of deep vein thrombosis (OR=2.0).

Conclusion. CVD should be considered not only as a multifactorial, but even as a multidimensional condition.

GE1.11-8

Prevalence of perineal varices in varicose disease of lower limbs
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Aim. Several teams have highlighted the possible role of pelvic venous insufficiency in growth of varicose veins. A study of the perineal varices (PV) prevalence and their involvement in the GSV haemodynamics became highly necessary to evaluate their specific risks of development.

Methods. Two prospective studies have been carried out simultaneously. The first one was related to the links between PV and GSV reflux. 613 varicose lower limbs with thigh GSV reflux and without previous surgery have been explored using ultrasounds. The haemodynamics became highly necessary to evaluate their specific risks of development.

Methods. Two prospective studies have been carried out simultaneously. The first one was related to the links between PV and GSV reflux. 613 varicose lower limbs with thigh GSV reflux and without previous surgery have been explored using ultrasounds. The haemodynamical investigation was focused on the originating source of the saphenous reflux. For each limb, all feeding sources and specifically the main source were noted. The second study was related to the prevalence of PV among patients requiring a surgery for varicose veins, whatever the methods. 904 lower limbs (79.5% women and 20.5% men) have been explored because of primary varices (73.3%) or recurrence (26.7%). Clinical and ultrasound investigation has searched for presence of PV systematically.

Results. PV have been noted as the main or exclusive source of the saphenous reflux in 11.9%. However PV were present in 24.5% limbs (29.8% women and 5.9% men). In the second study, PV were present in 27.8% of the 904 limbs. 32.6% women and 9.2% men have presented PV. Prevalence of PV was 25.6% among the 663 limbs investigated because of primary varicose veins. Prevalence of PV was 53.6% among the 241 limbs investigated because of recurrent varicose veins. The difference between the 2 groups was statistically significant (p <0.02).

Conclusion. In case of varicose veins of lower limbs, prevalence of PV can be estimated between 30% and 35% for women and between 6% and 9% for men. The higher prevalence in case of recurrent varicose veins may suggest that PV are commonly insufficiently considered during the initial treatment.
GE1.11-9
How to improve the awareness of chronic venous disease - An experience from Slovak Republic
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Chronic venous disease (CVD) belongs to the most prevalent chronic conditions in developed countries.

Aim. The aims of our study were 1/ to evaluate the prevalence of symptoms and signs typical for CVD according clinical stages of the CEAP classification, 2/ assessment of the same group of patients after three months of treatment with micronized purified flavonoid fraction, 3/ improve the awareness of CVD among general population and thus diminish the gap between evidence and practise.

Methods. Together 3442 consecutive patients with CVD sympto-mented anatomical dissections, 3D modeling by veno-CT, but also determined anatomical dissections, 3D modeling by veno-CT, but also termined the severity of CVD by using the C class of the CEAP classification. Each patient then fulfilled a questionnaire about the presence and severity of leg heaviness, tiredness or pain, leg cramps and sensation of swelling as well as questions concerning the quality of life: Each investigated person obtained an educational material on CVD.

Results. From the group of investigated patients 2% of them suffered on clinical stage C0, telangectasies or reticular veins were found in 10%, varicose veins (CEAP class C2) in 27%, oedema in 24%, skin changes in 29%, healed ulcerations in 4% and active venous ulcer in 4% of investigated persons. After 3 months of treatment with micronized purified flavonoid fraction oedema reduction was seen in 55% of investigated, trophic skin changes in 12% and venous ulcer healing in 37% of patients.

Conclusion. The survey confirmed high prevalence of chronic venous disease in Slovak republic, especially the occurrence of advanced clinical stages, skin changes, healed or active venous ulcers. Therefore appropriate treatment and especially prevention is necessary. For early treatment is important to improve the awareness of CVD in general population. Printed educational material freely available in the GPs` waiting room is one of the possible solutions.

GE1.11-10
Anatomical variations of the femoral vein above the knee
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Aim. To demonstrate the different dispositions of the femoral axis at the thigh level, according to their embryologic origin.

Methods. and method. 150 fresh cadaver were injected with green latex, then dissection was performed. A colored segmentation was used to identify the anatomical elements.

Results. The iconography shown is based mainly on color sequ-ented anatomical dissections, 3D modeling by veno-CT, but also anatomical slices and phlebographies. The unirrential dispositions represent 91% of the cases: - Modal type was found in 88% of the cases. (it is a preaxial trunk or arterial type); - Not in the limb axis (3%): it can be a deep femoral trunk (2%), or an axio-femoral trunk (1%) - The bitruncular dispositions are only 9%. - Total or subtotal bifidity (2%) - Bifurcation (7%): could be low, axio-femoral type (5%) or high, deep femoral type (2%) - The angiologist must be aware of these bitruncular variations, to properly check the femoral deep vein thrombosis.

GE1.11-11
Hemodynamic study of the reflux circuit in great saphenous vein in the essential venous insufficiency
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Conclusion. 1st - Hemodynamics Circuits of Reflux trunk exclusive G.S.V. 54%. 2º - Hemodynamics Circuits of Reflux derived to Collateral / Affluences trunks: 19% (Giacomini Veins 5%) - Anterior Saphenous 6% - Collateral Inter-Saphenous Veins 6% 3º - Hemodynamics Circuits of Reflux of re-entry into Perforating Veins: 47% (Thigh 16%: P. Dodd 5% - P. Dodd in Hunter 11% - Most of one re-entry into Perforating Veins 2%) (Legs 51%: Sherman’s Perforator Complex 12% - Boyd Perforator Complex 8% - P. Complex Cockett 5% - Most of one re-entry into Perforating Veins 6%).

GE1.11-12
The distribution and significance of varicosities in the saphenous trunks
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Aim. Determine the prevalence, distribution, and extent of varicosities and focal dilatations in the saphenous trunks, their association with sites of reflux, and correlation with CEAP classes.

Methods. This prospective study included patients in CEAP classes 2-6. Varicose segments and focal dilatations of the great and small saphenous veins (GSV, SSV) were recorded, and the diameters throughout the length of the saphenous trunks were measured. The presence of varicosities in the tributaries and accessory veins were documented. A varicose vein segment was defined when at least 2 dilatations were found in continuity.

Results. From the 739 consecutive patients, 239 were excluded due to superficial or deep venous thrombosis, previous interventions, or C3-C6 presentation without CVD. The remaining 500 patients (681 limbs) were divided into two groups based on CEAP class: Group A (C2 +C3) and Group B (C4-6). The prevalence of the saphenous varicose segments in both Groups was small with the GSV in Group B being the highest (4.3%) and the SSV in Group A being the smallest (1.2%). Focal dilatations were significantly more prevalent than varicosities in the saphenous trunks (p<0.001). Varicosities of tributaries and accessory veins were more prevalent than those of saphenous trunks (p<0.0001). The mean length of varicose segments in the saphenous trunks was short (3.8cm, range 2.1-6.4 for Group A vs. 4.1cm, range 2.3-8.3 for Group B, p=0.09).

Conclusion. Using the novel definition for varicosities in the saphenous trunks it was determined that focal dilatations are far more common than varicosities. Because these entities are more prevalent in the accessory saphenous veins and tributaries, and CEAP class correlates positively with the extent of reflux, saphenous trunk diameter, and duration of disease, earlier interventions must be initiated to prevent CVD progression.
Venous malformations are often coupled with lymphatic dysplasias

Vascular malformations are developmental anomalies (birth defects) of the vessels. The most common are venous defects, followed by a-v and lymphatic dysplasias. Although there are many reports about these defects no data exist about combination between venous and lymphatic malformations. Aim of this study is to recognize if combination of both defects (venous and lymphatic) exist and with which incidence.

Methods. A group of 23 patients affected by venous malformations of the lower limbs were studied. All patients performed a complete diagnosis of the venous malformations. In all patients lymphoscintigraphy were done with a separate study of superficial and deep lymphatic system.

Results. 14 cases (61%) had a normal superficial and deep lymphatic drainage system. 5 cases (22%) had a normal superficial lateral lymphatic coupled with a marginal vein. Of this 5 cases, 3 had a contemporary aplasia of the deep lymphatic pathways of the affected limb with marginal lymphatic acting as main drainage way. 4 cases (17%) had aplasia of some parts of the deep lymphatic system of the limb affected by venous dysplasias. No patient has signs of lymphenheda.

Conclusion. Venous malformations of the lower limbs has a high frequency of contemporary lymphatic dysplasias. Aplasia of parts of the deep system are common. A marginal lymphatic (abnormal superficial lymphatic sited on the lateral side of the limb) may coexist, this defect is mainly coupled with the marginal vein and probably has the same course. This data is important and should be researched before surgical removal of the marginal vein in order to avoid lymphatic damage which may result in lymphedema. Noticeable is the data that aplasia of deep lymphatic may exist without lymphedema. This is the first report about marginal lymphatic.

Magnetic resonance imaging in diagnostic of vascular malformations

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Aim. To analyze the findings of vascular malformations (VM) on magnetic resonance imaging (MRI) and to correlate these findings with duplex scanning (DS) and intraoperative data.

Methods. Results of treatment of 78 patients (mean age - 25.6 ± 10.8 years) with vascular malformations were estimated. Arteriovenous form was revealed in 34 patients (43,6%), venous form - 43 (55,1%), lymphatic - 1 (1,3%). Affection of neck and face was revealed in 22 patients (28,2%), upper extremities - 18 (23,1%), lower extremities - 34 (43,6%), trunk - 1 (1,3%). Affection of several zones - 3 (3,8%). Extension of affection was determined by the data of clinical investigations, arteriography, DS of soft tissues and MRI.

Results. In detecting of presence of the disease sensitivity, specificity and accuracy with MRI was 98%, 98% and 98% respectively. When revealing the form sensitivity, specificity and accuracy with MRI was 96%, 96%, 96% respectively; in detecting of the depth and degree of affected areas - 96%, 96%, 96% respectively, when revealing the defeat of the bones and joint - 86%, 91%, 89% respectively.

Conclusion. Appropriate diagnosis and assessment of VM can be made on clinical findings and non-invasive studies. The basic prerequisite for a rational therapy of VM is differentiated diagnostics, especially the differentiation between arteriovenous malformations, haemangiomas and venous malformations. Angiography reveals the arteriализation, arteriovenous fistulas, CT - infiltrations of bone and soft-tissue. MRT demonstrates completely the extent of malformations because of its bright signal intensity in the T2-weighed images.
Techniques: surgery (interruptions/limited excisions) + foam-sclerotherapy + ELA n°29; foam-sclerotherapy + ELA n°7; surgery (interruptions/limited excisions)+foam-sclerotherapy n°4; surgery (interruptions, excisions, valvular repair/reconstruction) alone n°14.

ELA was performed by a Diode 808 nm. device (Eufoton–Trieste-Italy), general, subarachnoid or local anestesia, surgical or percutaneous cannulation; disposable fibers of 0.6 mm in diameter; 6-10 W, pull-back velocity >3 mm/sec (10-40 J/cm). Cases: 4 atypical perforating veins, 32 varices or superficial cavernomas vessels 4-8 mm diameter. Pharmacological prophylaxis by Calcium heparine and pro-fibrinolytics, 1st-2nd class elastic compression stockings for venous CVM of the lower limbs. In 28 cases complementary foam sclerotherapy.

Results. Surgery led to partial results in the majority of the cases. Complementary foam sclerotherapy improved the results by high dosage and drug concentration. ELA has been employed as complementary treatment of surgery and/or sclerotherapy, never alone. ELA was less invasive, sufficiently effective, repeatable (especially in marginal veins), well tolerated, followed by minimal complications (phlebitis 2%, skin burns), improved the results and shortened the operating time.

Conclusions. ELA is proposable as complementary treatment and as first choice in selected cases. Its application does not eliminate the need for complementary foam-sclerotherapy especially for the marginal veins and smaller vessels.

AP1.12-5

Safety of ultrasound guided microfoam sclerotherapy (UGMS) in children with venous malformations

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Aim. The treatment of venous malformations with UGMS is an endovascular procedure of low aggressiveness, high efficiency and safety. This study describes our experience with UGMS in the paediatric population, given that microfoam treatment requires high doses and that insufficient data are available on the safety of this technique in children.

Methods. We have reviewed the clinical records of pediatric patients with venous malformations treated with UGMS during the last 12 years in our clinics in Granada, Pamplona and Madrid. We present 35 patients (18 male and 17 female) with ages between 3 and 18 years, 21 of them being between 3 and 14 years. The indications for treatment were functional limitation, associated coagulation disorder or cosmetic reasons. Nine of the cases were big unoperable malformations and four presented episodes of disseminated intravascular coagulation. Colour ultrasound and angio MR tests were employed for diagnosis and pre-treatment evaluation as well as for the follow-up. Treatment was spaced between 7 and 30 days and lasted between 6 months and 5 years. In each session a mean volume of 18 ml (range 2-80 ml) of microfoam at 1-3% concentration was injected.

Results. No complications related to the volume of microfoam injected were observed. Only one patient aged 12 with a hand malformation was inadvertently injected with 3% microfoam close to an A-V connection, resulting in distal arterial foam embolism and spasm. This was treated by local fibrinolysis and angioplasty, resulting in full recovery.

Conclusion. Our experience with UGMS in children shows that injecting large volumes of the microfoam is a safe procedure. This permits treating large lesions, which usually require the injection of high volumes in multiple sessions during a long period of time.
BO2.1 - Talk to the experts: My technique in compression treatment-bandages or stockings

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Tailoring compression to the individual needs. Based on experience and endorsed by several experiments investigating the effect of various kinds of compression in different clinical conditions I try to adjust my regimen to the individual situation. Several patient-oriented factors should be considered, e.g. the underlying disease (venous, lymphatic, arterial involvement), size and configuration of the extremity, age, walking ability, pain and discomfort. The compression tools differ mainly concerning the applied pressure, the elastic property of the material and the duration of wear. Therapy phase. For severe stages of chronic venous insufficiency (CEAP C4, C6), after varicose vein ablation by different methods, and for the initial treatment of lymphoedema, superficial and deep vein thrombosis compression devices providing a high massaging effect during walking (‘high working pressure’) are preferred (inelastic bandages like Unna-boots, cohesive and adhesive bandages, multi-component bandages with high stiffness). Such bandages applied with an initial pressure of more than 50 mm Hg need to be applied by trained personnel. In addition intermittent pneumatic compression pumps may be beneficial. Maintenance phase. Medical compression stockings are the basic management in all patients with chronic venous insufficiency in order to reduce pain and prevent massive swelling and ulcer recurrence. Except in cases with severe swelling of the thigh knee-high compression stockings are usually sufficient. Compliance, which is the most important practical problem, can be improved by special aids to alleviate donning of stockings, by information and education of the patients, but also by special tricks like putting on two stockings, one over the other.

PP2.2 - Thromboembolic disease

PP2.2-1

Current status of thrombolysis and thrombectomy in iliofemoral deep venous thrombosis

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Iliofemoral deep venous thrombosis (DVT) represents a unique subset of patients with DVT. The extensive nature of their DVT and the fact that the single common venous channel draining the lower extremity is obliterated significantly increase postthrombotic morbidity and recurrence. Studies have shown that within 5 years 95% of iliofemoral DVT patients treated with anticoagulation alone develop chronic venous insufficiency, 15% have venous ulcers, and 40% have venous claudication. These patients have a markedly reduced quality of life and significant risk for recurrence. The 2008 American College of Chest Physicians (ACCP) guidelines now recommend that patients with iliofemoral DVT be considered for a strategy of thrombus removal, including venous thrombectomy and catheter-based procedures designed to eliminate clot. A randomized trial of patients with iliofemoral DVT treated with operative venous thrombectomy plus anticoagulation versus anticoagulation alone demonstrated improved patency, lower venous pressures, less leg swelling, and fewer postthrombotic symptoms in the patients receiving thrombectomy at 6 months, 5 years, and 10 years of follow-up. Non-randomized reports document that patients undergoing venous thrombectomy can expect approximately a 76% patency and retention of venous valve competence in nearly two-thirds over the same time period. Following venous thrombectomy, patients should receive the same intensity and duration of anticoagulation as those patients who are treated with anticoagulation alone. Catheter-directed thrombolysis is the preferred method of managing patients with iliofemoral DVT. Numerous reports have demonstrated good outcomes in patients treated with catheter-directed thrombolysis, including significantly better patency and valve function when compared to patients treated only with anticoagulation. Pharmacomechanical techniques are now being used to shorten treatment times and reduce the dose of plasminogen activator. Two randomized trials (CAVENT, ATTRACT) are underway, which should confirm the principle that a strategy of thrombus removal is the preferred method of management of patients with iliofemoral DVT.

PP2.2-2

Catheter directed thrombolysis in DVT

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Okrent introduced the method with catheter directed thrombolysis (CDT) in 1991. The first review article was published 5 years later concerning the results of CDT for iliofemoral venous thrombosis with almost 1 year of follow-up in 265 patients. The success rate to reopen the veins was 84% and one death was observed. These results, which were better and safer, compared to systemic thrombolysis, were the background for a new optimistic active attitude treating a disease with at least 50-60% risk of postthrombotic changes including physical discomfort with venous claudication and dermal changes. Which patients can benefit from CDT? Age of the patient, age of the thrombus, extension of the thrombus, previous deep venous thrombosis, bleeding episodes/disorders, recent major surgery and delivery are factors to be discussed carefully, before deciding whether to offer the patient CDT or not. The fact, that almost 20% of iliofemoral vein thromboses involve the inferior vena cava, raises consideration whether the procedure shall be protected with a cava filter. There are today few publications with rather small materials with follow-up from 2.5 years. In the material from the Oslo group, 85% of the patients were almost free of symptoms and in the material from Copenhagen, 89% of the patients were without reflux (6). Finally, a very small group of patients in a RCT had open veins in 69% of the cases after 5 years. These results, from our own institution in the period 1999-2007 with 101 patients with iliofemoral DVT treated with CDT (103 extremities, 78 women and 23 men with a mean age of 59 years (range 15-59 years)) will presented. Median follow-up was 50 months. Patency without reflux after 6 years will be presented as Kaplan-Meier plot.

PP2.2-3

Endovascular DVT interventions

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Venous thromboembolism (VTE) is a highly prevalent disorder that causes significant mortality and morbidity from pulmonary embolism
(PE) and the post-thrombotic syndrome (PTS). In recent years, endovascular have shown great promise to improve VTE treatment outcomes. PE may be prevented through use of inferior vena cava (IVC) filters, of which some types may now be retrieved to avoid long-term device-related sequelae. Percutaneous pulmonary artery thrombectomy/thrombolysis procedures can be lifesaving in selected patients with massive PE who are poor candidates for other treatments. At present, PTS occurs in 25-50% of proximal DVT patients who receive standard anticoagulant therapy. PTS often leads to chronic lifestyle-limiting symptoms, work disability, major quality of life impairment, and high costs to patients and society. In recent years, the use of pharmacomechanical catheter-directed thrombolysis (PCDT) to rapidly eliminate thrombus has shown promise to improve treatment outcomes in a safer and more efficient manner than previous thrombolytic therapies. The PCDT technique is currently undergoing rigorous assessment in a U.S.-based multicenter RCT called ATTRACT (Acute Venous Thrombosis: Thrombus Removal with Adjunctive Catheter-Directed Thrombolysis). Finally, endovascular iliac vein ablation and endovenous saphenous vein ablation can be very useful tools in treating patients with established PTS. Overall, endovascular therapy shows great promise to improve VTE treatment outcomes, but its proper utilization remains uncertain due to the lack of rigorousRCTs validating its safety and efficacy.

**PP2.2-4**

**New anticoagulants in the treatment of venous thromboembolism**

H. Decousus

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The reference anticoagulants used to prevent and treat venous thromboembolism (VTE) consist of heparins and vitamin K antagonists. These treatments present several limitations which justify the search for new anticoagulant agents. The new anticoagulants currently being or already developed for this pathology basically fall into two main families, factor Xa and factor IIa inhibitors. Xa inhibitors can be subdivided into those that act indirectly via anti-thrombin, and those that inhibit the factor directly. Indirect Xa inhibitors are represented by fondaparinux, idraparinux and biotinylated idraparinux. Fondaparinux is marketed for prevention and treatment of VTE. Idraparinux, which is derived from fondaparinux, has a far longer half-life allowing a single sub-cutaneous injection per week. The initial results have revealed an increased risk of bleeding with time. A new development programme modifying the dosing regimen used for idraparinux has thus been launched with biotinylated idraparinux, which presents the advantage of having an antidote.

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on the occurrence of ATVT with standardized diagnostic methods, involving passengers in experimental well-controlled studies. - The project was named "The WRIGHT project" – WHO Research Initiative on Global Hazards of Travel project. It has been extremely difficult to raise money. Mainly through efforts from the UK government and EU, the Rosendaal epidemiological projects have received partial funding, the Toft cabin related risk factor studies complete funding, while the prevention studies have received no funding. At the ISTH meeting in Sydney September 2005 four of the projects reported preliminary results. 1. The absolute risk of venous thrombosis – (Rosendaal et al. J Thromb Haemost 2005; 3 (Suppl. 1) p 1657. Retrospective cohort study amongst employees of international companies. - Conclusion. Air travel is associated with an increased risk of venous thrombosis, and the risk is slightly higher after exposure to a succession of flights. 2. Incidence of ATVT among Dutch airline pilots (Rosendaal et al): - The risk of developing ATVT seems to be lower in Dutch airline pilots then in the general Dutch population. 3. Activation of coagulation system during air travel: a cross-over study (Schreijer et al. The Lancet 2006;367:832-838): - *The study suggests that thrombin generation occurs in some individuals after an 8-hour flight. 4. Hypobaric hypoxia is not associated with prothrombotic alterations (Toff et al. JAMA 2006;295:2251-2261): - Conclusion: in healthy subjects, exposure to mild hypobaric hypoxia is not associated with prothrombotic alterations in hemostatic parameters and is unlikely to contribute to the risk of ATVT. Another study in the WRIGHT project is Travel-related venous thrombosis: results from a large population-based control study (MEGA study). Rosendaal et al PLoS Medicine 2006;3:1258-65: - Travelling for more than 4 hours by any transportation mode increased the risk of VT two-fold; - It was more apparent with air travel, suggesting flight-related factors which are absent during travel by other modes of transport. The summary of the results from the 5 WRIGHT projects in phase I suggest that: - air travel is associated with an increased risk of venous thrombosis. - This increased risk applies to other forms of travel where travellers are exposed to prolonged seated immobility. - The risk increases with the duration of travel and with multiple flights within a short period; - Obesity, height, use of contraceptives and the presence of prothrombotic abnormalities increases the risk; - Two billion people per annum travel by air. The results from the WRIGHT project indicate that over 150,000 of them will develop ATVT, of whom 7,500 will suffer a fatal PE; - While the risks and risk groups have now been clearly identified, there is no clarity about effective and safe prevention; - For this reason it is essential that the prevention study proposed for phase II of the WRIGHT project is carried out and that future passengers will be adequately informed about their risk and the optimal mode of prevention. Present advice for prevention of ATVT. The suggested research projects will hopefully answer the questions that were raised, within the next few years. While waiting for the outcome of the research, what can we recommend the 2 billion people that continue to fly every year? In 2006 a conference on Traveler's Thrombosis was organized in Hall, Austria by Schobersberger, Partsch and Eklöf and the update was published in VASA in 2008 resulting in the following consensus. - The cabin-related risk factors that may lead to hypercoagulation and stasis can be remedied by simple means: - Drink plenty of non-alcoholic fluids to avoid dehydration; - Moving feet and legs and taking deep breaths to optimize our strategy in patients with extensive ST. 

Superficial thrombophlebitis (ST) is a serious illness as it may lead to deep vein thrombosis and even pulmonary embolism in certain cases. Therefore duplex scan is mandatory to evaluate the extension of the thrombus and to detect a (non-) contiguous deep vein thrombosis (DVT). A wide variety of therapeutic measures have been described: local application of a cold-pack, gel, spray etc, local incision with expression of clots, compression with bandages or stockings, immediate mobilisation, NSAID’s, surgery and of course anticoagulation with heparin or oral anticoagulants. The problem is to find out which treatment will be appropriate for each single patient. Some cases of ST are rather clear-cut. A limited ST in a varicose tributary can be treated with simple local measures, whereas a ST associated with a DVT will be treated as a DVT. However there is less consensus in literature about the optimal treatment for extensive ST of the main trunk of the great or small saphenous vein. Several recent papers (mainly from Europe) suggest treatment with low molecular weight heparin (LMWH) might be efficacious. The use of intermediate dosages of unfractionated heparin or LMWH for at least 4 weeks are recommended in the ACCP guidelines [1] (Grade 2 B), as well as in a recently published Cochrane Review[2] on treatment of ST. Future studies are needed to optimize our strategy in patients with extensive ST.

References

PP2.2-8
How to treat superficial thrombophlebitis?
M. De Maeseneer
University Hospital of Antwerp, Antwerp, Belgium

Superficial thrombophlebitis (ST) is a serious illness as it may lead to deep vein thrombosis and even pulmonary embolism in certain cases. Therefore duplex scan is mandatory to evaluate the extension of the thrombus and to detect a (non-) contiguous deep vein thrombosis (DVT). A wide variety of therapeutic measures have been described: local application of a cold-pack, gel, spray etc, local incision with expression of clots, compression with bandages or stockings, immediate mobilisation, NSAID’s, surgery and of course anticoagulation with heparin or oral anticoagulants. The problem is to find out which treatment will be appropriate for each single patient. Some cases of ST are rather clear-cut. A limited ST in a varicose tributary can be treated with simple local measures, whereas a ST associated with a DVT will be treated as a DVT. However there is less consensus in literature about the optimal treatment for extensive ST of the main trunk of the great or small saphenous vein. Several recent papers (mainly from Europe) suggest treatment with low molecular weight heparin (LMWH) might be efficacious. The use of intermediate dosages of unfractionated heparin or LMWH for at least 4 weeks are recommended in the ACCP guidelines [1] (Grade 2 B), as well as in a recently published Cochrane Review[2] on treatment of ST. Future studies are needed to optimize our strategy in patients with extensive ST.

References

PP2.3 - Guest lecture: WHY do varicose veins develop?
N. Labropoulos

Abstract not available

PP2.4 - UIP consensus varicose veins

PP2.4.1
UIP consensus on diagnosis and treatment of varicose veins
P. Gloviczki

Abstract not available
PP2.6 - Sclerotherapy 2: Miscellaneous

PP2.6-1
Intra-operative sclerotherapy of post-surgical inguinal neovascularization: 2 years results
M. Lefebvre-Vilardebo 1,2, P.H. Lemasle 3
1 Centre de Chirurgie des Varices Paris-Défense, Neully-sur-Seine, France
2 American Hospital of Paris, Neuilly-sur-Seine, France
3 Cabinet Nouvelle France, Le Chesnay, France

Aim. According to REVAS consensus, varicose recurrence is a very common problem, often requiring a new surgery. Junction stumps and/or neovascularization are the main sources of reflux. Reopening the groin can induce a high rate of complications, mainly lymphatic. The aim of this prospective study is to check the effectiveness of intra-operative foam sclerotherapy in the time of stab avulsion of tributaries in order to avoid groin redo surgery.

Methods. Between January 2002 and December 2005, 106 patients were included because requiring an intra-operative foam sclerotherapy of inguinal sources of reflux. All patients have a 2 years minimum follow-up. The standard procedure was the injection of sclerosing foam added to an extensive stab avulsion of varicose tributaries and of possible residual saphenous trunk under local anesthesia. Foam was made with air and Lauromacrogol 400% using a 4:1 ratio. It was injected through a catheter into a tributary or a trunk. An iterative groin open surgery was performed only in case of very large residual junctions (25).

Results. The technical failure rate was 8.5%. Foam was injected in 97 cases (91.5%). All patients but one were investigated with duplex scan 1 to 3 months after surgery: 77 total thrombosis of inguinal networks (73.3%), 10 partial thrombosis (9.5%), 15 patencies (14.3%) and 3 uncertain conclusions due to the calibers smallness. Foam was found in 97 cases (91.5%). All patients but one were investigated with ultrasound guided duplex scan 1 to 3 months after surgery: 77 total thrombosis of inguinal networks (73.3%), 10 partial thrombosis (9.5%), 15 patencies (14.3%) and 3 uncertain conclusions due to the calibers smallness. Foam was injected through a catheter into a tributary or a trunk. An iterative groin open surgery was performed only in case of very large residual junctions (25).

Conclusion. Intra-operative foam sclerotherapy added to extensive phlebectomies is a valuable procedure to avoid aggravating groin redo-surgery. In case of a lack of sclerosing effectiveness or in case of recanalization, networks could be injected under ultrasound guidance.

PP2.6-2
Surgery or sclerotherapy for groin recurrent varicose veins?
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Recurrence of varicose veins after surgery continues to be a problem of great magnitude, and a major cause is inadequate groin dissection with failure to ligate flush in sapheno-femoral junction. From literature 20%-26% have major recurrence of varicosities after previous surgery (high ligation, phlebectomy, or stripping). This relative high percentage has not lessened much during the past decade. Of the patients coming to our clinics foam sclerotherapy and surgery have been used for groin recurrence and the results critically evaluated. Reexploration of inguinal region is often beset with difficulties from previous scar tissue encasing the delicate dilated varices. The technique described from Arthur K.C. Li in 1975 has been performed in all surgical patients. This approach is familiar to vascular surgeons, very safe and the dissection trough normal tissue allows early control of the femoral vein above and below sapheno-femoral junction. A short video will be run to demonstrate the utility of the procedure.

PP2.6-3
A comparison of sclerotherapy modifications in the treatment of venous stasis dermatitis
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Correction of retrograde flow is necessary for effective treatment of venous stasis dermatitis. In case of minor or moderate phlebecta-sy, sclerotherapy is a good way for it. However, most of specialists do not use sclerotherapy for treatment of venous stasis dermatitis at all, or limit themselves to microsclerotherapy around the dermatitis area.

Aim. To compare effectiveness of local, partial and truncal sclero-therapy of superficial varicose veins in the treatment of venous stasis dermatitis.

Methods. 65 patients (female) with acute or chronic venous stasis dermatitis (CEAP C4a) due to superficial venous incompetence were chosen for this investigation (in all patients no changes in deep veins were found) and divided in 3 groups. In the first group (25 patients) total scleroobliteration of the dilated veins was performed, in the second group (22 patients) – partial scleroobliteration, and in the third group (18 patients) – only scleroobliteration of the local intradermal veins. After 7-10 days local and systemic antibacterial and systemic phlebotonic therapy was prescribed. Adequate elastic bandage was recommended for all groups.

Results. Full remission of stasis dermatitis in the first group was in 3–4 weeks (22 patients or 88%), up to 6 weeks (3 patients or 12%) and no more than 6 week. In the second group results were the follow-ings: remission in 3–4 weeks – 12 patients (55%), up to 6 weeks – 6 patients (27%), from 6 weeks to 3 months – 4 patients (18%). In the third group: remission in 3–4 weeks – 3 patients (17%), up to 6 weeks – 5 patients (28%), from 6 weeks to 3 months – 9 patients (50%). Only one patient from the third group has not reached a full remission of dermatitis in 6 months.

Conclusion. Length or area of venous scleroobliteration has a di-rect influence to the reaching of dermatitis remission.

PP2.6-4
Non-saphenous sclerofoam treatment of lower extremity primary varicose veins
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Removal of the Saphenous Vein from superficial circulation is considered to be the first essential step in treating primary varicose veins of the lower extremities. This study was done to challenge that dogma. Only limbs with primary lower extremity varicose veins were chosen for this study. Those with recurrent varices, with a-v malformations and/or with previous vein treatments were excluded.
Out of a total 109 limbs of 102 patients. 85% (n=93) were women and 15% (n=16) were men. Ages ranged from 18 to 82, with a mean of 50 years. A total of 89 limbs had clinical disease limited to visible varicose veins, CEAP Class 2. Two limbs had associated edema, CEAP Class 3. Thirteen limbs demonstrated some form of skin and subcutaneous change secondary to chronic venous disease, CEAP Class 4. One limb had a healed venous ulcer, CEAP Class 5. Foamed sclerosant, 1% to 1.5% Sodium Tetradecylchol, was generated by the Tessari technique with room air. A maximum of 15ml/treatment was injected through a tributary varicose vein, not the Saphenous Vein. Limb compression with focal pressure over varicose clusters was applied for 72 hours. Limbs were examined clinically and by ultrasound at one to four weeks. If patients required a second treatment, this was done at the one week follow-up visit. In 77 limbs, all varices and the Great Saphenous vein were closed with an average of 1.7 treatments. In 25 limbs, all varices were closed but the Saphenous veins were open without reflux. In 7 limbs, varices were closed but the Saphenous vein continued to reflux. In this study of 109 limbs with Great Saphenous reflux, non-Saphenous injection of foam obliterated the varices 100% of the time and closed the Saphenous Vein or abolished Great Saphenous reflux in 93.5% of cases.

**PP2.6-5**

**Efficiency and safety of an accelerated therapy regime for tributaries: polidocanol-0.5%-foam with injections every 2nd to 3rd day**

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Although the duplex-controlled foam-sclerotherapy of tributaries is common in daily practice, data on optimal concentration of sclerosant and frequency of therapy are missing.

**Aim.** To evaluate the efficiency and safety of a duplex-controlled foam-sclerotherapy with 0.5%-Polidocanol every 2nd to 3rd day in tributaries with diameters of 3-6mm.

**Methods.** Retrospective analysis of 110 legs of 76 patients. Injections were done every 2nd to 3rd day. In each session 1 injection/leg with a volume of 2ml/injection were given. Controls were advised 1 week, ca. 6 months (medium-term) and ca. 12 months (long-term) after beginning of the therapy.

**Results.** 110 legs (CEAP C2-C4) have been controlled for a period of 14.2±4.2 months. No reflux was seen after 3.4±2.7 injections for each leg. Success rates were 76.7% in the medium-term and 51.2% in den long-term control. Adverse events were sclerophlebitis/ thrombophlebitis (8,2%), hyperpigmentation (14.5%) as well as induration in the treated region (9.1%) and pain in the treated leg (7.3%). In 3.6% of the cases intermittent and self-limited paraesthesia and in 0.9% a migraine occurred. One patient with a previous thrombosis had a thrombosis of a muscle vein (0.9%). Severe adverse events like a deep venous thrombosis, embolia, allergic shock, necrosis, scotoma or neurological deficit were not seen. Vein surgery U4 weeks before the sclerotherapy does not increase the rate of adverse events (with surgery: 27.3%, without surgery: 35.2%, p=0.05). Legs with refluxes in the long-term controls needed further treatment in 64.2%. 20.6% of them got a vein surgery, 79.4% got a second treatment in 64.2%. 20.6% of them got a vein surgery, 79.4%.

**Conclusion.** Foam-sclerotherapy with 0.5% Polidocanol and injections every 2nd or 3rd day with and without surgery of the truncal veins is an effective and safe procedure for tributaries.

**PP2.6-6**

**The role of foam sclerotherapy in elderly patient (over70) with severe disabling CVI**

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Our study aimed at evaluating the efficacy, safety, patient's satisfaction and ability to make elderly patients autonomous after such procedure.

**Methods.** Between December 2005 and December 2008 we performed ultrasound-guided foam sclerotherapy in 49 patients with C4-C6 (CEAP classification) CVI, with a mean age of 74.3 years (range70-84). All patients were evaluated before and after treatment (6-12-24-36 months) through the Venous Severity Score System (VSSS) and quality of life questionnaire (SF12). Seventeen patients (34.6%) had been suffering from one or more leg ulcers (C6 - CEAP) for an average period of 3.6 years; they suffered from physical disability and a poor quality of life. Eighteen patients had external or internal saphenous trunk treatment, and at the remaining 31 patients, incompetent perforating veins and relapsing collateral varices accounting for ulcers and venous hypertension were treated. At the end of treatment, all patients were followed up with objective clinical exams, CDU, VCSS, VDS and SF12 questionnaire at 6-12-24-36 months.

**Results.** During the 6-36 month follow-up period (mean, 15.9 months) symptoms improved or disappeared in all patients. Ulcer healing was observed in 12 out of 17 patients (70.5%) with an average treatment time of 2.7 months. On average, VCSS improved from a baseline value of 12.7 to an after-treatment value of 4.3; VDS score improved from 2.1 to 0.6. We obtained a complete success in 45 patients (91.8%), a partial success in 5 patients (6.1%) and 1 failure (2.1%). No major or minor systemic side effects have been observed.

**Conclusion.** Factors like age ulcers and a high cost often turn into a limitation for conventional stripping procedure. Foam sclerotherapy, as a minimally invasive, repeatable, inexpensive and safe procedure, seems to be a promising option among this group of patients.

**PP2.6-7**

**Compression in sclerotherapy of the sapheno-femoral junction: our experience**

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The aim of our work has been to evaluate, clinically and with duplex examination, the results of compression-sclerotherapy of the sapheno-femoral junction (SFJ). This has been compared to its diameter and the possibility to apply a compression bandage. 1500 SFJs treated with Sigg's method have been divided into three groups (A,B,C) depending on thigh-circumference. Each of these groups has been divided into two equal subgroups (1D) with a SFJ-diameter of more than 8mm. Clinical and duplex-examination (7.5MHz probe) have been done at 6,8,12 months and at 2 years (stage 1) for all cases, at 3 years (stage 2) for 1034 cases, at 5 years (stage 3) for 870 cases, at 8 years (stage 4) for 600 cases, at 11 years (stage 5) for 440 cases, and at 15 years (stage 6) for 260 cases. Globally we have had 180 clinical failures (12%) and 545 duplex failures (25%). There has been no difference in the failure-rate between subgroups 1 and 2 at all stages clinically and with duplex examination. On the other hand we have found significant differences in the failure-rates among the three groups. We have shown that the SFJ can be successfully sclerosed without considering its diameter, but depending on its compression with a compression bandage.
PP2.6-8

CO2 foam sclerotherapy in patients over 70 years old: efficacy and safety

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Aim. To assess the efficacy and safety of CO2/Air foam-sclerotherapy in patients over 70 years old.

Methods. A total of 88 (16 men and 72 women) elderly patients (average age 71.23; range of 70 to 85; 29 patients>75 years old, 9 patients >80 years old) with ultrasound truncal incompetence in greater or short saphenous veins associated to varices were enrolled. Only non-walking patients or with major active pathologies were excluded. (average ADL 4.24; average IADL 5.78). Forty-three percent of patients were CEAP class 3, 39.7% CEAP class 4 and 17.1% CEAP class 5. USG was performed using polidocanol (POL) 1% in a ratio of 1-mL POL to 3 mL CO2 + 1 mL air (Tessari method). After treatment and anelastic bandage positioning the patients walked immediately for 30 min. All patients had Duplex scan before treatment and at 7, 90, 180 days in 88.6% of patients and at 1 year in 87.5% of patients. Pain recovered respectively in 2 months and 15 days. No cough, thoracic oppression or visual disturbances were observed.

Results. The total number of treatments was 226 with a mean number of treatments for patients of 2.59 (range of 2 to 4). The average total volume per treatment was 6.96 (range of 4 to 8). CO2/Air foam allowed complete sclerosis at 90 days in 96.5% of patients, at 180 days in 86.6% of patients and at 1 year in 87.5% of patients. Pain linked to signs of inflammation appeared in 8.84% of treatments, 1 year pigmentation was present in 5.68% of patients. Only 2 major side effects were registered. 1 gastrocnemius DVT and 1 skin abscess recovered respectively in 2 months and 15 days. No cough, thoracic oppression or visual disturbances were observed.

Conclusion. 1% polidocanol CO2/air foam seems to be as effective and safe in elderly patient same as what described in adult subjects, provided that elderly able to walk and are free from major disabling or lifethreatening diseases.

PP2.6-9

Sequential sclerosant treatment of varices in lower limbs secondary to pelvic venous disease

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In the treatment of subafragmatic venous insufficiency, occlusion with coils and/or foam is the therapeutic of choice nowadays. However, it is still undefined the treatment of leakage points from the pelvic and atypical varices of lower limbs. We think that the use of sequential sclerotherapy with foam and/or sclerosant liquid may be an efficient method.

Goals: To design a therapeutic method in atypical varices of lower limbs in those patients who present a mixed picture of pelvic CVI and atypical varices in lower limbs without arch affection neither saphenous axis were previously embolized (one month before).

Methods. From January 2004 to January 2007, a group of 68 patients with atypical varices in lower limbs without arch affection neither saphenous axis were previously embolized. This group with previous pelvic treatment were then performed a treatment of atypical varices of lower limbs with sequential sclerotherapy technique at three times: First time: foam, Second time: classic liquid sclerosis, Third time: cryosclero-sis. Likewise, they were performed periodic follow-ups with Doppler ultrasound at one month, six months and at one year.

Results. Patients did not present severe complications (DVT, PTE, ulcers, necrosis and allergic reactions). There were minor complications as melitensis (4.4%), haematomas (29.4%), indured and irritated strings (32.3%) as well as transitory pigmentations (8.8%). Recoverences in one year were valued according to the vessel caliber and topographic distribution. The response to a new sclerosis treatment in the recurrence is 100%. The approval of treatment and guidelines of patients are very favourable as well as the final stetic results.

Conclusion. In view of scarce complications and results, we think that sequential sclerosis of atypical varices of lower limbs is a good additional method to the previous pelvic venous treatments in this kind of patients.

PP2.6-10

Significance of pressure insufficient perforating veins in the treatment of varicose veins by sclerotherapy, subtilte: condition of insufficient perforating veins after sclerotherapy

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Aim. From 1998 to 2006, we performed two-port system subfascial endoscopic perforator vein surgery (TPS-SEPS) with or without superficial venous ablation at 755 limbs. Of those, 256 limbs had stasis dermatitis and were classified as C4-C6, according to CEAP classification. At the time of SEPS, 71 of those 256 limbs had active stasis ulcers and 17 had inactive stasis ulcers. The remaining 477 limbs had no stasis dermatitis and were classified as C2. In C4-C6 cases, the importance of SEPS is established to a considerable extent. However, in C2 cases, there have been so many disputes about the necessity of SEPS. Therefore, we reported our present methods of operation for IPVs (insufficient perforating veins) in C2 and C4 cases. We also designed the study to investigate the states of the IPVs by duplex scanning after intra-operative sclerotherapy.

Methods. Sclerotherapy was done through backward injection of Polidocanol in 56 limbs of 42 patients. In 24 of the limbs, the IPVs below the knee, which were marked by duplex scanning at the preoperative examination, were severed by SEPS before sclerotherapy. In contrast, for the remaining 32 limbs, sclerotherapy of below knee varicose veins was done without SEPS.

Conclusions. 59.3% of IPVs occluded only by sclerotherapy, but neither the diameter of IPVs nor the distance from the site of sclerorant injection had any consistent pattern of occlusion of IPVs. It is still uncertain whether patient IPVs lead to the recurrence of varicose veins in C2 cases. Nonetheless, to achieve a certain blockage of IPVs, SEPS is reliable.

PP2.6-11

Polidocanol foam sclerotherapy as a new and effective treatment of post surgical lymphocutaneous fistula: first results of a clinical trial

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Aim. The formation of lymphocutaneous fistula and lymphorrhoea following vascular or lymph node surgery is a serious complication. There exists no consensus on the most effective treatment for these post surgical lymphocutaneous fistula. Therefore in our clinical trial the differences of polidocanol foam sclerotherapy in direct comparison to drainage plus pressure therapy in the treatment of lymphocutaneous fistula should be investigated.

Methods. Retrospectively we analyzed between 2005 and 2008 the data of 33 patients who developed a post surgical lymphocutaneous fistula. We offered all patients drainage plus pressure therapy or sclerotherapy with 1% polidocanol foam to treat the lymphocutaneous fistula.

Results. Secretion volume at the beginning varied between 50 and 350 ml/d (median 100 ml, mean value 144 ml), and at the end of ther-
apy between 0 and 20 ml/d. Altogether 12 patients were treated with polidocanol foam sclerotherapy and 21 patients were treated with drainage plus pressure therapy alone. It took significantly less time (Mann-Whitney test, p<0.05) to remove the lymphatic drains in the patients where we used the polidocanol foam sclerotherapy (median 4 days, mean value 6.4 days) in comparison to drainage plus pressure therapy alone (median 31 days, mean value 30.2 days). None of the patients developed a major complication.

Conclusion. Polidocanol foam sclerotherapy of lymphocutaneous fistula is an effective and well tolerated therapeutic option. Therefore it seems to be a good alternative to other treatments like radiotherapy or surgical re-intervention.

PP2.6-12
Hand veins: new approach with lapidium chlorhidrate foam
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Hand veins are a major concern of some patients due to the esthetic and age concern they involve. Traditionally, surgery is the gold standard technique offered to solve the problem. Nevertheless, foam sclerotherapy seems to be a logical approach to treat them, in an easier and less morbid way.

Methods. Sixteen patients with concerns about their hand veins were treated with foam sclerotherapy using lapidium chlorhidrate. Follow-up involved questions regarding swelling, discomfort, bruising and edema.

Results. Foam sclerotherapy with lapidium chlorhidrate is a safe and easy way to treat visible unwanted veins of the hands.

AP2.6 - Endovenous procedures 3: Prospective studies

AP2.6-1
Endovenous laser ablation (EVLA) with 1320nm in the treatment of varicose veins – A 3 year prospective study
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Many wavelengths have been tried for endothermal closure. Infrared wavelengths target endothelial water allowing lower fluences. Aim. To investigate the efficacy and safety of 1320nm EVLA, recording vessel sizes and reflux status over time.

Methods. Duplex ultrasound (US) mapping demonstrated reflux prior to treatment. After Seldinger venous access, the laser fibre was placed 2 cm distal to the proximal source of reflux. Pervenous tu-mescent local anaesthesia was used for analgesia, venous compression, displacement of adjacent tissues, and as a heat sink. With laser fluences of 5-7 watts, the fibre was withdrawn mechanically at 1mm/sec. Ultrasound guided foam sclerotherapy (UGFS) with 3% sodium tetradecyl sulphate on 2-3 sessions treated distal and incompetent tributaries. Serial duplex ultrasound was at 1 month, 6 months and annually (with a patient questionnaire) for 3 years. Class 2 graduated compression hose were worn for 10 days. Ambulation was encouraged stat. Clexane was used peroperatively with those with higher thrombophilic risk.

Results. After primary closure in over 600 vessels, no cases required repeat laser treatment. Vessels over 4mm in diameter were readily cannulated. Pre treatment with nitroglycerine ointment enabled access to smaller vessels. EVLA was well tolerated, causing minimal or no discomfort. No DVTs, arterial injections, burns, or fatalities occurred. There was 1 case of pulmonary embolism. Thrombophlebitis was infrequent, usually observed over the UGFS segments. Serial duplex US surveillance was by the same sonographer. All refluxing junctions reduced in size, and 90% became competent. Trunkal veins closed, and trapped blood was released for comfort. All patients reported high satisfaction with improvement in symptoms and appearance at 3 year followup.

Conclusion. EVLA with 1320nm is a safe popular and effective nonsurgical technique in the medium term to treat refluxing leg varicose veins.

Declaration. This study was self funded, with no commercial interest.

AP2.6-2
Endovenous laser treatment of greater saphenous vein.
Results at 2 years
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Aim. of the study: To evaluate the effectiveness of Endovenous Laser Procedure for the Treatment of incompetent Greater saphenous vein (GSV) on hemodynamic criteria.Duplex Ultrasound was performed at 1 month, 6 months, 1 year and 2 years. Incomplete or segmental occlusion were analyzed.

Methods. Between January 2003 and June 2008, 242 patients (260 incompetent GSV) with a diameter greater than 7 mm were included in the study after examination with Echo-Doppler and mapping. 183 women (75,6%) and 59 men (24,4%). 50% on right side and 50% on left side.The inclusion criteria were terminal or preterminal incompetence associated with a tunicular reflux of GVS. The protocols described. Treatment was performed on outpatient with a Laser Diode 940 mm. The protocol of discontinuous shooting was identical in all patients. 11-Watt 5’ to 1 / 3 upper thigh, 11-Watt 2.5’ to 1 / 3 medium thigh and 11-Watt 2 at 1 / 3 lower thigh during the area of introduction. A complementary phlebectomy was performed in all patients. Non elastic compression bandaging was fixed and preventive treatment with injection of LMWH was given for a period of 6 days.

Results. After 2 years only 7 patients (2.7%) have a complete occlusion of the trunk. The percentage of occlusion of the GVS is 89.6% (235 patients) and in the presence of an invisible vein into the saphenous compartment the chances of recanalization are zero. 20 patients (7.7%) were lost at 2 years follow-up. Laser Endovenous has become a technique whose results are comparable to the ligation division and stripping in terms of complications and quality of life. It seems to be responsible for less post-operative bruising and a quicker resumption of social activities. The chances of success depend on the fluence issued which must be greater than 50 J/cm

AP2.6-3
Endovenous laser treatment of saphenous and perforators reflux for leg ulcers in primary chronic venous insufficiency
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Aim. Venous leg ulcers are usually related to incompetent perforating veins also in primary chronic venous insufficiency. The need for new surgical strategies and techniques to overcome the barriers to effective treatment of this problem is always actual. We present
Endovenous laser treatment versus varicose veins. Results to 5 years
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To refer the personal experience on the endovenous laser treatment of varicose veins. 188 patients (143 F and 45 M) were treated from December 2001 to December 2008. The superficial chronic venous insufficiency was caused by the incompetence of the saphenofemoral junction and the reflux of the great saphenous vein, as demonstrated by duplex scanner. All patients were operated with laser procedure under local anesthesia and sonographic guidance. After venous duplex mapping, a 5-F introducer sheath was placed into GSV. The tip of the laser fiber was repositioned within the GSV 15-20 mm distal to the SFJ. Tip position was checked by US and direct visualization of the red aiming beam through the skin. Laser energy was delivered at 12-14 watt with a pulse of one second and one second of interval. The laser fiber was withdrawn at an average rate of 2-3 mm per second. The patients were instructed to ambulate and to resume immediately their normal activities. The laser procedure has been well tolerated by all patients. No deep venous thrombosis, no pathologies, no adverse reactions. Early and mid-term results are favourable. Follow-up examinations were performed at 1, 2, 3, 4 and 5 years. At 1 year follow-up 165/177 GSV (93,4%) was successfully closed, 156/49 GSV (93,5%) at 2 years, 93/106 (86,1%) at 3 years, 63/75 (84%) at 4 years, and 24/35 (68%) at 5 years. 9 cases (25,7%) of asymptomatic recurrent varicose veins have been had to 5 years. Endovenous laser treatment is a minimally invasive outpatient procedure for the therapy of varicose veins. After a treatment of around 30 minutes the patient can walk home and resume normal activities. Today it appears to have higher success and lower complication rates than the other existing minimally invasive treatments such as US-guided sclerotherapy or radiofrequency energy ablation.

Endovenous laser treatment versus surgery for incompetent great and small saphenous veins
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This study was designed to evaluate the efficacy of the new endovascular laser treatment compared with the old surgical method. We randomized a total of 945 patients with incompetent great and small saphenous veins in two groups, 459 with endovenous laser treatment and 486 with crossectomy and saphenectomy. The patients were submitted to a complete phlebological examination, including EchoDoppler and were informed about both methods. The selection was based on the payment possibility of the patients, with laser treatment being considerably more expansive and not accessible to almost half of patients. All the operations were performed under local tumescent anesthesia, ambulatory-endovenous laser treatments +/- phlebectomies and crossectomy and saphenectomy. The patients were monitorised clinically and by EchoDoppler at 7 days, one month, 3 months, 6 months, 1 year and every 6 months after. Clinical recurrence at 4 years was 3% for the laser group and 4% for the surgical group. The morbidity was very low for the laser group-4%:indurations, pain, inflammation on the route of the vein and small echymosis, without superficial burns, hematomas or deep vein thrombosis. The recovery for work was 2-3 days. For the surgical group the morbidity was bigger-10%:hematomas, paraphresias, infections of the wound, deep vein thrombosis (1 case) and a lot of cases with echymosis and pain. The patients recovered for work at 5-7 days. In conclusion the endovascular laser treatment brings less complications than surgery and less days of recovery. We still need more time to evaluate the situation but for it is clear that the future is not the surgery in the varicose veins disease.
Six year experience with endovenous laser ablation in Czech Republic

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Aim. Endovascular techniques of saphenous ablation are minimvasive alternatives of radical surgical treatment. This study summarizes our own clinical experience with endovenous laser in 6 year period.

Methods. 725 endovenous laser procedures of trunk varicose veins were performed in 630 patients. Post-operative follow-up (clinical and duplex ultrasound) was performed after 5 days and 1 month, 6 months and yearly thereafter. Results were evaluated by comparison of CEAP clinical class and quality of life (QoL) pre- and post-operatively, by percentage of recanalizations and also using Kaplan-Meier life-table method.

Results. Saphenous occlusion was verified in 97.3% after 1 month, 44 non-occluded trunk veins were found during the whole follow-up period (1-72 months, mean 15 months) which represents final occlusion rate of 93.9%. With Kaplan-Meier analysis, we reached 88.9% occlusion rate. Cox regression analysis of factors influencing non-occlusion and early or late recanalisation of saphenous vein found 2 factors with statistical significance: energy per centimeter (p=0.04) and laser power (p=0.04). Cumulative rate of occlusions is significantly higher (94%) in patients treated with more than 50 J/cm compared to less than 50 J/cm (87%), log-rank test 0.039. Using power values less than 13W, results were significantly better (p=0.011) compared to power values of 13 W or more. Mean clinical CEAP classification improved from 2.22 (before operation) to 0.24 (1 month after) and 0.48 (last visit) and also QoL was significantly better in laser group compared to traditional surgery group (p=0.001).

Conclusion. Present study supports concept of 'slow heating' during endovenous laser treatment of varicose veins to achieve sufficient energy per centimeter of the vein and the optimal clinical outcome.

1010 980nm laser saphenous ablations with 12-24 month duplex examination

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Aim. To evaluate duplex results of the endovenous laser ablation, a standardized endovascular laser procedure, in the treatment of an incompetent great (GSV) and small (SSV)saphenous vein with at least a one-year follow-up.

Methods. Ten centres from Europe and America entered an international, multi-centre, retrospective registry, organized by the IEWG (International Endovenous Laser Working Group). Data concerning 1010 patients with incompetence of GSV and SSV, treated with the EVLA procedure, were collected. In particular, the duplex failures, (i.e. junction reflux; the presence of an open stump longer than 5 cm in continuity with the junction; a totally open trunk; a partially open trunk), were analyzed at one or more years postoperatively.

Results. There was a paucity of severe complications. At one year, the rate of complete occlusion of the saphenous trunk and junction competence was high (93.6% and 94.3% respectively). There were a moderate number of duplex failures: isolated junction failures (3.2%); isolated trunk failures (6.3%); total and partial failures (2.3%). The number of duplex failures remained steady for the 907 patients who had a two-year duplex follow-up.

Conclusion. Based on a duplex scan at least one-year post-treatment, this multi-centre registry confirms the safety and efficacy of the EVLA procedure in the treatment of great and small saphenous vein reflux. Additionally, the moderate number of duplex failures could not only be a guide for further improvements in this technique, but may also serve as a resource for more well-defined indications for the endovenous laser treatment.

Progression and recurrence of vein disease in patients treated with endovenous laser ablation: two-four year experience. Is there a place for the phrase recurrent varices after laser or reval?

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Aim. The incidence of recurrence of reflux at the SFJ and SPJ after endovenous laser treatment (ELT) has been well studied. However, tracts of recurrent flow also occur in the GSV and SSV away from the junctions after laser ablation. This study looks at how often new vein disease develops after ELT, as well as where, when, and why.

Methods. A retrospective analysis of 50 cases (66 veins) treated with 980 and 1520 nm ELT. Thorough Duplex ultrasound scanning was performed at 24–45 months follow-up, average: 28.8 months. All segments of vein with any reflux (>0.5 sec.) were noted and recorded as progression (new vein disease) or recurrence (recurrent or continued flow through previously-lased vein segments).

Results. Recurrent SFJ reflux: 3/50 (6.0%); SPJ: 0/9. Recurrent truncal reflux without junctional involvement: proximal GSV, 5/50 (10%); 8/50 (16%); SSV, 1/9 (11.1%). New reflux in non-saphenous vein segments (progression): 34/50 (68%) with 6/34 (17.6%) arising from saphenous trunks and 28/34 (82.4%) arising from incompetent perforators. IPs below knee: 23 in 11/34 (32.4%) causing 15.6% of new vein disease. IPs above knee: 42 in 25/34 (73.5%) causing 28.6% of new vein disease. Total IPs 73 in 51/36 (86.1%). No vein disease found: 14/50 (28%).

Conclusion. Unlike ultrasound findings at one year follow-up, two-four year ultrasound follow-up after ELT shows new vein disease to be seven times more common than recurrent disease in previously treated veins. Disease progression in non-saphenous veins is 5.5 times more common than saphenous truncal progression. New incompetent perforators accounted for virtually all non-saphenous vein progression. New IPs in the calf were 3 times more common than those in the thigh. At 28.8 months of follow-up, 72% of patients had ultrasonographic and/or visible progressive and/or recurrent vein disease. Regarding the long-term success of ELT, coining the term REVAL might be appropriate.

Clinical comparison of thigh only versus extended endovenous laser ablation (EVLA) in great saphenous vein insufficiency treatment

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It is known that performing EVLA only in the thigh when great saphenous vein (GSV) has insufficiency in all of your length may lead to varicose vein recurrence in the leg. Also the symptoms may still remain with this procedure only. The fear of causing skin damage or permanent sensorial injury is the main cause of avoiding EVLA in the leg. Other methods have been associated to EVLA with the hope to improve outcomes.

Aim. To compare clinical efficacy and side effects of treating GSV insufficiency with EVLA from the groin to the middle of the leg to EVLA in the thigh only.
Methods. A total of 20 limbs with GSV insufficiency from the groin to the leg were randomly assigned to receive treatment with EVLA from the groin to the middle of the leg (extended: named E-EVLA) or in the thigh only. In all cases groin ligature was performed. No other method was associated. The laser used was an 810nm Diode and same tunescence anesthesia was performed in both groups. Symptoms improvement, varicose veins resolution or recurrence in the legs, leg swelling, pos-procedure hypoesthesia, skin hyperpigmentation and burns were assessed after one month.

Results. There was no difference between the groups in concern to skin hyperpigmentation or leg swelling. No skin burn happened. Better symptoms improvement and less remaining varicose veins were observed in the E-EVLA group. Cutaneous hypoesthesia was noticed in 6 cases in E-EVLA and in only 1 in the other group. After one month, 2 cases were still remaining with hypoesthesia, but with less intensity.

Conclusion. The use of EVLA below the knee is more effective if compared to EVLA only in the thigh. Side effects are mild and temporary. Further information and treatment improvement may be obtained with less invasive therapies in association to EVLA.

GE2.6 - Short free paper session I

GE2.6-1
Long term follow-up study of intravascular 1320-nm laser closure of the great saphenous vein
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Aim. To determine the long term efficacy and safety of a 1320 nm intravascular laser to close the great saphenous vein.

Methods. 164 patients treated with incompetent great saphenous vein (0.5-1.44 cm in diameter) associated with distal varicose veins were treated with a 1320-nm intravascular laser at 5-6 W with an automatic pullback mechanism at 1 mm/s. Duplex ultrasound examinations were performed at baseline and followed from 1-5 years post treatment.

Results. The demographics of patients included an average age of 49 with 84% female. The average baseline GSV measured 0.78 cm (range included 0.57-1.95 cm). Average length of follow-up was 25.3 months. 12.5% of patient received follow-up sclerotherapy for residual reticular and telangiectatic veins. 75% of patients had absent great saphenous veins after treatment. 25% of patients had open, patent GSV with no reflux. The failure rate for treatment was 7.8%. Treatment failures included open GSV with reflux, 2 patients underwent repeat CTEV treatment, and one patient had ultrasound guided foam sclerotherapy treatment.

Conclusion. 1320 nm intravascular laser is safe and effective in treating an incompetent great saphenous vein up to 1.44 cm in diameter.

GE2.6-2
Efficacy of additional graduated compression after sclerotherapy treatment of reticular and telangiectatic leg veins
M. Goldman
La Jolla Spa MD, La Jolla, USA

Sclerotherapy with post-treatment compression remains the gold standard for treating lower leg telangiectasias and reticular veins. However, there is no uniform consensus on the duration of time that post-sclerotherapy compression is recommended.
Complications of foam sclerotherapy for reticular veins

M. Goldman
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250 patients with reticular veins 1-6mm in diameter without reflux from the Great or Small saphenous vein were treated with foamed sodium tetradecyl sulfate (STS). Patients were evaluated from 4 weeks to 4 years post-sclerotherapy to determine treatment efficacy and adverse effects. 175 patients with veins <3mm in diameter were treated with 0.25% STS mixed 1:4 with room air. 75 patients with veins between 3-6mm in diameter were treated with 0.5% STS mixed 1:4 with room air. An average of 10.25ml of foam (2ml-24ml) with STS 0.25% and 12.5ml (9ml-28ml) with STS 0.5% was injected per treatment session. All patients wore 30-40mmHg graduated compression stockings for 7 days/24 hours/day after treatment. Repeat treatments were performed 6-8 weeks apart. 42% of patients required 1 treatment, 38% required 2 treatments, 16% required 3 treatments and 4% required 4 treatments for complete resolution of reticular veins. Hyperpigmentation over the treated veins was noticed in 33% of patients injected with 0.25% STS and 45% of patients injected with 0.5% STS. Pigmentation lasted >1 year in 3 and 4.3% of patients respectively. Telangiectatic matting occurred in 5% and 7.4% of patients treated with 0.25% and 0.5% STS. Treated veins were painful for up to 2 weeks in 1.4% and 2.0% of patients treated with STS 0.25% and 0.5% respectively. There were no episodes of visual changes, headaches or any neurological our pulmonary symptoms in any patient. There was no correlation between quantity of foam injected and adverse effects. Foam sclerotherapy of reticular veins is safe and effective.

GE2.6-4

A CA and CB for EACH C CLASS of the C of CEAP classification

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In the ‘C’ clinical classes of the CEAP, there is a C/t and a C/6. It is the only one class divided into 2 subgroups [1].

Aim. To propose a CA and CB in each C class in order to have a similar organization at all levels.

Method. To start with a preview publication in which it was proposed a similar idea [2]. To see if it was possible to find 2 items in each class with respect to the clinical severity.

Results. C0 and C1 got already two items in each: no Visible (noV) - no Palpable signs (noP), Telangiectasias (Tg) - Reticular Veins (RV) [1]. C2 could be divided in two: Primary Varicose Veins (VV) and recurrences (REVAS) which are more difficult to treat. For C3, some works showed that Corona Phlebectatica (Cph) is a clinical sign sandwiched between Edema (Ed) and Cta [3]. C4 is already cut in two: C4a: Eczeema (Ec)-Pigmentation (Pig). C4b: Lipodermatosclerosis (Lip)-Atrope Blanche (AB). Obviously for C5 and C6 the more severe is the “recurences”. The proposition could be:

<table>
<thead>
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<th>C class</th>
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<tr>
<td>C0</td>
<td>noV</td>
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<td>C1</td>
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<td>C2</td>
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<td>C3</td>
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<td>C4</td>
<td>Ec-Pig</td>
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<td>C5</td>
<td>Healed VU</td>
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<td>C6</td>
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Inclusion of REVAS and Corona in the ‘C’. It brings a better description of the clinical severity in the C class. This improvement of CEAP is done without any change.

References


GE2.6-5

The CEAP classification in daily phlebology practice: a franco-italian multicenter survey on the prevalence of isolated varices (C2) and complicated varices (C2+)

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After many attempts of varicose veins classification during the past, the CEAP has now got a worldwide consensus and has been recently improved to better describe the complexity of the venous disease.

Aim. To identify with the revised classification the prevalence of isolated varicose veins (C2) and complicated (C2+) among patients, to compare their symptomatic expression and their description with the CEAP.

Methods. Franco Italian cross sectional study. Each centre was asked to include the next 10 patients consulting for varicose veins and to achieve a full completion of the clinical and duplex examination. Exclusion criteria: patients with CVD without any varicose veins and patients with acute deep venous thrombosis or superficial thrombophlebitis.

Results. Current results covers 171 patients (100 French and 71 Italians) presenting 258 legs with varicose veins. They were 57 ± 15 years old, 71.6% were female and 56.5% were overweighted. C2 prevalence was 64.0% and C2+ 36.0% and strictly comparable between Italy (C2=63.3%) and France (C2=64.4%). Prevalence of C2 significantly differs between male and female: 49.3% vs. 69.0% (p<0.001) and decreases according age (p<0.001). C2,3 represents 11.2% of patients, C2,4, 9.7%, C2,3, 8.0%, C2,3,4, 5.1%, C2,4,5,1.6% and those involving C6 2.4%. C2+ are more symptomatic than C2: 74.2% vs 52.1% (p<0.005). These previous results are similar in Italy and France. A secondary etiologies is significantly more frequent in C2+ (17.2% vs 1.2% p<0.001), deep vein are more often involved (16.1% vs 1.2% p<0.001) and the association of reflux and obstruction is more present.
(13.6% vs 1.9% p<0.001). The average duration to fill in the grid of the advanced CEAP is 6.1 ± 3.8 mm.

**Conclusion.** The advanced CEAP provides a better description of the real venous status of patients which allows better comparison between epidemiological studies.

**GE2.6-6**

**Prevalence of varicose veins in a diagnostic unit in mexican city**

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A series of studies have been published on the epidemiology of varicose veins in different countries with prevalence between 10% and 25%. In Mexico there aren't any epidemiological studies about it. We carried out a prospective and traverse study in 2008 with people that attend a diagnostic unit in Mexico City by a random survey to 1300 patients. There were no exclusion approaches and a questionnaire was applied with a qualified nursing guide who carried out the physical exploration for the doubtful cases of doubt, it included type of varicose veins, evolution time, cause, associated diseases (arterial hypertension, diabetes mellitus) etc. And we took the general population description measures. The results were the following: Age average: 49.5 years old, BMI: 27.38 (overweight), height: 1.62 m, weight: 71.1 kg, male: 66% and female: 34%. The prevalence of varix including telangiectasias was of 926 = 71.23%. The patients with C2-C6 varicose veins corresponds to 17.38%, 52.54% of the population including telangiectasia was of 926 = 71.23%. The patients with C2-C6 varicose veins was of 0.71 versus 0.92 in September, the increase of patients in treatment is lower in September. The prevalence of the disease is between 3 to 6% of the population description measures. The results were the following:

**Conclusion.**

**GE2.6-7**

**Epidemiological study of the seasonal variation of the incidence and the prevalence of varicose ulcer: the Vesuve study (variation épidémiologique saisonnière de l’ulcère d’origine veineuse)**

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An epidemiological study has been conducted to appreciate the epidemiological variations of the varicose ulcer.

**Methods.** The study has been conducted in the angiologists’ clinics all around France, in 14 sites including all types of climates according to a north-East South west distribution. The patients have been recruited during one day in march and one day in September from 2005 until 2008.

**Results.** 14 investigators have included 250 per day (total of 2000) patients. Patients are older than 70 y. The relative variation of the prevalence is of -25% between March and September. In March the mean ulcer/investigator was 0.71 versus 0.92 in September, the increase is of 30%. The amount of patients in treatment is lower in September by 15%. The incidence (New patients in treatment) is multiplied by 3 in September by comparison to March.

**Conclusion.** Prevalence of the disease is between 3 to 6% of the patients. There is a rise after the summer. This study may be consider as a good picture of the epidemiological evolution of inter-annual and intra-annual variation of the ulcer disease.

**GE2.6-8**

**Evolution of primary venous insufficiency: ascending development. Observational and hemodynamic study**

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The pathogenesis and pathophysiology that lead to the development and progression of primary venous reflux are largely unknown, but the emergent observations from hemodynamics studies of recent years oppose the "retrograde theory". Currently, hemodynamic study allows us to discovers many intermediate levels of saphenous insufficiency on different evolutive stages with normal competence of terminal valve of over 50%. Hemodynamic laws do not support such a "retrograde" development of the reflux from upper to lower levels of veins and suggest that the natural history of venous insufficiency is indeed dictated by the hydrostatic column of venous pressure and, therefore, it follows the gravity gradient: the lower the level of the leg, the higher the gravitational force, the higher the hydrostatic pressure causing venous incompetence. The reflux would subsequently expand following the gravity gradient rising to higher levels according to the pressure gradient. The latest segment of the vein to be involved is the terminal valve (eg. SFJ). "Wall weakening" is the initiating factor of primary reflux that, therefore, does not develop in a retrograde fashion beginning from the terminal valve but, more likely, may follow an opposite, more physiologic, pattern. In order to test the hypothesis of "ascending development" of reflux for which the terminal/Junction valve represents the last stage of a venous insufficiency that advances from the lower levels, we carried out an observational study to analyze the natural evolution over time in a series of patients with lower limb venous insufficiency left untreated. The original hypothesis of a retrograde pattern of evolution for primary venous insufficiency beginning from the terminal valve and progressing from above-to-below along the legs could not be confirmed by our data and from a practical point of view, this knowledge may change the therapeutic approach.

**GE2.6-9**

**Posterior accessory saphenous vein of the leg implications in the pathogenic sever trophic disorders**

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Posterior accessory saphenous vein of the leg (Leonardo’s vein) has an origin, an anatomic course and a terminal part, relative stable (80%). To 20% of the subjects there is some variations of the course and on the final part. This are confirmed trough clinical examination, anatomical study, classic phlebography and 3D phlebography.

Posterior accessory saphenous vein of the leg is highly pathogen trough: - Permanent long and short reflux - Hyper pressure and stasis. - Microangitis of stasis. - Development of the major trophic disorder (lipodermatosclerosis, leg ulcers).

**Methods.** The study is analyzing 100 patients (55% males, 47% females) retrospective on 10 years (1997 - 2006) with ages between 31 and 75 years old hospitalized for leg ulcers, lipodermatosclerosis. Deep venous thrombosis of the leg was discovered from anamnesis at 20% of the patients. Long saphenous vein stripping was performed in 35% of the patients. The patients was examine trough clinical examination, venous and arterial duplex scan and in some cases classic and 3D phlebography. Femoropopliteal arterial axe obliteration was discovered at 15% of the patients. 20% of the patients refused surgical treatment. The surgical treatment was long and short reflux stopped. Angioplasty and arterial by-pass was performed to the patients with bought arterial and venous diseases.
Results. 1 year follow-up: 70 patients were healed, 10 patients presented modest lipodermatosclerosis skin changes, 10 patients from 20 patients who refused surgical treatment have come for reevaluation. Lipodermatosclerosis was present at all 10 patients.

Conclusion. Posterior accessory sapenous vein of the leg is irrelevant in leg trophic diseases pathology. - Quality of life was visible improved trough surgical remove of the posterior accessory sapenous vein of the leg. - If the association of the arterial diseases (atherosclerosis obliteration) is not solved, therapeutic failure can be made.

GE2.6-10

Hemodynamic study of the reflux circuit in short saphenous vein in the essential venous insufficiency


Conclusion. 1º Hemodynamics Circuits of Reflux trunk exclusive S.S.V: 53%. 2º Hemodynamics Circuits of Reflux derived to Collateral / Affluences trunks: 9%. 3º Hemodynamics Circuits of Reflux of re-entry into Perforating Veins: 23%. 4º Hemodynamics Circuits of Reflux in longitudinal and transversal vascular axis: 15%

GE2.6-11

Internal calf pump performance (ICP) evaluated togheter with ecodoppler color

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2 Bonaerense Society of Phlebology and Lymphology, Buenos Aires, Argentina, Argentina

Aim. In order to evaluate ICP performance together with Ecodoppler color, determinations were obtained in healthy patients, in patients with some venous disorders and in patients post endoluminal treatment.

Methods. 40 patients were evaluated, 33 women and 7 men, between the ages of 25 and 77 years old. It was used a Sonosite 180 Plus ecograph color Doppler, with a 5-10 MHz lineal vascular transduction. Two very important components of ICP were evaluated: internal calf muscle thickness, examined in its maximum expression (ICM) and the most important internal calf vein in each patient evaluated (ICV). They set a correspondence (C): CICM – ICV: ICM / ICV


Conclusion. In patients with permeable blood vessel, results appeared in a variable range. In patients with obstructed blood vessel (pathological o therapeutics) and external compression, results appeared in a delimited level. We think that these correspondences must be considered in order to evaluate ICP performance easily.

GE2.6-12

Pseudo-phlegmasia caerulea dolens after cardiac catheterization

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A 37-year-old male presented with an acute coronary syndrome; the right coronary artery could be successfully treated with PCI. The puncture site in the right common femoral artery was closed with a closure device (Starclose®). Smoking and hypercholesterolemia were risk factors for cardiovascular disease. The patient was in good clinical condition. Shortly after arrival at the coronary care unit, the right leg became very painful and swollen. Clinical examination of the leg suggested the presence of phlegmasia caerulea dolens. Duplex ultrasound demonstrated an important haematomata in the right groin with normal arterial flow but absent flow in the external iliac vein and femoral vein. The veins could not be compressed. The same findings were also present at the popliteal vein and the calf veins; a diagnosis of deep venous thrombosis was obvious. A venous thrombectomy with creation of an arteriovenous fistula in the groin was scheduled. Only a few seconds after incision, the colour of the right limb improved. After evacuation of the haematoma, the puncture site in the common femoral artery was closed. Subsequently a venotomy of the common femoral vein was performed. To our surprise, there was a good spontaneous blood flow in the deep vein and as no thrombus was found the venotomy was closed without AV fistula. From the first postoperative day intermittent pneumatic compression was applied while in bed and the patient was mobilized quickly. His complaints of pain resolved completely and the colour of the limb had normalized. Postoperatively, he was treated with aspirin and clopidogrel. Duplex ultrasound, one month postoperatively, showed normal findings without any sign of deep venous thrombosis.

Conclusion. This case illustrates the clinical picture of a transient phlegmasia caerulea dolens, based on a localized, external compression of the deep venous system, but without presence of a deep venous thrombosis.

GE2.6-13

Relationship between number of pregnancies and great saphenous vein diameter

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Purpose. Number of pregnancies has been mentioned as a risk factor for chronic venous insufficiency. We have related reflux to diameter of the great saphenous vein (GSV). This analysis investigated if number of pregnancies correlated with GSV diameter.

Methods. Ultrasound evaluation of the GSV was performed during a voluntary service provided by American medical personnel in Guayaquil, Ecuador. Women who perceived they had leg venous problems were evaluated. Median number of pregnancies of 178 women, 51±5 years of age, was 4 (range 0-15). Minimum number of women per subgroup of 0, 1, 2, …, 8, 9, >10 was 5. GSV diameter in mm was measured at mid thigh with the patient standing. Statistical analysis included calculation of correlation coefficients and t-tests.

Results. Correlation coefficient between number of pregnancies and left GSV diameter calculated for the entire data set was low: 0.06. The correlation coefficient calculated for the average GSV diameter of each subgroup increased to 0.48. GSV diameter was smallest for women without pregnancies, 2.6±0.5 mm (P<0.01). GSV diameter of women having one pregnancy, 2.8±1.6 mm, was not significantly different than subgroups with less (P<0.30) or more pregnancies (P<17). Largest GSV diameters were: 4.2±3.4 mm (N=9 pregnancies), 4.1±2.5 mm...
mm (N=10), 4 ±2.8 mm (N=2) and 4 ±0.8 mm (N=5). The average GSV diameters for >9 or 1-8 pregnancies were not significantly different (P= .50). 

Conclusion. GSV diameter increased with one pregnancy. Otherwise, the number of pregnancies was not related to GSV diameter.

GE2.6-14
The research of erythrocytes immune function in chronic venous insufficiency of the lower extremities
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The influence of inflammatory processes has been one of the hot topics in discussions of the etiology of chronic venous insufficiency (CVI). Erythrocytes are very important in controlling inflammatory immunity and immune reactions. The purpose of this study was to analyze the correlation between the development of CVI and the change of CD35, Fy6 on erythrocytes, and interleukin-8 (IL-8) levels.

Methods. A group of 45 patients with CVI were studied in parallel with 8 healthy individuals serving as control subjects. Control subjects were those with normal findings on lower extremity duplex examinations. We used an erythrocyte flow cytometer to examine the expression of both CD35 and Fy6 on red blood cells, and an enzyme-linked immunosorbent assay analysis method to measure plasma IL-8 levels. We also analyzed the change of IL-8 levels under the influence of erythrocytes using a modified method of the hemimmune reaction.

Results. Compared to normal control subjects, CD35 expression increased significantly among patients with CVI classified as C4 without lipodermatosclerosis, but tended to decrease and reach the lowest level among patients classified as C5-C6. Fy6 expression increased significantly among patients in the early stages of CVI, but tended to decrease remarkably among patients classified as C5-C6. The inflammatory response intensified at the C5-C6 classification, where high levels of IL-8 coexisted with a low expression of Fy6. The increase in IL-8 in the CVI group was higher than in the control group in association with the complete blood cells, regardless of the presence of erythrocytes, when inactive tumour cells were added, whereas the level of IL-8 in the CVI group was significantly lower than in the control group.

Conclusion. Abnormalities of erythrocyte innate immunity represent a fundamental derangement in CVI. These inadequate inflammatory responses may lead to local tissue and microvascular damage of the lower extremity.

GE2.6-15
The challenges associated with venous duplex scanning
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The acquisition of venous ultrasound images remains an important step in vascular diagnosis offering unique diagnostic information. It is widely used for the diagnosis and follow-up of deep vein thrombosis (DVT) and assessing the development of the more complex post-thrombotic syndrome. The duplex provides both anatomic information and physiological measurements. However, there are many challenges associated with the imaging of the venous system. These include anatomical variations such as duplication of vessels, misidentification especially when examining the popliteal fossa region, it is imperative to always be aware of the fascial layer separating the superficial and deep systems. Recurrent varicose veins can be extremely challenging as the anatomy can become fragmented after surgery. Imaging of the IIac veins come with their own set of unique problems. Patient size can often result in poor or redundant compression techniques. Therefore one must rely heavily on use of colour and spectral Doppler for patency of the system in this area. Thrombus age, is extremely difficult to determine especially when trying to establish ACUTE-ON-CHRONIC DVT. Technical difficulties can hamper an examination for many reasons such as a tense, swollen limb, painful limb making compression unbearable or overlying oedema, such limitations should always be documented. The machines’ settings can lead to erroneous results especially in the assessment of a compromised venous system. Other pathologies can mimic the signs and symptoms of DVT therefore careful attention to detail and an open mind are extremely important. At times venous scanning may still prove challenging but attention to detail and knowledge gained from experience and training will benefit the examiner and patient enormously. The design and implementation of appropriate protocols will help avoid many potential pitfalls.

GE2.6-16
Differential diagnosis: what if the swelling is lymphoede-ma, lipoedema or myxoedema?
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There are many reasons for a swollen limb. An increased load on a normal lymphatic system, a poorly functioning or damaged lymphatic system, congestive cardiac failure, kidney disease, high central venous pressure, hormonal imbalance, hyper-permeability issues or venous failure. How can you be sure that the swelling is due solely/mainly to venous failure? Might there be other reasons? Could there be a problem with the lymphatic system and its ability to clear the fluid load. Spending time to understand what might have happened to the lymphatic system and what is happening now may help you in your differential diagnosis and thus in the targetting and sequencing of your treatment and importantly will help attain a better patient outcome. A full medical, surgical and familial history of the patient may disclose prior events which may have influenced lymphatic system structure or function. Events such as prior surgery and or radiotherapy associated with cancer treatment of the bowel or reproductive system, or prostate may damage the lymphatic system resulting in a reduced transport capacity. The lymphatics may be constrained by fibrous tissue within the abdominal cavity due to prior peritonitis or may be partially closed by high external pressures due to clothes, garments, gastrointestinal bloating. The flow of lymph slowed due to low tissue pressure variation in the major cavities. Hypo/hyper thyroidism also result in large molecules sequested in the tissues which slow the entry of fluids into the lymphatics and entrap fluids. Lipoedema and associated microaneurysms will result in fatty deposits due and further poor lymph flow. Malformed lymphatics may underlie all of the above. All of these mean the lymphatic system may not have the capacity to takeup and clear an excessive load created by venous failure. Techniques to enable accurate differential diagnosis including lymphoscintigraphy, tonometry and bio-impedance will be presented.

GE2.6-17
Treatment of incomplete trunk varicosity with combined foam sclerotherapy and VNUS closure fast technique
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The cause of an incomplete trunk varicosity can for instance be an atypical Dodd perforator, a pundendal varicosity or an ischiadicus varicosity. A very sufficient and new method is the combination of foam sclerotherapy and VNUS closure fast. In this method the foam is applied over the VNUS closure catheter at the proximal insufficiency point of the incomplete trunk varicosity directly into the side branch (i.e. atypical Dodd perforator, pundendal varicos, ischiadicus varicosity). Afterwards the trunk varicosity is treated with the VNUS closure-fast technique.
GE2.6-18
Echocolor-Doppler criteria for diagnosis of chronic cerebrospinal venous insufficiency
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The blood leaves the brain through the postural and respiratory mechanisms, that can be measured by echo-color-Doppler (ECD). Five parameters have been described linked to normal cerebral venous outflow and we measured them in multiple sclerosis (MS) patients and in 5 populations controls.

Methods. From an initial cohort of 350 subjects, after application of exclusion criteria, we selected 125 patients affected by MS, and 185 controls, respectively composed by age- and gender-matched, healthy aged, and patients affected by other neurological diseases. They blindly underwent transcranial and extracranial color-Doppler sonographic examination (TCCS-ECD), aimed at investigating five parameters related to normal cerebral venous outflow haemodynamics. Overall we analyzed 1550 TCCS-ECD parameters.

Results. In controls we found 898 normal parameters of cerebral venous return vs. 27 anomalous, whereas in MS 504 parameters were normal and 321 anomalous, respectively. Consequently, each of the considered Doppler haemodynamic parameters, when compared to revised McDonald criteria as a gold standard of MS diagnosis, showed separately a highly significant sensitivity and a noteworthy specificity. However, the detection Y2 parameters in the same subject, never observed in controls, perfectly overlapped the diagnosis of MS (value, 95% CI: sensitivity 100%, 97-100; specificity 100%, 98-100; positive predictive value 100%, 98-100; p<0.0001).

Conclusion. This study demonstrates a significant impairment of cerebral venous drainage in patients affected by MS, and that the detection of ECD anomalies could help in the diagnosis of MS.

GE2.6-19
The role of biomechanical research in monitoring of patients with chronic venous insufficiency of the lower extremities
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Aim. We researched how the functional insufficiency of lower extremities and instability of leg articulations can influence on development and evidence of varicose disease. The influence of static load, weakness of musculoligamental system, concomitant pathology of musculoskeletal system was studied. Was provided the monitoring of functional adoption of musculovenous pump of crus during conservative treatment and different variants of operative measures.

Methods. Clinical analysis of movements and functional state of musculovenous pump of crus was made with the help of podometry, goniometry, plantography, functional electromyography, Doppler mapping and thermography during conservative treatment, before and after operative intervention.

Results. All 146 patients with chronic venous disease had abnormal function of musculovenous crus pump. Of the 146 patients, 102 had functional insufficiency of lower extremities and instability of leg articulations. We used the complex of exercises which stimulates musculovenous pump of crus and develops ankle joints. Orthopedic alignment of feet was provided. As a compressive therapy elastic bandage and moving pneumatic compression of the legs were used. As a compressive therapy elastic bandage and moving pneumatic compression of the legs were used. The influence of biomechanical research in monitoring of functional adoption of musculovenous pump of crus was made with the help of podometry, goniometry, plantography, functional electromyography, Doppler mapping and thermography during conservative treatment, before and after operative intervention.

Conclusion. Biomechanical analysis of lower extremities which was provided during the treatment improved the result. It helped to specify questions about character and sequence of treatment, including operative treatment. The prediction of treatment and the quality of life of tested patients is improving. Active rehabilitation is provided on the principals of biological feedback.

GE2.6-20
International phlebological file, or how to make CEAP friendly and easy to use
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The CEAP classification is complete and well structured (1). But it is complex and difficult to use in daily practice. Venous registries using CEAP have been made since several years but their goal is only to evaluate treatment protocols on varicose veins. OJECTIF To make CEAP easy to use in daily practice and provide a scientific tool to evaluate the CVD.

Method. We chose to continue developing our computerized program which name was the European Phlebological File or more recently the Computerized Venous Registry (CVR). File Maker pro is used as software. This new program name is. International Phlebological File (IPF).

Results. - It works in five languages: English, French, German, Italian and Polish. 1) Five main chapters are proposed: Demographic data, Examination, Diagnostic conclusion, Therapeutic approach and Images. Examination chapter includes CEAP items but also non-CEAP like a symptoms scoring system, a quantification of varicose veins, REVAS, Quality of Life, etc. 2) Basic and advanced CEAP and its Scores are calculated in real time. Are available an automatic summary of the file, an export in Excel format sendable by e-mail.

Advantages. Several files in one: a simple version (daily use) to a complete version (scientific studies) but all intermediaries are possible. Four studies were already carried out using this software (2,3,4,5).

References

GE2.6-21
Assessment of microcirculation on sternal wound healing after open chest cardiac surgery using laser doppler imaging system
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In this study we propose to investigate the effect of the neovascularisation and blood flow to the sternum and surrounding tissues by...
using a laser doppler imager. The healing process of the sternum is not entirely dependent upon the internal thoracic arteries following open heart surgery. The causes of the delayed healing are not entirely clear, but are thought to include both mechanical factors such as poor wiring of the breastbone during surgery, and biological factors related to the interruption to the blood supply to the sternum and surrounding tissues associated with the procedure.

Aim. To assess the role of internal thoracic arteries in sternal neo-vascularisation following coronary artery bypass graft (CABG) and valve replacement (VR) surgeries using Laser Doppler Imager

Methods. Patients were divided into two groups who had undergone CABG and VR surgeries (60 patients). Sternal microcirculation measurements were taken by using a Moor LDI laser Doppler imaging system, at ten time points (pre-induction to 96 hours after bypass). The regional blood flow was estimated by measuring the doppler shift of laser light caused by blood cells passing within the laser light field. Blood samples were taken for the analysis of number of factors.

Results. The neovascularisation and wound healing were comparatively faster in VR surgical patients than other group. New vessel formation from the right internal thoracic and intercostal arteries to the left side confirmed that the vascular supply of the sternum on the left side following CABG surgery was not entirely dependent upon the left internal thoracic arteries.

Conclusion. There was a formation of new vessels from right side of the sternum following the mobilization of left internal thoracic artery in CABG surgical patients. The healing process was faster following VR surgery due to bilateral new vessel formation.

GE2.6-22
Clinical use of laser doppler scanner as a diagnostic and prognostic tool for peripheral vascular disease
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Peripheral vascular disease (PVD) needs more extensive investigations to prevent the progression of the disease. The use of ultrasound scan establishes the changes in the arteries. The progressive changes of skin and microcirculation wants more aggressive treatment. Unfortunately, there is no investigations for the management of that area.

Aim. To establish the use laser doppler scanner in evaluating the disease process and the skin changes secondary to the deprivation of the blood supply in PVD patients.

Methods. 160 patients were selected with initial stages of lower limb PVD patients Moor LDI laser doppler imaging system. The regional blood flow was estimated by measuring the doppler shift of laser light caused by blood cells passing within the laser light field. The measurements of the distal dorsal part of the foot were taken in standing and lying down positions to establish the extend of the disease process and the skin changes secondary to the deprivation of the blood supply to the sternum and surrounding tissues.

Results. The postural changes in skin blood supply showed combination of various measurements, which is not statistically significant. We compared these values with ultrasound measurements to establish the relationship with the diseased arteries and the microcirculation. New vessel formation in the areas of reduced blood supply showed the establishment of collateral circulation to that area. Reduced blood flow showed mild to moderate degrees of atrophic and trophic skin changes.

Conclusion. There was no evidence in this study confirmed the clinical use of laser doppler scanner as a diagnostic and prognostic tool. The disease process and the compensatory mechanism in the arteries and microcirculation were different in this study.

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CB2.7 - Lecture: Microcirculation in phlebology

CB2.7
Microcirculation in phlebology
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Microcirculation is the terminal part of the systemic circulation and a connecting system between arterial, venous microvessels and tissues. It is called "exchange circulation" since it is the site of hematotissular exchanges. The local blood perfusion is regulated through the metabolic pathway, conditioned by changes in tissue PO₂ and PCO₂, which uses ED/FR or NO and adenosine as vasoactive mediators and the myogenic pathway, conditioned by changes in pressure or flow. A third mechanism is arteriolar vasomotion. In CVD the capillary barrier is altered in the presence of stasis, resulting in an uncontrolled outflow of liquids and corpuscles into the intestinal tissue with consequent edema and ultimately tissue necrosis. By phlebostatic ulcers we mean lesions of the skin of the lower limbs, typically in the internal malleolar area, caused by prolonged venous hypertension with consequent irreversible microcirculatory failure. The defense mechanism causes vasomotion opening and closing periods to change, with prevalence of closing periods of the precapillary sphincters, limiting capillary hypertension and resulting in capillary hemoconcentration. This phenomenon promotes drainage of fluids from the interstitial spaces and prevents hypoxic alterations of the hematotissular barrier. In severe chronic venous insufficiency, vasomotion fades out and arteriolar vasomotor-sis occurs. The microhemodynamic and microhemorheological events lead to capillary thrombosis with exclusion of microcirculatory units, consequent tissue ischemia and trophic lesions. The flooding of the interstitial tissue overloads lymphatic microvessels which together with venous capillaries act as a drainage system. The investigation methods are Dynamic capillaroscopy which provides number of capillaries per field and diameters, rCBV (blood velocity in the capillaries). Relative HCT. Laser Doppler detects the resting flow (RF), the autoregulation of skin microcirculation, arteriolar reactivity through postural tests, post-ischaemic hyperemia test. Transcutaneous oxymetry (TcPO₂-TcPCO₂) allows to study tissue metabolism and, indirectly, tissue perfusion. Microlymphography investigates skin lymphatic capillaries (number of meshes, diameter and morphology plus functional investigation).

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PP2.8 - Sclerotherapy
3: Safety aspects

PP2.8.1
The French polidocanol registry on long term side effects a survey covering 3357 patient years
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Aim. Short and mid-term side effects of sclerotherapy, in particular with Polidocanol have been previously described in our registry of 12 173 sessions. With this follow-up registry the incidence of long term adverse events was evaluated.

Methods. The physicians involved in the initial French registry have been contacted and asked to partake in the follow-up survey.
Initially included patients have been controlled at the latest possible date in order to determine if a complication had occurred after the end of the initial survey.

**Results.** Data on 1065 patients included during the initial registry have been reviewed with a maximum follow-up of 60 months covering 3357 patient years. A total of 8 (0.39%) adverse events have been observed in patients treated with liquid polidocanol and 50 (1.45%) in patients treated with foam. Most frequent side effects were visual disturbances with a total number of 16 and most severe were 9 muscular vein thrombosis. The onset of side effects was observed directly after sclerotherapy or in the first 6 months afterwards.

**Conclusion.** Sclerotherapy with polidocanol is safe, especially at long term, The use of liquid, with an incidence of side effects lower than 0.4% is perfectly fit for the treatment of benign lesions such as small varices, reticular veins or telangiectasias, whereas foamed Polidocanol used in the treatment of large varicose veins presents less side effects than surgery, with which it now competes.

**PP2.8.2**

**Complications of duplex guided sclerotherapy of the small saphenous vein. Study of a population of 4984 patients**

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**Aim.** To establish in a population of 4984 patients the complications following the Duplex guided sclerotherapy (DGS) of the small saphenous veins (SSV).

**Methods.** an open prospective study is performed since 1990 about the treatment by DGS of patients having varicose disease. The different sclerosing agents were (Tétradeclyl sodium sulfate (TDS) 3% and Polidocanol (Pol) 3%), with the liquid or foam form. The most important volume was of 2cc. The different complications were noted.

**Results.** the mean of age of the general population is of 51, 27 years and the females represent 80, 6%. The number of saphenous veins treated is of 4974 with 891 SSV. In the population of SSV, the mean of age is of 52, 9 years, the follow-up of 59 months. The foam 3% was used in 57, 57% of the cases versus 39, 8% for the liquid and 2, 5% for the foam 0, 5%. The mean of volume was of 1,9cc and the concentration of 2, 9%. The observed complications in this population of 891 SSV were: - DVT 14; - SVT 3; - Necrosis 1; - Œdema 27; - Pigmentation 1. The DVT occurred in 0,56% of the cases using the liquid form and 2,25% with the foam.

**Discussion.** The DVT represent 1,6% of the complications. The foam 3% induces four times more DVT than liquid 3%. The cutaneous necrosis that we observed in 1995 allowed an important work about the anatomy of the small artery of the SSV, inducing a better knowledge if its situation during the sclerotherapy.

**Conclusion.** The SSV was first considered as a difficult and dangerous axis to be treated. Today, also the DGS has become easier, it has to be performed very carefully. In order to avoid a DVT, we surely have to avoid foam on patients with vascular risk.

**PP2.8.3**

**Detergent sclerosants interfere with natural fibrinolytic mechanisms but induce clot lysis in vitro**

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**Aim.** To investigate the effects of Sodium Tetradecyl Sulphate (STS) and Polidocanol (POL) on fibrinolytic mechanisms.

**Methods.** Clot lysis was studied by turbidity measurements in microtitre wells. Tissue plasminogen activator (t-PA) and plasminogen activator inhibitor-1 (PAI-1) were quantitated by ELISA and plasminogen with a chromogenic method. Fibrinogen was isolated from human plasma and recombinant human t-PA was added in some studies.

**Results.** Both sclerosants enhanced fibrinolysis induced by dilute t-PA in plasma clots probably by inactivating PAI-1. However at higher active concentrations, STS was found to inhibit t-PA activity on fibrin and also destroyed plasminogen. STS had a solubilizing effect on non cross linked fibrin but neither sclerosant had significant direct lytic activity on cross-linked fibrin. STS was more potent in clot lysis than POL, STS but not POL destroyed fibrinogen, elevated D-dimer levels and destroyed plasminogen at concentrations above 0.3%.

**Conclusion.** STS and POL exhibit clot lysis activity independent of t-PA in vitro.

**PP2.8.4**

**Sclerotherapy of varicose veins in patients with documented thrombophilia. A prospective controlled randomized study of 105 cases**

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**Conflict of interest:** none

**Aim.** To assess thrombotic complications following sclerotherapy in thrombophilic patients in combination with thrombophrophylaxis, in two randomized arms using low molecular weight heparin (LMWH) or warfarin.

**Methods.** This multicentre prospective randomized controlled study received the Ethics Committee approval and was sponsored by The Société Française de Phlébologie (French Society of Phlebology). In total, 105 patients (81 female, 24 male) ranging in age from 20 to 82 years (mean 50) were selected: - 75 Factor V Leiden mutation - 18 Prothrombin 20210A mutation - 8 high level of Factor VIII - 5 combinations of these After randomization, 51 and 54 patients received with warfarin and LMWH, respectively. A total of 199 sclerotherapy sessions were performed. Foam was used in 160 treatments.

**Results.** No episodes of symptomatic DVT or PE occurred; no instances of DVT were revealed by ultrasound-monitoring.

**Conclusions.** This study suggests that in the three of most common forms of thrombophilia, sclerotherapy, in combination with thrombophrophylaxis, can be performed safely. Prophylaxis with LMWH is easier to use than warfarin.

**PP2.8.5**

**Perivenuous tumescent compression to enhance sclerotherapy results and reduce adverse effects**

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**Aim.** To report results of tumescent perivenous compression (TPVC) following foam ultrasound guided sclerotherapy (UGS) to the incompetent great (GSV) and small (SSV) saphenous veins.

**Methods.** The author has routinely used the technique of TPVC following UGS to the GSV and SSV for the past 4 years. The technique is described in detail. Retreatment rates and adverse effects over a 3-year period for the first 100 limbs treated are reported.
Results. There were 80 GSVs and 20 SSVs treated and followed over a 3 year period. The mean age of patients was 55.2 with 91 females and 9 males. The mean GSV diameter was 5.6mm and the mean SSV diameter was 4.5mm. The diameter range was 3mm - 10mm. All patients were treated with STS3% foam with a Air: Sol ratio of 3:1. The average solution dose was 1.5mls (6.2mls foam). The maximum dose was 5mls (12mls foam). The only adverse effects recorded were 1 episode of superficial thrombophlebitis requiring NSAIDs and 1 allergic reaction to either tape or compression stocking. The were no cases of migraine, visual disturbance, chest tightness or other neurological deficit. There were 2 early failures to close (10mm GSV and 8mm SSV) subsequently treated successfully with endovenous laser ablation (EVLA). Five others (4 SSVs) required retreatment between 5 months and 36 months. All others had only 1 treatment to GSV or SSV trunk.

Conclusion. TPVC appears to reduce treatments required to close the GSV and SSV compared to previously reported studies using foam UGS. Results are comparable to those achieved by EVLA when treating GSVs less than 6mm diameter. The SSVC is probably better treated with EVLA when technically possible. TPVC may reduce the incidence of neurological episodes when using foam UGS. TPVC with UGS provides a cost/effective alternative to EVLA in the treatment of varicose veins associated with GSV incompetence.

May sclerotherapy cause a pulmonary injury? Preliminary results with dynamic scans of the thorax using 99mTc pertechnetate

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Foam sclerotherapy, which started to be diffused ten years ago, radically changed phlebology world. Several authors highlighted the necessity to study and assess the propagation of the gas microbubbles and/or drug within the bubbles in this "modern" sclerotherapy.

Aim. To detect and quantify the uptake of 99m-Pertechnetate in transit organs (lungs, heart) and in target organs (thyroid, salivary glands, stomach) and consequently to assess the possibility of recognizing a pulmonary injury in these patients.

Method. Scintigraphic studies, with 99mTcO4- alone (120 MBq), mixing it with the sclerosant drug/microbubbles and after ten min from the sclerotherapy on a double-head gamma camera. Four cc of foam were injected, at intervals of 5 to 7 days, into a collateral saphenous vein with a Butterfly not in Trendelenburg position, more in details the following assessment have been performed: Dynamic acquisitions were focused on the chest and the neck (total 1800 sec). Semiquantitative analyses were performed with region-of-interest (ROI), which were drawn over the lungs, heart, thyroid and stomach. The cpm in ROIs were plotted against time and the curves were fitted (counting out the initial transient phase).

Results. The three main outcomes of our studies are summarised below. 1) The labelling of the sclerosant drug with Pertechnetato 99mTcO4- is not an adequate procedure to highlight the pathway of the sclerosant drug in foam sclerotherapy; further details will be provided on this part of the studies. 2) The lack of important variations in the time/activity curves of the lungs between the first and the last sclerotherapic tests tend to indicate, at first instance, that there is no pulmonary damage neither immediately nor at short observation. Our results were an impetus for further analyses and discussion. 3) Is absolutely necessary, at this point, apply new procedures and stable ties drug / tracer to follow the path indisputably drug sclerosing within the circulatory stream.

Polidocanol does not remain on the surface of bubbles free in the venous blood

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In sclerosant foams the wall of the bubble is made up of a double layer of surfactant molecules recruited from the surrounding solution. The hydrophobic pole of the molecule is orientated into the gas of the bubble. It has been widely observed that sclerosing power of foam is substantially greater than the equivalent liquid it is possible that this increase derives from this molecular recruitment. When foam sclerotherapy is undertaken bubbles get into the general circulation and methods designed to avoid their presence seem ineffective. If the wall of the bubble once free in the circulation still retains sclerosing power as the lung filters out these bubbles, sclerosis of the small vessels of the pulmonary tree might occur potentially causing pulmonary microvasculature injury.

Methods. A new assay for polidocanol was developed using liquid chromatography and tandem mass spectroscopy, this allowed accurate detection of very low concentrations of polidocanol. Polidocanol microfoam was injected into a closed syringe of fresh human venous blood, after a period of mixing the syringe was held vertically, such that the upper portion of blood contained the bubbles. The syringe contents were then divided into 5 samples the upper bubble rich the lowest bubble poor. The concentration of polidocanol was then measured and samples compared. A number of formulations were prepared varying the concentration of polidocanol and the gas to enhance bubble preservation.

Results. For none of the different formulations were there any trends towards higher concentration of polidocanol in the bubble rich samples. The same methodology was employed in an in vivo experiment and bubble containing blood sampled from the pulmonary artery, again bubble rich fractions did not contain excess polidocanol.

Conclusion. Polidocanol does not remain on the surface of free bubbles following short exposure to venous blood and thus is unlikely to cause sclerosis remote from the site of injection.

Foam Echoguided Sclerotherapy (FES): how to avoid overdoses before injections?

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To perform Sclerotherapy is not always easy. The Duplex has permitted to work with good conditions: varicose veins (VV) are visible, needle too. But some inconveniences can occur like pain, haematomas, inflammatory reactions, etc. To avoid these immediate or short term reactions some technical precautions are essential. Technical precautions before injections. A clinical evaluation and a Duplex investigation are mandatory. In an erect position must be done: 1 A VV clinical assessment a/ to make a map of the VV II-self, b/ to start drawing the VV to be injected on the skin c/ to calculate the length to be treated. 2 A VV Duplex assessment a/ to recognize the superficial venous anatomy, b/ to finish the VV drawing, c/ to estimate the diameter of this VV, d/ to make photography. In lying position must be done: 1 Some preparations: Before any injections, all the injection material is prepared, including thigh elastic stockings. 2 A new Duplex assessment a/ to see the arterial vessels in the injection area, b/ to estimate the new diameter (usually 1 to 2 mm less). 3 The volume to be injected is calculated as: 0 D/4*XL (D=3 14, D= diameter, L=length). This table shows the relationship between the volume of a cylinder
PP2.8-9
Prevalence of patent foramen ovale (right to left shunt) is higher in patients with varicose veins

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4 BTG Inc, Conshohocken, USA

Patent foramen ovale (PFO) is reportedly present in 26% of adults. Echocardiography of patients treated with foam sclerotherapy demonstrates bubble emboli in the right heart in all patients, in those with R>L shunt bubbles cross into the left heart and will result in cerebral bubble embolisation. This investigation sought to determine the prevalence of R>L shunt in subjects with symptomatic great saphenous vein (GSV) incompetence.

Methods. Patients between 18-60 years with symptomatic GSV incompetence and varicose veins (CEAP C3-5) were recruited into a study of endovenous microfoam ablation (EMA). Patients were tested for the presence of R>L shunt at rest and with Valsalva, using single-sided transcranial Doppler (TCD) of the middle cerebral artery (MCA) to detect the presence of bubble emboli following an injection of contrast (agitated saline/blood/air mixture). One or more high intensity transient signals (HITS) within 15 cardiac cycles was considered positive for R>L shunt, and classified by Spencer grade. Presence of bubble emboli during EMA was subsequently monitored.

Results. Of 214 subjects tested for R>L shunt, 85 (39.7%) were positive at rest and 113 (52.8%) were positive after the Valsalva. The total number of patients positive either at rest or after Valsalva was 128 (59.8%) [95% CI 53.4 - 66.4]. Of 61 patients with R>L shunt who subsequently underwent EMA, 89% had cerebral bubble embol detected during EMA. In 21 treated patients negative for R>L shunt, bubble emboli during EMA were detected in 6 (29%).

Conclusions. In this series patients with GSV incompetence R>L shunt was twice as prevalent as reported in the general population, and most will have MCA bubbles during EMA. A link between R>L shunt and varicose veins is a new and unexpected finding of importance to the safety of the treatment of varicose veins with foam sclerotherapy and EMA.

PP2.8-10
Chasing the bubbles in foam sclerotherapy
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Foam sclerotherapy, which started to be diffused ten years ago, radically changed phlebology world: furthermore the usage of duplex guidance and of colour-duplex control of our treatments, led us to assess the pathways and diffusion of the microbubbles of sclerosant foam; as a result a few hypotheses have been formulated on foam bubbles propagation, whereas, in comparison, no studies have been performed on liquid sclerosants from this point of view. Several authors highlighted the necessity to study and assess the propagation of the gas microbubbles and/or of the drug within the bubbles in this “modern” sclerotherapy. The aim of this study is to highlight: 1- if bubbles and drug are linked or separated in their pathway within the blood stream 2- the possible changes of bubble propagation induced by various therapeutic procedures (such as limb elevation, immobility after the injections, etc.). A study with echocardiography has been performed on one patient: the arrival time of the bubbles and their persistence modalities and time within the atrium (after a standardised injection of sclerosant foam) have been monitored and calculated in different time intervals.

Avantages. Easy to calculate, easy to prepare and safe. If it is your first time inject half

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PP2.8-11
Transient adverse effects positively associated with patent foramen ovale after ultrasound-guided foam sclerotherapy
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Aim. To prospectively study the association between patent foramen ovale (PFO) detected by contrast transcranial Doppler (cTCD) and adverse events (AEs) reported by patients after ultrasound-guided foam sclerotherapy (UGFS) for the treatment of varicose veins.

Methods. All patients reporting AEs after UGFS were studied using cTCD directed at the middle cerebral artery to determine the Spencer grading score by counting high intensity transient signals (HITS). Agitated saline was used as the contrast medium. The Spencer grading score determined the presence or absence of PFO. All patients undergoing UGFS received follow-up phone calls within 24 hours and again 2 weeks after the procedure.

Results. Of the 3,259 patients who underwent UGFS, AEs were reported by 7 (0.21%) patients at their first session. These included visual disturbance, migraine, and chest discomfort. Five (71.4%) of these 7 patients tested positive for PFO by cTCD. The 2 week follow-up confirmed no permanent symptoms. Published studies show high sensitivity and specificity for cTCD when compared with contrast transesophageal echocardiography (cTEE).

Conclusion. The overall rate of AEs reported is consistent with published results. The presence of a PFO was detected in most patients reporting AEs after undergoing UGFS. While PFO screening with high sensitivity and specificity can be performed efficiently in the clinic setting, based on the literature, further investigation is warranted.
AP2.8 - Endovenous procedures 4: Wavelength and new fibres

AP2.8-1
Does the wavelength influence the results when treating internal saphenous vein insufficiency with endovenous laser treatment? A prospective analysis comparing three series
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Aim. In literature (Min, Anastasic, Proebstle) there are references of patients series treated with different wavelength endovenous lasers to correct the reflux of the internal saphenous vein, however, there are no studies of a same author using different wavelengths. To compare and analyse short and mid-term outcomes in the treatment of the internal saphenous vein and to determine if the wavelength influences the results through a prospective standardized study of the application of different endovenous laser wavelengths (980nm, 1470nm, 1500nm).

Methods. Between January and June 2007, at Hospital Ruber Internacional in Madrid, three series of selected homogenous patients who underwent the above mentioned endovenous laser treatments were evaluated. These series consisted of 150 lower limbs each one. There is a registered follow-up until December 2008. The patients of the three series did not experience serious complications such as deep venous thrombosis or pulmonary embolism. There were minor complications such as haematomas, ecchymosis, thrombosis, the induction of saphenous path, paraesthesia and pain. Data tabulation demonstrates a higher incidence with the 980nm laser. The efficiency in the closure of saphenous axis is similar in the three series.

Conclusion. In the studied series, all wavelengths are effective for the closure of saphenous axis but the influence of minor complications are higher with the 980nm laser.

AP2.8-2
Laser wavelength and its influence on outcome of endovenous ablation of varicose veins
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Aim. Comparison between 980 and 1470 nm diode lasers and 1320 nm Nd: YAG laser in terms of side effects and therapeutic results.

Methods. Sixty limbs were operated on with diode 980nm laser and 60 limbs with Nd: YAG laser 1320 nm. New 1470 nm diode laser was used in 20 limbs. Endovenous laser procedures of great saphenous veins were performed under tumescent local anesthesia (TLA) in continuous mode. Demographic data, TLA volumes and basic laser parameters were comparable in all cohorts. At D5 all patients completed short pain related questionnaire and 10-cm visual analogue scale (VAS) to evaluate post-procedural pain. Physician evaluated size of bruising or hematoma, induration and superficial phlebitis using 10-cm VAS at D5. Next visits (1,6,12 months) consisted of evaluation of actual quality of life (QoL) using CIVIQ-2 questionnaire and eventual sick leave by patient and clinical CEAP score and quality of saphenous occlusion using duplex ultrasound by physician.

Results. Statistically significant difference in postoperative pain (p=0.005) was found in 980nm group (median [inter-quartile range]: 2.15 [1.1-4.2]) compared to 1320 nm group (1.3 [0.4-2.2]) and influence on usual daily activities grades 1 (best) to 5 (worst) (p=0.03): in 980 nm group (2.5 [2.3-3.1]) compared to 1320 nm group (2.0 [2.3]). Evaluation by physician found difference in grade of bruising or hematoma (p<0.001): in 980 nm group (3.8 [3.5]) compared to 1320 nm group (1.35 [0.4-2.5]) and in induration (p<0.001): in 980 nm group (0.4 [0-1]) compared to 1320 nm group (0.0 [0-0.6]). Results in 1470 nm group were very similar to 1320 nm. There were no differences in QoL, clinical CEAP score and occlusion rate.

Conclusion. Efficacy of hemoglobin-specific and water-specific lasers is comparable in short and mid-term horizon. The advantage of water specific device consists in the least immediately postprocedural discomfort.

AP2.8-3
Endovascular vein ablation using a 1470 diode laser and radial fibers - A new era is arising?
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Endovascular vein ablations using LASER under US control are effective and safe in the treatment of Varicose Disease. This technology was standardised by the IFVG using a axial emission fiber and TLA, which provide Anesthesia, good contact between the fiber tip and the vein wall and a buffer to prevent damage to the surrounding tissues. Recently was introduced a new wavelength (1470 nm) and fibers with radial emission which allows perform this procedure without TLA. Differently of blood absorbed LASERS (810, 940, 980, etc.) this wavelength (1470) has advantages such as less power energy, less pos operative pain, bruising, etc. When associated with radial emission fibers, which has more homogeneous distribution of energy, can be used without TLA allowing to see with US in real time the vein closure process. Using a retrospective analysis the authors presents their results using this new technology and present some particularities of this treatment.

AP2.8-4
Treatment of the varicose veins using 1470nm diode laser – Short term results
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The objective is to report the short term results of the treatment of the varicose veins with new diode laser energy.

Methods. This study included 55 saphenous veins (GSV 45, SSV 10) in 54 extremities in 44 patients treated with 1470nm diode laser energy between June 2008 and Jan 2009. The correct position of the fiber (Bare Fiber or One Step Fiber) tip was confirmed by the ultrasound, and tumescent anesthesia was delivered peri-venous space under the US guidance. The diode laser energy was applied to the vein in continuous mode, the power 11.9 J/sec, the LEED 56.5 J/cm, the withdrawal speed 2.1 mm/sec, the length of treated vein 36.9 cm. The patients were evaluated clinically and with the DUS to assess the efficacy of treatment and the adverse reaction.

Results. The follow-up period was 7 - 187 days. No patients presented the reflux flow at the junction. In one case, the DUS revealed that the thick-walled open vein with no reflux flow at a point distant from the junction. Bruising was minimal, but observed in many patients. Three moderate pains at above knee region, one neuralgia of superficial femoral nerve, and one sural nerve palsy with the small thrombus at SPJ. There were two technical troubles, one One Step Fiber burned to the vein and one bare-tipped broken fiber by the needle used during the tumescent anestheisa was found after the end of procedure. No deep vein thrombosis and no pulmonary embolism.
Conclusion. Endovenous laser ablation of the varicose veins using the new type of 1470nm diode laser seems to offer a valid alternative to accomplish durable occlusion of the vein in the short-term period. Despite the careful handling of the instrument, two mechanical adverse events occurred. Additional investigations are needed to achieve the safe and the effective results.

AP2.8-5

Endovenous Laser Ablation (EVLA) of the gsv with a 1470 nm diode laser and a radial emitting fiber. Follow-up after 6 months and comparison with the bare fibre

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Aim. EVLA of saphenous veins is a safe and efficient treatment option. Influencing parameters for occlusion rate and side effects like bruising and local pain are energy, wavelength and fibre geometry. The aim of this study was to demonstrate efficacy and safety of EVLA with a 1470 nm diode laser using a radial emitting fibretip after a follow-up of 6 months. The results were compared with the outcome using a bare fibre and otherwise equal conditions.

Methods. In this non-randomized prospective study 50 consecutive patients with 50 insufficient GSV were included. Until now 38 patients could be followed after a mean of 181 days (91–289) clinically and by standardized duplex investigation. EVLA was performed with a 1470 nm laser (Ceralas D15 ELVeS 1470nm) in continuous mode, 15 W and a radialfibre in local tumescence anesthesia. All patients had LMWH prophylaxis and analgesic tablets if needed. In the comparison group 55 patients (53 GSV) were treated with a bare fibre and otherwise equal conditions. 31 patients were followed-up for 520 days.

Results. With a mean energy density of 91 J/cm in the radial fibre group the occlusion rate was 100% after 6 months. High patients satisfaction was achieved in 97%. Mean pain duration was 2.5 days (SD 3.8) and a mean of 2.3 (SD 4.2) analgesic tablets was used. Return to daily activities after a mean of 1,6 days (SD 1,1). No severe complications like DVT occured. The paraesthesia rate in the track of the GSV was 6% after 6 months. In the bare-fibre group we observer a tendency towards more local pain but also an occlusion rate of 100%.

Conclusion. Our short-term results show that EVLA of the GSV with 1470 nm and a radial fibre is safe and efficient. Compared to older studies postoperative pain is reduced.

AP2.8-6

Endovenous laser treatment with 1470nm laser and external chromophore. Preliminary study

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Aim. The aim is to show the preliminary experience of superficial venous insufficiency treatment of the lower limbs with an endo laser venous system (ElVeS® PainLess, biolitec AG, Germany), associated an external chromophore.

Methods. After informed the patients and obtained their written consent they were treated under a protocol performed with an endo laser venous system (ElVeS® PainLess, biolitec AG, Germany) consisting of a 1470nm diode laser (Ceralas® E, biolitec AG, Germany) and a radial fibre (ElVeS® Radial Fibre, biolitec AG, Germany) with an auxiliary channel for external chromophore administration (NaCl 20%) at the same time. The intraoperative endovenous laser has been verified with US duplex.

Results. The simultaneous association of the 1470nm wavelength with an external chromophore achieves the desired venous photothermal-oblitration, with absence of allergic reactions and without needing cold tumescent anesthesia. Light sedation was used in few patients whereas the rest did not need any anesthetics, resulting in a completely ambulatory procedure. In the preliminary evaluation post-treatment with US duplex, was observed venous obliteration in all cases. Clinical symptoms were resolved. Collateral effects were minimal discomfort and local pain, echinosis post-puncture, minimal fibrosis, abscess hyperpigmentation and neurits.

Conclusion. By using this new wavelength that is 40 times more absorbed by water than lower wavelengths in association with the administration an external chromophore less energy is required to cause immediate photo-thermal obliteration of the varicose vein. This development provides the benefit of better therapeutic results with less collateral damage.

AP2.8-7

Effectiveness and clinical outcome following endovenous therapy of primary varicose veins: first results of a randomised, prospective study comparing the vnus closure fast system, 980nm and 1470nm lasers and conventional surgery

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Endovenous therapies of primary varicose veins are accepted alternatives to conventional surgery. However, comparative data are hardly existent.

Aim. To compare effectiveness and clinical outcome of different endovenous methods.

Methods. 201 patients (243 legs) with primary varicose veins were evaluated. Indications for treatment resulted from clinical presentation and duplex sonography. Methods used: (a) VNUS Closure Fast: n=72 pat.; n=84 legs; (b) 980nm laser: n=75 pat.; n=85 legs. (c) 1470nm laser: n=60 pat.; n=64 legs; (d) conventional surgery: n=12 patients; n=12 legs. Times of investigation: all patients of the 1470nm laser and conventional surgery group, as well as 42 patients of the 980nm laser and 42 patients of the VNUS Closure Fast group were evaluated up to POD-14 so far, the remaining 50 patients of the VNUS Closure Fast and 31 patients of the 980nm laser group were followed up for 12 months now. Evaluated parameters comprised weight, height, BMI, the revised CEAP score, relevant concomitant diseases, sick leave, time to normal physical activity, pain score, use of analgetics, CIVIQ quality-of-life score, duplex, and complication rates.

Results. Analysing general patients data (age, weight, etc.), no significant differences between groups were detected. As measured by duplex sonography and questionnaire, all patients profited from the methods evaluated in this study. However, following POD-14 one complete (reflux=1sec.) and one incomplete (reflux=0.4sec.) insufficiency was detected in the 980nm laser group. Out of those patients, which were followed up to 12 months, 3 patients of the 980nm laser group revealed complete (n=2; reflux=0.55sec.) and incomplete (n=1; reflux=0.25) insufficiencies after 6 months, respectively. Within the VNUS Closure Fast group one patient with incomplete reflux (0.3sec.) was detected following 12 months. Severe complications were not detected in any patient.

Conclusion. All methods evaluated in this study seem to be comparable effective and save. However, due to its minimally invasive character and slightly better outcome, the 1470nm laser and the VNUS Closure Fast system seem to be most suitable.
AP2.8-8
Does the laser power influence the results of Endov- enous Laser Ablation (EVLA) of incompetent saphenous veins with the 1470 nm diode laser and radial fiber – a prospective randomized study comparing 10 and 15 watt. 5 months follow-up
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Major side effects after endovenous laser ablation are pain and bruising. The aim of this study was to compare outcome and side effects after EVLA of incompetent great saphenous veins (GSV) with a 1470 nm diode laser (Ceralas E, Biolinec) and radial fiber using a power of 10 or 15 W.

Methods. Between 27th May 2008 and 7th October 2008, 48 consecutive patients (48 legs) with an incompetent GSV were treated by EVLA. The patients were randomized in two groups. Group A consisted of 24 patients, and a power of 10W was used, group B consisted of 24 patients and a power of 15 W was used. All patients were re-examined after 1, 10, 30 and 150 days clinically and by duplex for complications and occlusion in the treated vein segment.

Results. There was no significant difference concerning gender, age, C of CEAP, BMI or diameter of the treated vein. In Group A the mean endovenous fluence equivalent (EFE) was 31 J/cm2 and in Group B 40 J/cm2. In both groups occlusion of the treated veins was achieved for all patients. 100% vein occlusion remained the same also after 150 days. The diameter of the GSV reduced at 3 cm below the sapheno-femoral junction from 1.1 to 0.6 cm at 1 month and 0.5 cm at 5 months respectively in the both groups. Patients in Group A used significantly less analgesic tablets in a smaller time interval. There was also a trend to less postinterventional pain in Group A without reaching significance.

Discussion. In this prospective randomized comparative study the power that was chosen did not influence the occlusion rate when a high EFE was used. Lower power level notably reduced days with pain killers and analgesic use as well as slightly reduced pain.

AP2.8-9
Endovenous laser ablation: intraluminal centralisation of fibre-tip can perfectionate the technique, a histologi- cal study
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Aim. In this histological study we analysed the use of a new tulip-shaped self-expandable catheter fixed to the fibre for ELT in an anial model (goats). Can the avoidance of the direct contact between the fibre tip and the vein wall prevent vessel wall ulcerations and perforations and venous tissue destruction? Were we looking the difference in destruction between veins treated with a normal bare fibre and veins treated with this new catheter fixed to the fibre.

Methods. In 10 goats, 20 lateral saphenous veins were treated with ELT. In 10 veins we used the tulip-shaped catheter fixed to the fibre. With a 980nm diode laser (Inter-Medic°, Barcelona, Spain) 62 J/cm2 on average were administrated. Postoperatively the veins were removed at different stages and sent for histological examination. The pathologists measured the diameter of the ulcerations, as well as the depth of penetration in the vein wall. A score to measure the venous tissue destruction was used.

Results. Veins removed immediately after ELT (without catheter) (n=57, 78 sections) show an uneven destruction of the vein wall with ulcerations and perforations. Using the catheter these ulcerations were avoided. In veins removed 10 days after treatment (n=48, 99 sections) we found a much more extended vein wall destruction. Using the tulip-shaped catheter we obtained a significant higher circumferential total vein wall necrosis (79.8 versus 64.4%) (p<0.001) and a reduced venous tissue destruction rate (p<0.001). Veins removed three weeks (n=67, 88 sections) after treatment still show a higher circumferential vein wall necrosis (97.6 versus 79.1%) (p<0.001) but the difference in venous tissue destruction disappeared due to inflammatory regression and healing of the damaged tissue (p=0.47).

Conclusion. The use of a new tulip-shaped self-expandable catheter fixed to the fibre for ELT avoids the usual ulcerations and perforations of the vein wall, results in a more even vein wall destruction with necrosis of a higher percentage of the circumferential vein wall. The venous tissue destruction and reactive inflammatory reaction is significantly lower. This can clinically correlate with less postoperative pain and phlebitis.

AP2.8-10
Endovenous laser treatment: is there a clinical differ- ence using a 1500nm laser versus a 980nm diode laser? A multicentric prospective comparative trial
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Aim. In this comparative multicentric prospective trial we compared the use of two different laser wavelengths: the 1500nm versus the 980nm diode laser. We studied the occlusion rates at one month and six months postoperatively and noted possible side-effects.

Methods. In 4 centers 201 great saphenous veins in 201 patients were treated according to the same detailed protocol using continuous retraction. The only difference was the delivered energy: due to the higher and more specific energy light absorbition of the vein wall using a 1500nm wavelength laser, the delivered energy using this wavelength was lower. 92 veins were treated using a 980nm laser and 109 veins using a 1500nm laser. An average linear endovenous energy density of 56.6 J/cm and 39.78 J/cm were administrated respectively for the 980 and 1500m laser. A duplex scan was scheduled at one month and six months. Postoperatively we measured ecchymosis, the incapacity to work, the use of painkillers, the induration around the treated vein, patient satisfaction rate and a quality of life score (CIVIQ2) was done.

Results. At 1 month we found no significant difference in occlu- sion rate (95%) nor in morphological evolution of the treated vein. The incapacity to work (p=0.078) and patient satisfaction rate (p=0.65) were comparable. Patients treated with a 1500nm laser had a lower need to take analgetics (p=0.001), the induration along the treated vein was lower (p=0.001) and they had a better postoperative quality of life (p<0.001).

Conclusion. Using a 1500nm diode laser in treatment of a re- fluxing great saphenous vein results in a similar occlusion rate at one month postoperatively and this with less side-effects. The occlusion rates at 6 months postoperatively will be available in may 2009.
AP2.8-11

Comparison of 810 to 1470 nm laser systems in identical veins

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Aim. Endovenous Laser - Obliteration (ELO) uses a variety of wavelengths from 810 to 1470 nm. Only few comparative studies exist. We performed a study comparing four modalities of ELO in identical vein segments of the same patient.

Methods. In a selection from more than 1600 cases (1/08 1/09), 32 patients were chosen with the particular condition of a low variance (<20%) in diameter of insufficient saphenous veins (GSV, LSV; 5-18 mm). The vein segment to treat was divided in two parts and these were randomized to two of four Methods. ELO 810 nm, 940 nm, 1470 nm, and 1470 radial (ELVeS). All patients received a coxal perivenous tumescence anaesthesia (CPTA) according to angiologic®-standards and postinterventional eccentric compression for at least 5 days. Vein diameter and clinical data were registered pre and after treatment, after one week, eight weeks and as far as feasible after 2, 6 and 12 months.

Results. The primary success rate (elimination of reflux) was 100% in all procedures. No patient had major postinterventional complaints (no prescription of analgesics). There were no complications. All patients were able to return to work or daily activities the same day. During performance only minor differences in pain sensations were detectable, without exception due to questions of technique. Primary and follow-up data of ELO were very similar for all wavelengths in the majority of VC ≤6 mm diameter. ELA of VC makes possible the extension of the treatment, shortens the operating and recovery time, leads to ideal cosmetic results, reduces the need for complementary sclerotherapy.

GE2.8 - Venous diagnosis 1

GE2.8-1

Risk factors related to the failure of venous leg ulcers to heal with compression treatment

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Published healing rates obtained with compression therapy in the treatment of venous ulcers vary widely from 40-90%. According to numerous studies it has been suggested that the application of external pressure to the calf muscle raises the interstitial pressure resulting in improved venous return and reduction in the venous hypertension. Several risk factors have been identified to be correlated with the failure of venous leg ulcers to heal with compression therapy (longer ulcer duration; large surface area; fibrous deposition present on >50% of the wound surface and an ABPI of <0.85).

Methods. An open prospective, single-center study was performed in order to determine possible risk factors associated with the failure of venous ulcers to heal when treated with multi-layer high compression bandaging system for 52 weeks. One hundred and eighty nine patients (101 women, 88 men; mean age 61 years) with venous leg ulcers were included in the study. The study excluded patients with arterial disease (ABPI<0.8), heart insufficiency with EF<35, pregnancy, cancer disease, rheumatoid arthritis and diabetes.

Results. Within 52 weeks of limb-compression therapy, 24 (12.7%) venous ulcers had failed to heal. A small ulceration surface (<20cm2), the duration of the venous ulcer <12 months, a decrease in calf circumference of more than 2cm during the first 50 days of treatment and emergence of new skin inlets on the wound surface were favorable prognostic factors for ulcer healing. A large BMI (>33 kg/m2), short walking distance during the day (<200m), a history of wound debridement and ulcers with deepest presentation (>2cm) were indicators of slow healing. Calf: ankle circumference ratio <1.5, fixed ankle joint and reduced ankle range of motion (<20degrees) were the only independent parameters associated with non-healing (P<0.01).

Conclusion. The results obtained in this study suggest that non healing venous ulcers are related to the impairment of the calf muscle pump.
GE2.8.2

New virtual computer tools to investigate venous patients

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The true revolution of medical imaging, from multislice CT or MRI acquisition, makes now possible a realistic 3D modeling of the human body. The last computer techniques bring us new tools to study the human anatomy, for educational purpose and for research in the field of venous diseases.

Aim. Validation and development of virtual dissection techniques.

- interactive handling of 3D anatomical models - and virtual travels inside the human body, using direct volume rendering method on multi-processor computer systems.

Results. 3 main fields of use of these new tools:

- Investigation of the patients with CVD: Pre-operative assessment of complex cases, recurrence after surgery, especially of the popliteal fossa. In all patients, it is mandatory to add an hemodynamical assessment by Duplex associated with a skin mapping. Assessment of congenital venous malformations in association with MRI and Duplex. - Educational purpose. It is a fine tool to learn venous anatomy. Here the virtual dissection of anatomical structures is a precious help by the way of interactive movies and animations. - For Research to enhance our anatomical knowledge and to build new quantification tools in radiology.

Conclusion. This 3D modeling techniques and databases will also find more and more indications in the near future.

- To simulate surgical approaches and strategies
- To help the surgical team, so that one can see the CT data correctly registered on the patient in the operating theater while the procedure is progressing (augmented reality)
- For educational venous anatomy and prepare to human cadaver dissection (virtual dissection)
- The first step is to bring an anatomical expertise for the validation of these databases and new tools for a better use of interactivity and simplify segmentation of the anatomical structures.

GE2.8.3

Superficial venous score 9-1: a classification system that improves cosmetic treatment of leg vein lesions

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Aim. Subsidiary exams such as ultrasound and VeinViewer improve diagnostic resolution. They enable viewing hidden veins behind leg vein lesions. After 4 years of practice aided by these methods, a decision table was developed (score 9-1) that helps to improve cosmetic leg vein treatment outcome. To describe the 9-1 venous scoring, a treatment oriented table. (mainly for cases CEAP 0 to 3).

Methods. A 9 cell table was devised and fashioned in 3 rows x 3 columns, implying the following 2 main questions:

- horizontal rows: which kind of varicose veins does the patient have (with or without reflux on saphenous veins), if any?
- vertical columns: which kind of telangiectasias does the patient have (with or without feeder veins connected), if any?

Results. Semiotics may be blind or misleading. The decision to place the patient on the first row (scores 9, 8 or 7) or on the second row (scores 6, 5, or 4) is based primarily on the ultrasound findings. Beginning sclerotherapy without ultrasound/VeinViewer evaluation may lead to treatment failure due to wrong conclusions during diagnosis. The importance of feeder veins is unfortunately not a general consensus. For instance: a patient with telangiectasias and no visible feeder veins scores 2 in this study; but if VeinViewer examination shows feeder veins, the score changes to 6. If an insufficient saphenous vein is detected, the score changes again to the highest one, 9.

Conclusion. The Score 9-1 helped us to choose leg vein treatment. It enabled us to understand that lack of cosmetic outcome in any type of sclerotherapy is probably lack of correct diagnosis/indication. This classification table is currently under evaluation in an ongoing validation study.

GE2.8.4

The relation between CEAP and the gold standard ambulatory venous pressure measurement

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Aim. To investigate the relation between CEAP and ambulatory venous pressure measurement (AVP) and anterior compartment pressure measurement (ACP), respectively, and the correlation between AVP and ACP.

Methods. Design: Descriptive study of a random group of patients with post-thrombotic syndrome, chronic venous insufficiency, or un-declared leg complaints that were investigated by AVP (primary outcomes: ambulatory venous pressure and venous refill time) and ACP. Patients: Between 2004-2008, in total 163 lower limbs were investigated in 89 patients in various stages and causes of chronic venous insufficiency at the Erasmus Medical Center Rotterdam. These were divided as 90 female and 73 male lower extremities, with a mean age of 44.3 years (standard deviation 14.7). Measurements: The legs were scored for CEAP, and investigated by AVP and ACP. Statistics: The data of CEAP, AVP and ACP were compared by Kruskal-Wallis one-way analysis of variance. Spearman’s test was used to investigate the correlation between AVP and ACP.

Results. The 163 lower extremities were divided according to CEAP: C0 n = 33; C1 n = 8; C2 n = 15; C3 n = 27; C4 n = 47; C5 n = 21; C6 n = 12. Kruskal-Wallis test showed statistically significant differences among the seven groups of CEAP compared to AVP (p <0.001), for as well ambulatory venous pressure as venous refill time, but not to ACP (p = 0.148). The ambulatory venous pressure increased and venous refill time shortened with increasing CEAP categories. A poor correlation was found between AVP and ACP (r=0.10).

Conclusion. Patients with more severe CVI and higher CEAP have a worse AVP. No relations between CEAP and ACP, and AVP and ACP, were observed suggesting that the later are different measures of venous hemodynamics.

GE2.8.5

The static disorders of the foot: a major risk factor of chronic venous disease

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Aim. To study the relationship between chronic venous disease (CVD) and the static disorders of the foot (SDF).

Methods. and Methods: A retrospective study including 600 lower limbs of 300 patients with CVD were assessed by measurement of the Dhan-Annourier angle of the foot, in order to quantify the SDF, a complete evaluation of the CEAP items (basic CEAP) and the symptoms including a scoring system of imputability.

Results. A significant correlation has been found between static disorders of the foot and: The body mass index (p<0.01), the presence of symptoms (p<0.01), their global score, their score of imputability (p<0.001), the CEAP clinical classes (p<0.001) and the long standing position during the day. Age and sex were not found significant. The SDF can be considered as an important factor of worsening of the CVD.

Conclusion. This emphasizes the crucial importance of the correction of the foot static disorders in CVD patients: it will improve the symptoms as well as all items related to the venous stasis. This could be easily explained by the improvement of the foot pump efficacy during walk.
Several dermatological applications of functional skin microcirculation mapping using PPGI method

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Spontaneous or provoked changes in skin perfusion can be used as clinical indices for several kinds of diseases. Evaluation of the skin complexion consists mostly in clinical assessment and allows only a qualitative rating. Technical possibilities for quantitative estimation are offered by IR-Thermography, Laser Doppler Flowmetry and LDFI (Laser Doppler Perfusion Imaging) and in recent times also by Photoplethysmography Imaging method (PPGI).

Aim. The objective of this study was to measure quantitatively temporal and spatial microcirculation changes during specific pharmacological and mechanical skin irritation tests (prick test, dermography test) using PPGI.

Methods. The core of the PPGI system is an imaging strategy, which is capable of contactless recording, processing and displaying image sequences of the selected skin area to visualize the skin vessels and to analyse the dermal perfusion. The selected body area is illuminated by monochromatic light. The size of the observed skin body region and the spatial resolution can be arbitrary chosen, depending on the utilized camera lens and distance between camera and measuring object.

Conclusion. Our data demonstrates that Photoplethysmography Imaging is highly quantitative of local skin perfusion changes in standardized dermatological tests used as diagnostic means in allergology. The presented PPGI technique opens up new quantitative insides of dermal perfusion and to analyse the dermal perfusion. The selected body area is illuminated by monochromatic light. The size of the observed skin body region and the spatial resolution can be arbitrary chosen, depending on the utilized camera lens and distance between camera and measuring object.

The analysis of complex rhythmical changes in dermal microcirculation requires sophisticated assessment strategies. PPGI allows to acquire undistorted vital signals in a broad frequency range; correlation of perfusion signals reveals that besides the known central rhythms certain local oscillations especially around 0.1 Hz occur, which show endogenous persuasibility. The local variability of the perfusion patterns can further be assessed. A completely new, previously unreported phenomenon of distributed blood volume movements in dermal perfusion could first be observed using the PPGI technique. The physiological origin of this phenomenon is unknown so far. However it is expected that the low frequency relaxation rhythms around 0.1 Hz have a very important bearing on the human physiology and have potential therapeutic implications i.e. in psychosomatic medicine.

A new method for studying chronic venous insufficiency (CVI), Teleray Light Reflex Rheography (TLRR)

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The techniques currently more in use for the study of chronic venous insufficiency, such as echo-color-doppler and plethysmographic methods, foresee an evaluation with the patient under static (clinoorthostatism) conditions or with dynamic manoeuvres of muscular activation that are not like the physiological conditions of deambulation. The techniques with air-plethysmography, impedance, strain-gauge and LRR are performed with the patient at rest and after movements of the foot (dorsiflexion) that, even if simulating deambulation, do not activate all the components involved in the physiology of walking. To examine what really happens during deambulation on the venous system, we have elaborated a system of telemetric transmission, in order to evidence the venous emptying and filling while the patient effects his/her usual deambulation, with his/her own footwear, insoles, walking-aides and possible subjective postural alterations of various origin. The method used is LRR, modified so that the signal, through a transmitter set on the belt of the patient, is sent to a receiver set on the rheograph. The layout so acquired is visualized on the monitor and subsequently elaborated and filed. This TLRR method, projected and built by Microlab Elettronica (Padua - Italy) and clinically experimentated at our Day Hospital and Vascular Laboratory, allows to overcome the obstacles determined by the anatomical-functional limitations that many patients may have with the standard tests, especially in advanced age (tip-toe, dorsiflexion, etc.) and that can prevent a correct execution of the evaluation and the consequent interpretation of the results. Due to the simplicity of the execution and the reproducibility of the exact anatomical-physiological conditions of the venous hemodynamics during walking, the new TLRR method can be applied for the study of all patients, also in the presence of deficits in a correct deambulation and it can therefore be used as screening of first level in the study of CVI.

Dynamic foot-exerciser: a validation study and testing in disuse oedema patients

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Aim. It is well-known that sitting one hour results in swelling and fluid retention. However sitting for a long-day work or in elderly
people with leg disease, the venous and lymphatic stasis might be important for chronic venous [and lymphatic] disorders (CVD). Physical training programmes developed to prevent CVD are aimed at calf muscles strengthening.

Methods. We studied a patented, dynamic foot-mover or calf muscle pump facilitating device (PFD: VenoGym® by Engineer E. Tacconi), designed to encourage the user to do a certain physical and spontaneous activity without any particular effort. A first test showed that a short period of use (half an hour in the morning and half an hour in the afternoon) of PFD induces subjective benefits, confirmed by the sensation of "light legs". Validation was carried out in a group of 22 healthy people (mean age 52 years, range 27-69), by Photoplethysmography (PPG) and in 4 subjects by Laser Doppler Imaging. Moreover we tested PFD on 12 aged disabled people and 12 patients without mobility problems, based on a special form for the Qol and swelling reduction, color-Duplex and laser-Doppler exams.

Results. PPG analysis showed that few minutes of exercise with PFD determined a vein emptying of both legs (45% ±18 M± SD right leg and 47% ±18 M± SD left leg). Laser Doppler imaging performed on both feet after 10 minutes of exercise showed a mean reduction of 19% of tissue perfusion. The study carried out on disabled patients, showed an improvement in blood flow and leg swelling reduction in both groups, the most effectiveness in the control group.

Conclusion. PFD device has a proven vasactive effect both on micro and macrocirculation, the results on disabled confirm the necessity of a valid physical activity.

GE2.8-10
Increased calf muscle deoxygenation during light-intensity exercise suggests increased venous reflux flow in advanced human chronic venous disease
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To determine the relationship between changes in calf muscle deoxygenated hemoglobin (HHb) and clinical stages of chronic venous insufficiency (CVI), we investigated the findings of duplex ultrasound scanning in relation to those of near-infrared spectroscopy (NIRS) in the calf muscle.

Methods. Calf muscle HHb level was measured using NIRS in 168 limbs of 158 patients with various clinical stages of CVI. Clinical manifestations were categorized according to the CIEAP classification, and the patients were divided into two groups: early CVI (C0-3,Ep, As, d,p, Pr, o) and advanced CVI (C4-6,Ep, s, As, d,p, Pr, o). Calf venous blood filling index (HHbFI) was calculated on standing, then the calf venous ejection index (HHbEi) was obtained after one tiptoe movement and the venous retention index (HHbRI) after 10 tiptoe movements.

Results. One hundred sixteen limbs had early, and 52 had advanced CVI. HHbFI and HHbRI were significantly increased in patients with advanced CVI in comparison with those in patients with early CVI (P<0.005, 0.0001, respectively). Similarly, HHbRI was significantly greater in patients who had superficial combined with deep and/or perforator insufficiency than in patients with superficial insufficiency alone (P=0.002). HHbRI showed the strongest correlation with duplex-derived peak reflux velocity in the popliteal vein (r=0.78, P<0.0001). ROC curve analysis revealed that HHbFI >0.2 was the strongest indicator of advanced CVI, with a sensitivity of 79.6% and a specificity of 81.9%. Furthermore, combination of an optimal cut-off point of 0.2 for HHbFI and 2.9 for HHbRI improved the ability to discriminate early from advanced CVI, with a sensitivity of 91.4% and a specificity of 89.7%.

Conclusion. These results suggest that HHbFI and HHbRI may be promising parameters for evaluation of human chronic venous disease. Furthermore, combination of the optimal cut-off points for HHbFI and HHbRI provides strong ability to discriminate early from advanced CVI.

CB2.8 - Venous pathophysiology

CB2.8-1
Modification of long saphenous vein diameter during pregnancy
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Data: it is classically knew that pregnancy is one of main aggravating factors of the superficial venous disease when the heredity predisposes emergence of varicose veins. Nevertheless, few studies demonstrated in an indisputable way the determinism of one or several maternities in the evolution of varicose veins. The study of Maffe showed that there was a positive correlation between the number of pregnancies and prevalence of them. While Abramson finds this relation only for the women between 24 and 35 years old. The same study showed that there was no relation between the weight gain during the pregnancy and apparition of varicose veins.

Aim. We wanted to know if there was a caliper variation of the long saphenous vein during the pregnancy and if there was a correlation between this variation o and appearance of a reflux.

Methods. We measured the diameter of long saphenous vein of 40 women, during their pregnancy as well as the appearance of a reflux of the same long saphenous vein which we quantified in duration.
Results. to a third approximately, there is no modification of the diameter of the long saphenous veins. Two thirds of the women, we find either a modification with or without soleus muscle vein dilatation and popliteal vein thrombosis caused by vein entrapment or without soleus muscle vein dilatation and popliteal vein thrombosis caused by vein entrapment. It seems on the other hand that the personal predisposition (previous pregnancies and age is a factor which facilitates the appearance of varicose veins and increases their importance.

CB2.8-2
The role of circumflex femoral veins in the SFJ incompetence. A case report
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A young female patient, 31 yo, an opera singer, came for a consultation, mainly for aesthetic problems of the lower limbs. Telangiectasias and lipodermatosclerosis were clinically evident. An asymptomatic bilateral P-point pelvic shunt was demonstrated by the EcoDoppler, while no nutcracker syndrome was detected. A Hemodynamic Venous Map of the left lower limb was performed to detail the features of the venous network. The exam demonstrated a Circumflex Medial Femoral Vein (CMFV), going to the Common Femoral vein and then to the GSV. A computer simulation showed the flow behaviour over the mean of a systolic-diastolic manoeuvre: A longitudinal section of the SFJ showed the valves: iliac, epigastic, SFJ terminal and pre-terminal ones. The Valsalva manoeuvre showed a GSV terminal valve incompetence. A dilated CMFV vein at the level of the SFJ was the source of the reflux through the GSV, while the external iliac vein was competent. Paraanao manouevre was always negative. Discussion. Flow in the CMFV was directed toward the common femoral vein as in the hyperpressive as in the relaxing phases of Valsalva. Hyperpression seemed only to cause the deviation of flow from the anterograde direction into the iliac vein to the retrograde flow (reflux) into the GSV. GSV reflux with Valsalva was present only in the supine position, while it disappeared in orthostatism, when before the Valsalva valve cusps were already in tension at rest, so that during the Valsalva the valve excursion was less wide. The exam shows clearly that a GSV reflux can sometimes occur in absence of iliac reflux. Circumflex femoral veins (medial and lateral) are common findings during ordinary Eecocolordoppler investigations of the venous system of the lower limbs. Over 11 cases of symptomatic patients were treated surgically with 78% excellent or good relief (Phlebology 2002;17:103-107). One recent case: A 25 year-old female came to our university hospital c/o popliteal tenderness, calf expansion and pain when standing. The medial head of the gastrocnemius muscle was partially resected safely. After surgery, all symptoms disappeared. Six symptomatic (slight dullness or swelling) legs were examined using color Doppler imaging in 2007-2008 and were all found positive in the dorsoflexion test of the ankle showing over 80% to 100% narrowing of the popliteal vein. The soleus muscle vein dilatation (over 5 mm) was observed in five legs. Popliteal vein thrombosis cases (seven legs) were examined over the same time period. All showed venous entrapment caused by the gastrocnemius muscle. Soleus muscle vein dilatation was also found in five of the 7 legs. Contralateral popliteal vein entrapment was positive in four legs and soleus vein dilatation was found in three legs out of those four. A popliteal vein entrapment study will be helpful to understand the popliteal vein entrapment syndrome mechanism.

CB2.8-3
Popliteal vein symptomatic & asymptomatic entrapment, and popliteal vein thrombosis caused by vein entrapment with or without soleus muscle vein dilatation
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Over 11 cases of symptomatic patients were treated surgically with 78% excellent or good relief (Phlebology 2002;17:103-107). One recent case: A 25 year-old female came to our university hospital c/o popliteal tenderness, calf expansion and pain when standing. The medial head of the gastrocnemius muscle was partially resected safely. After surgery, all symptoms disappeared. Six symptomatic (slight dullness or swelling) legs were examined using color Doppler imaging in 2007-2008 and were all found positive in the dorsoflexion test of the ankle showing over 80% to 100% narrowing of the popliteal vein. The soleus muscle vein dilatation (over 5 mm) was observed in five legs. Popliteal vein thrombosis cases (seven legs) were examined over the same time period. All showed venous entrapment caused by the gastrocnemius muscle. Soleus muscle vein dilatation was also found in five of the 7 legs. Contralateral popliteal vein entrapment was positive in four legs and soleus vein dilatation was found in three legs out of those four. A popliteal vein entrapment study will be helpful to understand the popliteal vein entrapment syndrome mechanism.

CB2.8-4
Anatomical reflux does not predict the functional impact of venous disease
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Aim. Numerous tools are available for the assessment of disease severity for patients with venous insufficiency. This study investigates the relationship between patterns of venous reflux with haemodynamic function, disease specific quality of life and clinical scoring systems.
Methods. Patients referred with symptomatic superficial venous reflux (without deep reflux) were prospectively studied. Pre-operative colour venous duplex, digital photoplethysmography (a measure of venous refill time, VRT), CEAP grade, VCSS and Aberdeen Varicose Vein Questionnaire (AVVQ) scores were recorded. Legs were stratified according to the pattern of reflux, into those with reflux of the greater, lesser or both saphenous veins.
Results. Over a 6 month period, 146 patients with varicose veins (211 legs) were studied, of which 108 completed all the investigations. The median VCSS was 4 (range 0-26) and median AVVQ score was 16.52 (range 1.31-48.2/100). CEAP scores were C2 (n=64), C3 (n=41), C4 (n=30), C5 (n=4), C6 (n=7). Median AVVQ scores were 13.89 (range 1.31-14.64) for patients with unilateral disease compared to 19.79 (range 2.69-48.23) to those with bilateral disease (p=0.069, Mann Whitney U). Of the 211 legs included, VRTs and CEAP score did not differ significantly according to the pattern of anatomical reflux across the 3 groups (p=0.95 and p=0.38 respectively, Kruskal Wallace test).
Conclusion. Bilateral disease may be associated with poorer quality of life, but anatomical pattern of reflux is otherwise a poor indicator of disease severity. Assessment of haemodynamic function and quality of life may be important when evaluating and managing patients with chronic venous disease.

CB2.8-5
Early stages of venous disease are associated with arterial endothelial dysfunction in healthy adults
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To evaluate the association between early stages of venous disease and arterial endothelial dysfunction. Venous disease has been associated with the release of inflammatory mediators that can affect arterial endothelial function increasing cardiovascular risk.
Methods. We studied thirty-nine healthy volunteers (mean age 30.9 years, men: 25.6%). Early stage of Venous disease was diagnosed using ultrasound examination; arterial endothelial dysfunction using flow-mediated dilation (FMD) and FMD normalized for the peak shear rate (nFMD).
Results. Early stage of VD was present in 14 (55%) of the subjects. The average FMD was 20.4% (SD. 5.7%) and the average nFMD was 16.7±10-3/sec (SD: 5.6±10-3/sec). Compared to controls, participants with early stage of venous disease had a lower FMD (15.2% vs. 23.8%, P<0.001) and nFMD (12.7±10-3/sec vs. 19±10-3/sec, P<0.001). People with the most clinically evident disease had the worst endothelial function.
Conclusion. Our findings, if confirmed in larger population, indicate that early stage of venous disease may cause a general pro-inflammatory situation and should be viewed as a cardiovascular risk factor in and of itself. The finding of a noticeable decline in selected
serum cytokine levels after compression therapy for venous insufficiency suggests that such a risk factor might be modifiable, with potentially important public health consequences.

**CB2.8-6**

The pathophysiological role of extra-saphenic perforator veins

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Understanding the patho-physiological role of extra-saphenic perforator veins has always been a big challenge for phlebologists. In this study we hypothesized that extra-saphenic perforator veins might play a pivotal role in the drainage of the superficial veins in critical conditions and we tested our hypothesis in three patho-physiological contexts: a) primary varicose veins, a condition in which some antegrade drainage through the sapheno-femoral junction is still preserved; b) recurrent post-stripping varicose veins with saphenous vein segments unwillingly left by the surgeon, a condition in which some drainage might still occur through saphenic perforator veins; c) recurrent post-stripping varicose veins in which the saphenous vein had been completely removed by the surgeon.

Methods. 2,581 pts., 74% females, mean age 61 years ± 7 SD, underwent echo-doppler examination of the lower limb venous system for primary varicose veins due to incompetence of the sapheno-femoral junction (2,527 pts.) or for recurrent varicose veins after stripping of the greater saphenous vein (254 pts.).

Results. Among the 2,327 pts. with primary varicose veins, 36% showed more than 2 extra-saphenic perforating veins hemodynamically active. Among the 254 pts. with recurrent varicose veins, those with saphenous vein segments unwillingly left by the surgeon (62 pts.) showed more than 2 extra-saphenic perforator veins 44% of cases, while pts. whose saphenous vein had been completely removed by the surgeon (192 pts.) showed more than 2 extra-saphenic perforator veins in 82% of cases.

Conclusion. These findings confirm our original hypothesis that extra-saphenic perforator veins represent the functional reserve of the venous system able to warrant the drainage of the superficial veins in critical condition. This phenomenon is particularly relevant once the greater saphenous vein, that represents the physiological drainage of the superficial venous system through the sapheno-femoral junction and/or its own perforator veins, has been completely removed.

**CB2.8-7**

Unmyelinated C fibers and inflammatory cells are present in the wall of human varicose veins. A clinico-pathological study

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The neurophysiological mechanisms involved in venous pain in chronic venous disease are not totally elucidated. Localized release of proinflammatory mediators seems to play a key role but the presence of nociceptors sensitive to inflammatory mediators such as unmyelinated C fibers has never been demonstrated.

Aim. To confirm the presence of unmyelinated C fibers and inflammatory cells in varicose veins.

Methods. Ten informed and consenting patients suffering from CVD (5 patients in CEAP class C2-C3, 5 in C4-C5 class) reporting moderate to severe leg pain (>30 mm on a 100 mm visual analogic scale) and with scheduled great saphenous vein stripping were included. For each patient, 5 segments of the varicose saphenous vein were collected and processed for light and electron microscopic examination. Immunohistochemistry for PS 100 and CD 45 was performed on deparaffinized sections.

Results. Patients were 33-65 years old; 80% were women. All present with GSV reflux. At light examination, PS100 immunopositive nerve fibers were found in all patients (98% of samples). The density of nerve fibers was highly variable from one sample to another. Hematoxylin-eosin-stained sections, immunopositive for CD45, were also found in all patients (92% of samples) but scattered and with no evident link with nerve fibers. Under electron microscope, unmyelinated C fibers were found in 8/10 patients (34% of samples). When present, unmyelinated C fibers were mainly located in the external part of the media (7/8 patients, 12/17 samples) and to a lesser extent in the adventitia (7/8 patients, 7/17 samples). Mastocytes were seen in 3 patients. Marked signs of wall remodeling were observed in all patients; histiocytic macrophages overloaded with products of degradation in all but one sample, collagen bundles accumulation, lipid accumulation and de-differentiation of smooth muscle cells in all samples.

Conclusion. Varicose veins exhibit unmyelinated C fibers likely responsible for pain diffusion in CVD.

**CB2.8-8**

Venous flow pattern and heart disease

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As veins are part of the cardiovascular system, changes in heart function are assumed to alter venous flow. However, since phlebology and cardiology are usually distinct specialist fields this interdependence is rarely taken into account. In our department, in which phlebology is closely associated with cardiology, we used the opportunity to systematically study the influence of heart disease on venous flow.

Methods. Over a 1-year period we examined the flow pattern of the femoral veins in all patients who were examined by transthoracic echocardiography for known or suspected heart disease. We compared the venous flow pattern of patients without echocardiographically verifiable heart disease with that of patients in whom heart disease was confirmed. Patients with present or preexisting venous disease were excluded.

Results. A total of 2558 patients were examined by transthoracic echocardiography during the 1-year study period. In 263 the examination result was completely normal and in 635 only minor changes were found. In these patient groups without significant heart disease the venous flow pattern was normal and quite uniform for all ages. 1460 of the 2558 patients examined were found to have significant heart disease. Of these, 542 had clearly abnormal femoral vein flow pattern. The following cardiac pathologies were associated with a characteristic alteration of venous flow: moderate to severe tricuspid incompetence, severe pulmonary hypertension and severe left ventricular dysfunction. Rhythm disturbances could also be depicted: in particular atrial fibrillation was never missed.

Conclusion. Flow pattern in the normal femoral vein is quite uniform for all ages. Certain cardiac diseases and some rhythm disturbances can change this flow pattern in a typical manner. Phlebologists should be aware of these flow pattern changes which point to specific and serious heart diseases. These patients should be seen by a cardiologist.

**CB2.8-9**

Non-invasive bioengineering assessment of the skin barrier function in patients with chronic venous insufficiency

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Chronic venous insufficiency (CVI) comprises all symptoms caused by permanent venous and capillary hypertension. While the clinical manifestations of the disease have been well characterized, there is little knowledge on the skin barrier function in those affected.

Aim. The aim of the study was to assess the skin barrier function in patients with CVI stage C2 and C4 by using non-invasive bioengineering methods.
Methods. 28 patients aged 50-80 years were included in the study following phlebological diagnosis by duplex sonography. The skin barrier function was assessed by measurement of transdermal water loss (TEWL), capacitance and skin colour on four different fields on both legs (flexor surface of the shin, medial and lateral malleolus, dorsum of the foot) and forearm as control.

Results. Compared to the control site, there was a tendency for increased TEWL as well as significant reduction of stratum corneum hydration on all measurement sites on the lower extremity. There were no significant differences in the measurements of skin colour.

Conclusion. The results of our study show that changes in the skin barrier function in CVI patients are detectable by bioengineering methods in very early stage of disease. Our findings could help understand the factors contributing to disease progression and facilitating the development of a venous ulcer.

CB2.8-10
Conscious venous blood pressure measurements in a porcine model of superficial varicose veins
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Aim. This study aimed to examine the conscious superficial venous blood pressure profile of a novel porcine model of varicose veins.

Methods. Right femoral arteriovenous fistulae (AVF) were surgically fashioned in three adult pigs to produce varicose veins. In-dwelling blood pressure radio telemeters (Telemetry Research Ltd, New Zealand) were inserted into the ipsilateral superficial venous network under general anaesthesia at 5-weeks post-fistula formation. As a control a 150g un-manipulated pig had radio telemeters placed in both the right and left superficial vein at equivalent sites to that of AVF animals. Duplex ultrasonography was also carried out on the vessels studied.

Results. In the conscious control veins pressure ranged from 0-15mmHg depending on posture (Table) and were acutely elevated by movement of the ipsilateral, but not contralateral, limb. In control veins Valvsala produced a slow rise in venous pressure of approximately 10mmHg. In comparison, AVF varicose veins were characterised by a mild non-pulsatile venous hypertension with a marked postural effect upon standing and during Valvsala. Activation of the thigh muscle pump (walking) also produced comparable differential responses.

<table>
<thead>
<tr>
<th>Control</th>
<th>Varicose</th>
<th>Veins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying</td>
<td>2.5±2.3</td>
<td>22.2±6.3</td>
</tr>
<tr>
<td>Standing</td>
<td>5.8±1.2</td>
<td>33.5±8.2</td>
</tr>
<tr>
<td>Valvsala (peak pressure)</td>
<td>16.5±6.8</td>
<td>95.8±40.9</td>
</tr>
</tbody>
</table>

We interpret the observed differences in Valvsala induced pressure profiles to reflect differences in venous outflow and retrograde pressure wave propagation within an incompetent venous network (varicose veins). The cessation of Valvsala was associated with rapid fall in distal venous pressures in both varicose veins and control veins.

Conclusion. The superficial varicose veins, which developed within this porcine model, have a pathophysiology that is consistent with that observed in humans. This study was supported by the Union Internationale de Phlebologie Research Fellowship.

CB2.8-11
Proteomic comparison of varicose veins in humans and in those that develop in a new porcine model
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Aim. This study aimed to examine the protein profile associated with varicose veins, in both humans and a novel porcine model of superficial venous disease.

Methods. Varicose and control veins were collected from a porcine model of superficial venous disease: 1 Two-dimensional gel electroforesis and mass-spectroscopy was used to identify differentially expressed proteins. The same process was used to compare human primary varicose and control superficial thigh vein samples. Written informed consent was obtained from all patients and the relevant institutional Human and Animal Ethics Committees approved the study.

Results. Proteins significantly upregulated (>2 fold) in pig varicose veins included cytoskeletal and contractility related proteins (actin, troponymosin, desmin and vimentin), heat shock proteins (HSPB1, HSP70, HSP 60) and ATP synthase. In human varicose veins upregulated proteins included cytoskeletal and contractility related proteins (actin, troponymosin, desmin and vimentin), heat shock protein (HSPB1), thioredoxin peroxidase 1 and serine proteinase inhibitor. Taken together, these profiles suggest a similar process of mild inflammatory induced fibrosis and tissue remodeling in both the human and porcine varicose vein.

Conclusion. These observations are encouraging as they indicate a similar molecular pathology between experimentally induced porcine varicose veins and human disease. Moreover they appear consistent with independently reported gene expression profiles of human primary varicose veins. 2

*This study was supported by the Union Internationale de Phlebologie Research Fellowship 2005.

References

CB2.8-12
Angiogenesis and venous insufficiency
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There is evidence that has accumulated in recent years which establishes an important role for vascular endothelial growth factor (VEGF), the receptors Flt-1 (VEGFR-1) and KDR (VEGFR-2). The VEGF-receptor-1 (Flt-1) has been reported to induce angiogenesis and to enhance vascular permeability.9 Vascular smooth muscle cells are recruited to render perrivascular support to newly generated vessels. In the presence of KDR, Flt-1 can trigger the mitogenic response to VEGF. In addition Flt-1 has been implicated in the chemotactic response to inflammatory cells such as monocytes 10 VEGF-R-2 (Flk-1/KDR) which is strongly selective for vascular endothelium enhances endothelial cell proliferation and migration, as well as tubule formation. By immunohistochemistry we could confirm up-regulated protein expression for Ang-1, Ang-2 and their receptor Tie-2 as well as VEGF receptors, KDR and Flt-1. These findings strongly suggest that the VEGF and angupoetin ligand receptor system is highly involved in generating tortuous and hypermeable vessels in venous leg ulcers.
BO3.1 - Talk to the experts: 
Closure fast - Indications and how to do it

N. Labropulos
Abstract not available

PP3.2 - Special issue in phlebology

PP3.2.1 Enhanced sclerosis by vis-sclerotherapy: a new treatment of superficial venous insufficiency
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Sclerotherapy for superficial venous and saphenous vein insufficiency has evolved greatly in the last two decades, mainly after the introduction of echo-guided sclerotherapy and foamed sclerosants. We have developed another advancement of sclerotherapy (VIS-sclerotherapy). This new patented treatment is a procedure in which the target vein is first pre-treated with a special catheter to enhance the effect of injected sclerosant which follows pre-treatment subsequently. The advantages are mainly the higher selectivity of action of the sclerosant (the pre-treated vein is more sensible even to low concentrations of sclerosants), reduction of vein diameter before the injection (this could permit sclerosing treatment of large veins which are transformed to smaller sized veins) and better safety due to smaller volumes of sclerosants to be injected. The higher sensitivity to sclerosants with VIS-sclerotherapy could also mean that the need for sclerosant foam or strong liquid sclerosants could need reconsideration. Moreover VIS-sclerotherapy has a deeper action on the vein wall with the aim to involve the media in the sclerosing effect in order to get better long term results. VIS-sclerotherapy is a new procedure, not only a therapy, and this means that this way of sclerotherapy could be considered for reimbursement by insurances or health care systems, which sometimes is not the fact right now.
The dry form which have the same consequences on the vision. The dry form of ADM is the most frequent. This form drives slowly towards a gradually severe decline of the visual acuteness. It is characterized by the progressive disappearance of the pigmentary epithelium cells of the retina. The wet ADM is the least frequent shape. It is characterized by neovascularization under the retina. Its evolution can be particularly fast.

Aim. We tried to know if the venous stasis we see with old patients (varicose veins) could have a correspondence in the eyes, and could explain in the physiopathological mechanisms of the ADM. If this hypothesis turns out exact, it could result in specific treatments of the ADM.

Methods. To study the hemodynamic parameters in the central retina pedicle in patients affected by ADM, we realized a colour duplex scan in 40 patients. We noted the circulatory speeds, the aspect of veins, and direction of the flow. When there was an one-sided ADM, we compared these data versus the healthy eye. When there was a bilateral ADM we tried to know if the gravity of the ADM was proportional to the venous insufficiency.

Results. We noticed that there were more frequently tortuous veins with a comparable venous stasis comparable at the varicose veins of lower limbs in the dry form ADM.

Conclusion. We think that credibly, the dry shape of the ADM is secondary to a venous incompetence, while the wet form is secondary in an arterial incapacity.

PP3.3 - Chronic Cerebro-Spinal Venous Insufficiency (CCSVI): Diagnosis and treatment

PP3.3-1
CCSVI and multiple sclerosis: theoretical and practical issues
S. Poland
Abstract not available

PP3.3-2
Cerebral veins and iron deposits explored by advanced MRI-SWI
M. Haacke
Abstract not available

PP3.3-3
Imaging and endovascular treatment of CCSVI
R. Galeotti
Abstract not available

PP3.3-4
Treatment of CCSVI: clinical results associated multiple sclerosis
F. Salvi
Abstract not available

PP3.4 - Guest lecture:
Asymptomatic deep venous thrombosis
W. Blättler
Abstract not available

PP3.5 - UIP consensus:
Curriculum in phlebology

PP3.5-1
Curriculum in phlebology (UIP consensus)
K. Parsi
Abstract not available

PP3.5-2
UIP consensus on diagnosis and treatment of deep venous insufficiency
F. Lurie
Abstract not available

PP3.5-3
DAPS - dalteparin in patients with Superficial Leg Vein Phlebitis (SVP) in addition to compression treatment – a placebo-controlled phase III study
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2 Department of Vascular Medicine, Klinikum Darmstadt, Darmstadt, Germany
3 Department of Dermatology, AZM Maastricht, Maastricht, The Netherlands

Patients with SVP are at risk for thrombus progression which may result in deep vein thrombosis (DVT) or pulmonary embolism (PE). Treatment strategies consisting of compression stockings and subcutaneous heparin are well established. Nevertheless, sufficient studies are missing to confirm efficacy of this strategy.

Aim. A phase III trial was initiated to assess efficacy and safety of dalteparin in patients with SVP.

Methods. In a randomized double-blind multicenter study 276 patients with SVP received compression stockings (30 mmHg) for 90 days and either dalteparin 10,000 IU (group A) or placebo (group B) for 14 days. Primary endpoint was progression of the thrombotic process during the treatment period as confirmed by compression ultrasound. Sonographic assessments were planned in all patients on days 1, 7, 14 and on day 90.

Results. In each treatment group 138 patients received at least one dose of study medication. A progression of the thrombotic process after 14 days was detected in 11 (8.0%; 95% CI: 4.0%-13.8%) patients in group A and 24 (17.4%; 95% CI: 11.5%-24.8%) patients in Group B (p=0.019). DVT rates were 0.7% in each group. No symptomatic PE occurred during the treatment period. Progression rates during follow-up after end of treatment were 3.1% (A) versus 7.0% (B) (p=0.168). One patient in group A (0.7%) and two patients in group B (1.5%) developed symptomatic DVT during follow-up. Another patient in group A experienced PE (0.7%). Symptom scores decreased in both
groups without significant differences. During the first 14 days adverse events were reported in 7.2% (2.2% serious) of patients treated with dalteparin versus 13.0% (6.5% serious) of patients treated with placebo.

**Conclusion.** Combined dalteparin/compression therapy in patients with SVP is safe and results in a decreased progression rate of the thrombotic process. No rebound phenomenon was observed after cessation of dalteparin.

**AP3.7 - Sclerotherapy 4: Telangiectasias and reticular veins**

**AP3.7-1**

**Telangiectasias microsclerotherapy treatment: the rules of 3**
C. Jean-Marc, J.M.C. Chardonneau
Gabinet Medical, Nantes, France

Telangiectasias, classified C1 in international classification CEAP, represents an important request of treatment among the female population. There are different forms of telangiectasias, in relation or not with a reticular vein. The motivation of treatment is principally cosmetic order. Different treatments are frequently used: laser, thermocoagulation, microsclerotherapy. The treatment by microsclerotherapy, recommendation of rank 1 C, is the treatment of first intention of telangiectasias. - 3 choices: Where What How; - 3 objectives: Security Effectiveness Analgesia Various parameters must be analysed: the place of injection, the type of used product, the strategy of treatment and also the injection technical in touch with the analgesia.

**AP3.7-2**

**Efficacy of sclerotherapy in intradermal varicose veins – A prospective, double blinded, placebocontrolled study**
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2 University of Heidelberg, Heidelberg, Germany

**Aim.** To investigate the efficacy of injection sclerotherapy with 0.25% Polidocanol (Aethoxysklerol) for intradermal varicose veins for obliteration and aesthetic outcome in a double blinded placebo-controlled study.

**Methods.** After prior duplex-sonographic investigation 48 patients with intradermal varicose veins (diameter 1-2 mm, CI,EP, A5, PR) were included. 24 patients (group 1) received Polidocanol (0.25% Aethoxysklerol) injection sclerotherapy and 24 patients (group 2) received sodium chloride injections. In all subjects an area of 100 square centimetres of the lower limb was treated. The borders of each area were marked and photo documented. The injections were performed by an examiner who was unaware of which liquid had been injected. External compression bandages and compression stockings were applied after the treatment for one week. One and four weeks later the results were controlled by the physician who performed the injections and documented by an independent photographer. The glossy prints of the areas before and after the treatment were sent to two blinded independent external reviewers. The reviewers noted their evaluation on a visual analogue scale (VAS). The reviewers received each anonymous photodocument twice within 3 weeks.

**Results.** The VAS of both experts showed a significant difference between the results in group 1 and group 2. Expert 1 (FXB) (p<0.0001) and expert 2 (RJ) (p=0.0004). In group 1 expert 1 noted a mean score of 31, expert 2 a mean score of 30.0. For placebo expert1 noted a mean score of 15.3 and expert 2 of 16.5.

**Conclusion.** Injection sclerotherapy is an efficient treatment that leads to a good aesthetic outcome using 0.25% Polidocanol (Aethoxysklerol®) is an efficient treatment.

**AP3.7-3**

**Polidocanol, sodium tetradeyl sulfate and placebo for sclerotherapy of C1-varicose veins: a double-blind, randomized, controlled clinical trial (EASI-STUDY)**
E. Rabe 1, D. Schliephake 3, J. Otto 3
1 Department of Dermatology, University of Bonn, Bonn, Germany
2 Chemische Fabrik Kreussler & Co. GmbH, Wiesbaden, Germany

**Aim.** To assess efficacy and safety of two sclerosing agents and a placebo after sclerotherapy of C1-varicose veins with a standardized digital imaging system and detailed safety monitoring.

**Methods.** Patients with C1-varicose veins (telangiectasias or reticular veins) were randomly assigned to one of three treatment groups (Polidocanol, POL, Aethoxysklerol®, Sodium-Tetradeyl-Sulfate, STS, Sotradecol®, and isotonic-saline, placebo control). Veins selected for injection had to be clearly visible C1-varicose veins in a treatment area of 10x10 cm. Retrieval of the exact location was guaranteed by a newly established digital imaging system. Images were taken before injection, at 12 and 26 weeks after the last of three possible injection visits. Photos were evaluated by the investigator and two blinded independent observers.

**Results.** In the 338 treated patients a statistically significant superiority (p<0.0001) of POL versus placebo was assessed for the primary efficacy criterion “improvement of veins”. The treatment success rates at 12 and 26 weeks for POL were 96% and 95% compared to STS (92%, 91%) and placebo (8%, 6%). Significantly more patients were satisfied or very satisfied with POL at 12 or 26 weeks (84%, 88%) compared to STS (64%, 63%, p<0.0001) or placebo (14%, 11%, p<0.0001). POL was safe and well tolerated, with almost only expected local symptoms at the injection site. The incidence of side effects was significantly higher for patients treated with STS.

**Conclusion.** Treatment of C1-varicose veins with POL is very effective and safe. POL was found to be efficacious vs. control and well tolerated with fewer side effects than STS.

**AP3.7-4**

**A new standardized digital imaging system to document treatment success after sclerotherapy of C1-varicose veins applied in a double-blind, randomized, controlled clinical trial (EASI-STUDY)**
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Measuring progression of treatment success after therapy of C1-varicose veins has always been challenging, since these veins are difficult to be documented repeatedly. Moreover retrieving the exact position to allow a reliable before and after comparison is mandatory.

**Aim.** Therefore a system was established to retrieve unmistakably the treatment area after sclerotherapy of C1-varicose veins and to document accurately the efficacy and the visual side effects in a study as well as daily routine.
Aims. To perform for the first time in China a clinical trial with sclerotherapy, in which Chinese doctors use Polidocanol/Lauromacrogol 400 (Aethoxysklerol®) and to assess efficacy and safety of Polidocanol compared to placebo after sclerotherapy of C1 and C2 non-saphenous trunk varicose veins. The performance becomes much more easy especially for beginners. There is no reason for concentric compression after sclerotherapy of spider veins. The performance becomes much more easy especially for beginners. There is no reason for concentric compression after sclerotherapy of spider veins.

Methods. In this study vascular surgeons familiar with surgical interventions in phlebology but without prior experience in sclerotherapy took part. Therefore a careful training in this therapy option had to be performed before the study. The following patients were included: Group A: Patients with spider veins (<1mm); Group B: Patients with reticular veins and/or small-sized varicose veins (1-5 mm) Group C: Patients with medium-sized and/or large non-saphenous subcutaneous varicose veins with a reflux >0.5s (>5 mm). The patients in each group were randomly assigned to receiving Polidocanol or placebo. The efficacy of treatment was assessed 3 months after the last injection: for group A and B the investigators rated the disappearance of the veins according to a 5-grade scale using a digital imaging system. For group C occlusion of vein and/or absence of reflux >0.5s was measured by duplex scan.

Results. The study was performed in 5 sites in China from December 2007 until February 2009. During this time 288 patients have been included. It will be shown that sclerotherapy with Polidocanol can be performed in a country without any sclerotherapy tradition provided that a meticulous training is given. Data on efficacy and safety after sclerotherapy with Polidocanol will be presented.

Sclerotherapy has been demonstrated to be highly effective for the eradication of telangiectasias and reticular veins with success rates of 90% routinely reported. We performed a retrospective study of patients being treated for reticualr and spider veins of the legs using low doses of these detergent sclerosing solutions. These data involve random samplings of treatments performed on over 30,000 patients treated over a period of 24 years. Only small diameter vessels (0.5-3 mm diameter) without saphenous system disease were included. Assessment was based on the written description in the chart or in most cases, images or photographs on file. The concentration of sclerosing solutions utilized were 0.1% or 0.2% sodium tetradecyl sulfate (STS) or 0.25% or 0.5% polidocanol (POL). The number of treatments varied from 1 to 5 over a single year. Follow-up was a minimum of 6 months from the first treatment, often involving multiple years. The number of treatments required to achieve a successful result defined as patients satisfaction that it is worse than before, 2 is same as before, 3 is moderate improvement, 4 is good improvement, 5 is complete treatment success. The 5-score range is very robust and provides reliable data for substantiating treatment success.

Before the performance of the ESCA-China study, there was little experience with sclerotherapy in China, and no officially approved sclerosing agent was available. Although surgical intervention techniques and thermal ablation therapy for varicose veins are well established and are on par with western standards, there has been, up to now, no ‘sclerotherapy tradition’ in existence amongst Chinese physicians who treat venous disease.

Aim. To perform for the first time in China a clinical trial with sclerotherapy, in which Chinese doctors use Polidocanol/Lauromacrogol 400 (Aethoxysklerol®) and to assess efficacy and safety of Polidocanol compared to placebo after sclerotherapy of C1 and C2 non-saphenous trunk varicose veins in the Chinese population.

Methods. In this study vascular surgeons familiar with surgical interventions in phlebology but without prior experience in sclerotherapy took part. Therefore a careful training in this therapy option had to be performed before the study. The following patients were included: Group A: Patients with spider veins (<1mm); Group B: Patients with reticular veins and/or small-sized varicose veins (1-5 mm) Group C: Patients with medium-sized and/or large non-saphenous subcutaneous varicose veins with a reflux >0.5s (>5 mm). The patients in each group were randomly assigned to receiving Polidocanol or placebo. The efficacy of treatment was assessed 3 months after the last injection: for group A and B the investigators rated the disappearance of the veins according to a 5-grade scale using a digital imaging system. For group C occlusion of vein and/or absence of reflux >0.5s was measured by duplex scan.

Results. The study was performed in 5 sites in China from December 2007 until February 2009. During this time 288 patients have been included. It will be shown that sclerotherapy with Polidocanol can be performed in a country without any sclerotherapy tradition provided that a meticulous training is given. Data on efficacy and safety after sclerotherapy with Polidocanol will be presented.

Sclerotherapy is still the gold standard in the therapy of spider veins. To get more efficiency it is necessary to undergo sclerotherapy especially in the reticular feeder veins. These are often not easy to detect. The effect of compression after sclerotherapy of spider veins is not proven.

Methods. In Germany the standard sclerotherapeutic agent in the treatment of varicose veins is polidocanol. We use for the treatment of spider veins polidocanol in the concentration 0.75%. We show how much easier it is to detect reticular feeder veins in the sclerotherapy of spider veins using transillumination. It was primary developed as a vein finder for vein access especially in children, neonates and emergency medicine. The patients were very happy with this kind of therapy because of the reduction of pain while injecting. The risk of accidental paravascular injection is reduced. The cosmetic effect increased. Using a special prepared blood pressure cuff we show that it is not possible to close spider veins with concentric koompression after e.g. sclerotherapy.

Conclusion. Transillumination with veinlite is very useful in the sclerotherapy of spider veins. The performance becomes much more easy especially for beginners. There is no reason for concentric compression after sclerotherapy of spider veins.
**AP3.7-8**

**Laser Enhanced Sclerotherapy (LES) treatment of telangiectasias**

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Chemical ablation (sclerotherapy) is the gold standard to treat telangiectasias. Should be done using both liquid or foam drugs. Transillumination adds a powerful tool to this technique allowing to found the ‘nutritia’ veins in cases there is no possible to see normally. Chemical ablation of large telangiectasias could develop intravascular clots which result in some degrees of pain and discromias. In these cases clots drainage is indicated. There is no consense about the use of compression after sclerotherapy to prevent these problems because researches shows that very high pressure levels are necessary to collapse them. On the other hand, very small veins which cause esthetical problems in some patients are technically impossible to puncture. Its possible to improve sclerotherapy results using together chemical sclerotherapy and transdermal laser. Principles of LASER ENHANCED SCLEROTHERAPY (LES) are discussed and results presented.

**AP3.7-9**

**Compression therapy vs. sclerotherapy for isolated refluxing reticular veins and telangiectasia: 12 months results of a randomized trial**

M. Schul

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**Aim.** To prospectively study quality of life benefits of compression sclerotherapy versus sclerotherapy for patients with isolated symptomatic refluxing dermal complexes.

**Methods.** Fifty-eight consecutive patients with normal saphenous and deep venous systems and venous dysfunction score greater than or equal to 4 were randomized to either sclerotherapy (N=29) or thigh high 20-30 mm Hg compression stockings (N=29). Following a trial of compression, the Compression arm was elective to cross over to the Sclerotherapy arm. Sequential quality of life (QoL) data was acquired over twelve months, e.g. Initial severity, after compression trial, following reticular vein sclerotherapy, and subsequent treatment of telangiectasia.

**Results.** Of the patients who completed the compression trial, three key symptoms of aching, pain, and leg cramps were significantly reduced, while patients in the Sclerotherapy arm of treatment reported broad symptom and cosmetic relief in all key symptoms assessed.

**Conclusion.** Compression therapy offers partial relief of aching, pain and cramping in patients with isolated refluxing reticular veins and telangiectasia. Sclerotherapy of these vessels offers statistically superior relief of aching, pain, swelling, leg cramps and presence of symptoms at rest. Minor varicosities may cause quality of life impairment in select patients and represent far more than simple cosmetic concerns.

**AP3.7-10**

**Endo-perivenous laser procedures for teleangectasias treatment**

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**Aim.** We have evaluated 808 nm wavelength laser in intra-extra luminal procedure for the treatment of telangiectasias. Endolasing with 100-200 µm optical fibers can cause photothermocoagulation of the vessel wall thanks to the direct intra-extra venous contact. Infras 808 nm being scarcely absorbed by both water and fat tissue, with respect to 940, 980 or 1064 nm, does not harm surrounding tissues when the fiber is out of the vein lumen.

**Methods.** Since march 2008, 100 patients (80 female, 20 male) presenting tortuous teleangectasias are treated with intra-extra luminal 808 nm diode Laser (Eufoton Trieste, Italy). A special fiber of 120/220 µm in teleangiectasias are inserted intra - extra near the veins wall, using at the same time a combined skin cooling system during and after treatment. We differentiate 2 types of teleangectasias treatments. a) Telangiectasias sized from 0.5 mm to 1 mm (blue, violet). We used a special titanium introducer for 25 G needle (EZ) to introduce easily the fiber into the needle. The fiber is pushed up where the reflux originates and the optical tip is indicated by the pilot red light at 655 nm. The end point is photocoagulation of the varicoso blood content and wall, which immediately becomes shrinked as soon as it gets touched. The treatment of these telangiectasias requires pressure applied with a cylinder of cotton, and elastic stocking 20-30 mmHg. b) Teleangectasias sized less than 0.5 mm (red) we used the direct transcutaneous impact of the naked bare optical fiber of 120/220 µm (without connector). The immediate vessel bleaching is followed by micro skin burns sized 200/300 microns that disappear on approx 10 days.

**Conclusion.** Effective treatment of teleangiectasias was achieved with intra-extra luminal 808nm laser with acceptable side effects.

**AP3.7-11**

**Clacs guided by the veinviewer: new therapy for cosmetic leg vein treatment (4 years experience)**

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The gold standard for cosmetic leg vein treatment is injection sclerotherapy. The trend is foam injection but there are complications like pigmentation and skin ulcer, and risk of anaphylactic shock and embolism. Our group have been associating laser and Dextrate sclerotherapy since 1995. The goal of this combination is to increase efficacy without having complications.

**Aim.** To describe and discuss a 4-year experience on varicosities treated under visual digital guidance in a completely different way. Sclerosis was achieved by combination of thermal and chemical agents: laser and dextrate.

**Methods.** Cryo-Laser and Cryo-Sclerotherapy session (Clacs) starts with full photographic documentation. In a first pass, feeder veins are spotted with the VeinViewer (V-V) and treated as follows: 1064nm Nd: YAG, 6mm spot size, 60msec pulse duration and 120 to 150J/cm2 (at least one shot at each linear 5mm). On a second pass the pulse duration is shortened to 45msec and telangiectasias are treated. Feeder veins (that appear still open under the V-V) receive another pass. Session size is between 50 and 350 laser shots. After the laser session, all treated veins are re-mapped with the V-V. Non-collapsed segments receive injections of Dextrate. All applications are performed under pre, parallel and post-cooling.

**Results.** Index of treatment startup on first consultation increased 35%, successful treatment of 672 patients with feeder veins that had former indications of detergent sclerotherapy or phlebectomy; reduction of 20% of sessions with the use of the V-V. Average of 3 sessions; patients’ satisfaction increased; compliance to the premise of no anaphylactic complication risk; no complications as ulcers, frostbite, skin burns or dischromias, rise on referrals by 20%.

**Conclusion.** Clacs is a safe and effective method to which the VeinViewer improves the outcome.
The Authors describe the rationale of cross-linked hyaluronic acid, (currently used in the antiaging area for face wrinkles treatment), as lower leg telangiectasia and varicose veins counteracting agent: in fact this high density, high molecular weight molecule can easily and painlessly be injected along or across the dilated capillaries network, or around dilated veins. Counteracting the micro-venous hypertension and reinforcing the fundamental substance lining around the small vessels. Cross-linked Hyaluronic acid has a very long half life and it's postinjection local retention produces steady haemodynamic improvement of microcirculation through mesenchyma and interstitial fluids modification and turnover. Costs versus profits, compared with conventional treatments are finally outlined and related to the final outcome.

GE3.7 - Lymphoedema/Pelvic Veins

GE3.7-1

When the vascular system is in failure: strategies to improve lymphatic transport

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The lymphatic system has a large reserve capacity. This is reduced when there are structural, functional or pathologic changes within the lymphatic system and its associated structures. While the lymphatic load is below lymphatic transport there are usually no significant tissue or cellular issues. However, when there are already secondary or primary lymphatic changes the load can easily rise above maximum transport capacity and interstitial fluid and its contents including a range of signalling molecules and inflammatory agents accumulate, furthering the progress of lymphoedema through its fluid fatty and fibrous stages. When there is a venous system incompetence generally there is an increased load on the lymphatic system. If the margin between the load and transport capacity is low or is already exceeded then there can be a general “safety valve” failure of the lymphatic system. Treating the venous insufficiency is crucial but there are many options also to influence lymphatic load and transport through the utilization of a range of health professional based treatment options and patient management options. This presentation will focus on outcomes from 4 clinical trials of leg lymphoedemas (all of 4 weeks duration) which indicate improvement in lymphatic transport, evidenced using the objective tools perometry and bio-impedance spectroscopy to determine limb fluids. The first trial focused on variation of tissue pressures through passive movement (22% reduction), the second on electrical stimulation of the lymphatic smooth musculature (20% reduction), the third on deep breathing and leg exercises (10% reduction) and the forth on gentle tissue vibration (2%). Reports of subjective improvements generally mirrored the objective ones as did tissue fibrous changes measured by tonometry. Not all parameters changed at the same rate but generally the level of improvement correlated with the phase of the lymphoedema (fluid, fatty, fibrous), but early stage intervention gained better outcomes.

GE3.7-2

Therapy of secondary lymphedema of the arm

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Aim. Analysis of therapeutically effects, wearing comfort and usability of different compressions garments (Venotram delight, Bauerfeind-Phlebologie, Zeulenroda, Germany) with the compression classes I (20 mmHg) and II (27 mmHg) in patients suffering from secondary Lymphedema especially occurring in breast cancer patients.

Methods. The wearing period of the compression material took 6 weeks. In weekly visits we measured the therapeutically effect especially the reduction of the arm circumferences in cm, which was documented in different measuring points. We additionally performed volume measurements of the arm using water volumetry, and measured changes in cutaneous moisture and elasticity throughout the study period using the Cutometer, Revisco- and Corneometer. We also documented the compliance of the patients with standardised questionnaires and compared the complaints caused by the lymphoedema before and after the wearing period.

Results. Garments with lower compression (Compression Class I) reduced the circumference particularly of the upper arm. By means of compression class II garments both the upper- and the forearm circumferences were reduced, which was confirmed by a significant reduction of the total arm volume. The patients appreciated the garment with the lower compression class more as to wearing- and usability-comfort, they assessed, however, the therapeutically effect higher in garments of compression class II.

GE3.7-3

Venous valve failure a phenotype feature of genotyped lymphoedema

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The cause of primary venous valve failure remains unknown. A recent study of two genotyped forms of inherited lymphoedema – Milroy disease (MD) and lymphoedema-distichiasis syndrome (LDS) revealed a high prevalence of varicose veins clinically. The venous system of the leg was investigated with duplex ultrasound in family members with a FOXC2 mutation (causing lymphoedema-distichiasis) and with a VEGFR3 mutation (causing Milroy disease). Pathological reflux was demonstrated in the great saphenous vein in all 18 participants with a FOXC2 mutation compared to only one of 12 referents (including 10 family members without a mutation). Deep vein reflux was recorded in 14 of 18 participants. Venous reflux was demonstrated in the great saphenous vein in 9 of 10 participants with a VEGFR3 mutation but no reflux was recorded in the deep veins. FOXC2 is expressed on veins as well as lymphatics during development. Both FOXC2 and VEGFR3 genes are strongly associated with venous valve failure. FOXC2 and VEGFR3 appear to be important for the normal development and maintenance of venous and lymphatic valves.

GE3.7-4

Mycrocirculatory physiological concepts of lymphedema

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Aim. Tissue changes in Severe Venous Insufficiency are characterized by the combination impairment of blood and lymphatic micro-structure.
circulation. Cutaneous lymph vessels are partially obstructed, and the formation of edema depends upon increased hypertension of the venous system accompanied by poor lymphatic drainage of interstitial tissue.

Methods. This event can be evaluated by new noninvasive techniques, like capillaroscopy and others, which reveal morphological and physiological abnormalities of capillary vessels with intact skin and the progressive damage of tissue and their decrease or absence of white atrophy. There is an invariably increase in pericapillary edema, and interstitial edema, and a fall of transcutaneous oxygen pressure.

Results. Fluorescent microlymphography also shows the concomitant involvement of cutaneous lymphatic vessels in severe and mild chronic venous edema. This technique is also used to assess changes in initial lymph vessels.

Conclusion. Articles about lymphedema are often introduced with the misleading statement that the pathophysiology of the disease is unclear and treatment is unsatisfactory. Yet, the general principles of the pathophysiology of the lymphedema are known; all thought the exact pathogenesis is still open to investigation.

GE3.7-5
LVA microsurgical indications
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Aim. To report the wide clinical experience in the microsurgical treatment of peripheral lymphedema, underlying the technique and the opportunity of an early treatment to obtain the best long term results.

Methods. More than 1800 patients with peripheral lymphedema have been treated with microsurgical techniques. Derivative lymphatic micro-vascular procedures recognize today its most exemplary application in multiple lymphatic-venous anastomoses (LVA), and particularly in the end-to-end telescopic technique, that allows to avoid any contact between lymphatics and the blood stream. For those cases where a venous disease (valvular insufficiency, venous hypertension, etc.), is associated to more or less latent or manifest lympho-static pathology of such severity to contraindicate a lymphatic-venous shunt, reconstructive lymphatic microsurgery techniques have been developed (autologous venous grafts or lymphatic-venous-lymphatic-anastomoses - LVLA). Objective assessment was undertaken by water volumetry and lymphoscintigraphy.

Results. Subjective improvement was noted in 87% of patients. Objectively, volume changes showed a significant improvement in 85%, with an average reduction of 67% of the excess volume. Of those patients followed-up, 85% have been able to discontinue the use of conservative measures, with an average follow-up of more than 10 years and average reduction in excess volume of 69%. There was a 87% reduction in the incidence of cellulitis after microsurgery.

Conclusion. Microsurgical lymphatic-venous anastomoses properly performed have a place in the treatment of peripheral lymphedema and should be the therapy of choice in patients who are not sufficiently responsive to nonsurgical treatment. Better results can be expected with operations performed earlier at the very first stages of lymphedema.

GE3.7-6
There is now indication for surgery in lymphoedema?
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Currently, most patients with severe lymphoedema of the members, achieve a great improvement with Medical Therapy, but a selected group of patients who will benefit from a surgery. The aim of our work was to demonstrate that a surgical time, improving the quality of treatment outcomes in severe lymphoedema of the members.

Methods. Between 1993 and 2008 are assessed 40 patients with severe lymphoedema of the members, of whom eight were treated with surgery. The surgery was necessary to stabilize the volume of lymphoedema and to allow efficient handling complex multidisciplinary therapy in the following cases: 1) Lymphoedema secondary to breast cancer surgery, which by its chronicity, do not respond adequately to medical treatment. Reductive surgery type Kinmonth was performed. 2) In lower limbs, we have evaluated three circumstances in which surgery produces benefit to the patient: a) After therapy combined, reduces the volume of member and is an area of redundant and loose skin, we conducted a resective surgery in Thompson type, which allows us to remove the excess skin. b) If after reducing the volume in a chronic lymphoedema member, is an irreducible sector indurated fibrous collagen; resective surgery is performed and then covered the surface with a free skin graft. c) When the initial volume is so important, resective surgery is indicated in the inner side of the lower limb, to produce a reduction the initial volume. Following the surgery, medical therapy combined was performed in all cases, on a regular basis.

Results. But today, in most patients with lymphoedema of the members, the combined physical therapy is the choice, there is a group of patients with severe lymphoedema of upper and lower, that benefit from a proper surgery, as an important stage of multidisciplinary treatment, which improves treatment effectiveness and quality of life.

GE3.7-7
Automatic mesotherapy guns, in lower leg mesenchymal treatment: indications, protocols and follow-up
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Lower leg mesotherapy has been originally addressed to the treatment of redundant fat and cellulitis, which very often involves thighs, femoro-popliteal area and legs and can be associated especially in the middle aged women with venous insufficiency and telangiectasia, subcutaneous and intradermal injection of mesotherapy compounds is very often capable to improve the cosmetic appearance of the legs, but also it's microcirculatory function, with symptoms relieve, like heavyness, paresthesia, itching, burning etc, due to reduction of the fat inflammatory process. The use of automatic guns since the first Device of Pistor, has been recently widespread in the clinical use, because of the great number of shots per minute that can be triggered, and of the reduced injection pain due to the quick needle penetration and withdrawl. In this paper we describe our experience in lower leg automatic injection with specific compounds formulaion that increase the venous tonicity and the interstitial compartment viscosity and elasticity such as low molecular weight hyaluronic acid, and other herbal extracts. Symptoms improvement, and overall treatment effectiveness are reported.

GE3.7-8
Lipedema: from clinical presentation to therapy
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Lipedema is a common but infrequently recognized dermatological disorder, characterized by bilateral enlargement of the legs...
due to abnormal depositions of subcutaneous fat associated with mild edema. Different synonyms are found in the literature, but because of the lack of a clear definition it is uncertain whether all publications in fact discuss lipedema. This abundance of terminology and unclear definitions has resulted in confusion about lipedema, under-diagnosis and mistreatment of the patients. For example, patients with lipedema are often diagnosed and treated as primary lymphedema. Lipedema is a chronic, progressive condition that may be associated with considerable morbidity. Initially, patients experience discomfort, easy bruising and tenderness of the disproportionately enlarged legs, which may progress to high intensity pain and limited mobility. In addition to the physical problems, lipedema may be associated with psychological morbidity. Therefore, it is important that lipedema is recognized as early as possible and that patients receive optimal information and care. Because it is estimated that 10-15% of patients in lymphology and edema clinics have lipedema, it is particularly important to increase the awareness of phlebologists about lipedema. After performing a review of the literature, this presentation describes clinical presentation, pathogenesis, management and therapies of lipedema.

GE3.7-9
Anatomie des veines ovariennes humaines
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Alors qu’il existe un renouveau d’intérêt pour les varices pelvienne, les veines ovariennes restent largement méconnues. Monedero et Labropoulos ont abondamment décrits les connections des veines sous inguinales avec les veines pelviennes. Nous avons réalisé la dissection de 20 cadavres pour examiner les différents aspects anatomiques des veines ovariennes. Un dessin anatomique a été fait à partir de chacune des 20 dissections. A droite, nous avons découvert une veine ovariennne unique dans 15 cas, deux veines dans 4 cas et 3 veines chez un seul cadavre. A gauche, nous avons trouvé une veine ovariennne unique dans 16 cas et deux veines dans 4 cas. La moyenne d’angle, à la terminaison de la veine ovariennne droite sur la veine cave inférieure est 27,4 degrés (10 a 110°). Du coté gauche, près de la veine rénale gauche, l’angle est 114,1 degrés et nom ce qu’il y as dans la littérature: l’angle est encore de 90 degrés). Le nombre de valves dans les veines ovariennes varie de 0 à 6, dans la majorité des cas nous avons trouvé 2 valves. En moyenne les veines ovariennes droites mesurent 2,85 mm de diamètre et 151 mm de longueur. De coté gauche le diamètre moyen est de 2,75 mm et la longueur 170 mm. Nous avons également découvert 30% de veines dysplasiques et des connections des veines ovariennes avec les parois latérales, postérieure et avec les veines sous inguinales au Scarpa. Mots-clés: Varices pelvienes, veines ovariennes, anatomie humaine.

GE3.7-10
A case of combined nutcracker and may-thurner syndromes in an adult with resolution of hemodynamic findings
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Nutcracker and May-THRanner syndromes (NCS; MTS) resulting from compression of the left renal vein between the superior mesenteric artery and aorta, and of the left common iliac vein by the right common iliac artery respectively, are rare venous pathologies with significant morbidity. No combined NCS-MTS cases have been previously described. We report a case of a 34-yo female with left flank and pelvic pain since teenage, exacerbated by standing and exertion and worsened after two pregnancies. She gradually developed labial and vaginal swelling, intermittent hematuria and left leg pressure discomfort. Venogram revealed gonadal vein enlargement, extensive venous collateralization and renocaval gradient of 10 mmHg. Gonadal and pelvic vein coil embolization worsened the symptoms. Two years later, at the Mayo Clinic, patient had an unremarkable physical exam with normalized blood and urine labs. Invasive and noninvasive testing showed resolution of pressure gradients due to extensive venous collateral formation.

Results. CTA noted May-Thurner anatomy and possible Nutcracker anatomy with hilar-aortomesenteric AP diameter ratio of 2.6. Venous phlebography was formal and continuous wave Doppler did not support May-Thurner physiology. Duplex ultrasound showed markedly decreased diameter and flow diminution in the upper left common iliac vein compared to its lower part. Duplex ultrasound of the left renal vein showed preserved phasicity, hilar-aortomesenteric AP diameter ratio of 5.0 and peak velocity ratio of 3.6. A venogram demonstrated both Nutcracker and May-Thurner anatomy with extensive collaterals enhanced by Valsalva but there were no significant pressure gradients. It was determined that this patient developed an extensive collateral system effectively decreasing venous pressures and resulting in resolution of hemodynamic findings of NCS and MTS. No further intervention had to be performed.

Conclusion. Resolution of pressure gradients may occur in adults with NCS and MTS spontaneously through formation of effective collaterals justifying a conservative approach in select cases.

GE3.7-11
Pelvic leaks
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Aim. The varicose vein surgery in lower limbs presents a high level of recurrence. An important part of these recurrent varices after surgery (REVAS) comes from insufficient communications or leaks from pelvic veins. The diagnosis of these pelvic leaks as well as its treatment by embolization with selective pelvic phlebography to occlude the reflux which originates varicose veins and post-surgical recurrences in lower limbs.

Methods. In the 2005-2008 period, 265 patients were studied with transvaginal and transabdominal duplex ultrasound and with selective pelvic phlebography of gonadal and hypogastric axis in a digital angioigraphy room. The embolization was done with a mixture of Etosulcer microfoam obtained with Tessani's method and with selective deposits of metallic spirals (coils) in the veins with reflex. Four groups of different leaks dependent on internal pudendal vein (60%), scatic-gluteal vein (47%), obturator vein (35%) and round ligament vein (12%) were canalized. The initial success rate of occlusion was 96%.

Conclusion. Selective embolization is an excellent treatment to occlude the leaks with reflux to lower limbs. We strongly believe that selective pelvic phlebography is the correct method to obtain the best results in the treatment of this pathology.
CB 3.7 - Endovenous procedures 5 - RFA

CB3.7-1
Ten year experience with endovenous ablation: RF and laser
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Endovenous techniques were approved in the USA in early 1999. The technique used involves single puncture, ultrasound guidance, large volume dilute local anesthesia, no sedation with immediate ambulation. We use RF and 1320nm. For RF, in 2007, we switched to ClosureFast®. For RFO, we developed the 1320nm to focally target water instead of hemoglobin in an attempt to reduce endovascular and perivascular heat formation. The purpose was to reduce risks of pain, hematoma while increasing efficacy. For 1320nm, an automatic pullback mechanism allowed uniform application of laser energy. Patients were followed on a yearly basis with a free ultrasound examination. Some 9% of patients returned with new perforating vein varicosities in the absence of recurrent targeted saphenous veins. We have tracked over 500 patients in our database. Overall, success rates for patients at 5-10 years is 91% demonstrated by absence of great saphenous vein (GSV) or small saphenous (SSV). For 5 years or less, the success rate as determined by ultrasound disappearance of the targeted vein is 95%. There was only 1 incident of thrombosis, within 6 weeks of treatment, extending into the common femoral (occurred in 2000). When segments of a GSV or SSV recanalized, of the 9% failures, 2% were seen at 6 weeks, 6% at one year and 1% at two years. Post-operative pain was minimal with 84% experiencing no pain with either technique. In the patients reporting mild pain or tenderness, only treated segments above the fascia were involved. Both RF and 1320nm, both of which target water, not hemoglobin, are highly effective long term with a very low incidence of side effects. The technique of ultrasound guided puncture under local anesthesia with immediate ambulation is very safe and effective, and has replaced surgical stripping. A decade of experience validates endovenous ablation.

CB3.7-2
Radiofrequency Segmental Thermal Ablation (RSTA) of great saphenous veins: two year follow-up
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Radiofrequency segmental thermal ablation (RSTA) showed its feasibility in occlusion of incompetent great saphenous veins (GSVs). The durability of the results are to be reported.

Methods. N = 295 GSVs in 225 patients were treated in a prospective multicenter trial by RSTA exclusively under local anesthesia. Control visits including duplex-ultrasound examination were performed after 3, 6, 12 and 24 months. Any flow observed more than 3 days, 3, 6, 12 and 24 months. Any flow observed more than 3

Results. N=166 (73.8%) of patients were female, mean age was 50.5 years [range 18-79]. Average treated length of n = 295 GSVs was 56.9 ± 10.6 cm [range 15.72], concomitantly performed procedures were phlebectomy in 164 legs (55.6%) and sclerotherapy in 38 legs (12.9%). During follow-up, one vessel was open at 3 days but occluded thereafter. Life table analysis according to Kaplan and Meier showed occlusion rates of 99.7%, 99.3%, 98.3% and 96.2% at 3 days, 3 months, 6 months and one year, respectively. At 2 year follow-up 2

of 97 GSVs evaluated until today showed recanalization, resembling 94.2% occlusion according to Kaplan and Meier. The average VCSS score improved from 3.9 ± 2.1 before treatment to 3.5 ± 1.2 at 3 days, to 0.9 ± 1.5 at 3 months, 0.7 ± 1.2 at 6 months, 0.6 ± 1.2 at 12 months and 0.2 ± 0.8 at 24 months thereafter. Presence of any pain in the treated limb improved from 58.6% before treatment to 48.5% 55.5%, 12.5%, 3.1% and 2.0% at the same follow-up intervals. Likewise, presence of leg swelling improved from 52.9% to 6.4%, 8.3%, 8.3%, 4.5% and 3.0%.

Conclusion. RSTA showed a high occlusion rate and durability of results. A remarkable subsequent improvement of clinical symptoms was noted.

CB3.7-3
Metaanalysis of the results after radiofrequency obliteration for treatment of varicosis
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With the VNUS Closure Plus®-System the treated vein is closed by slow pull-back with temperature, resistance and energy is monitored. With the VNUS Closure Fast®-System the vein is obliterated in 7 cm segments. For the Closure Plus®-System many data were published during the past years. We have performed a metaanalysis of the data including our own 2 study series from 1998 and 2005. The perioperative complication rate is very low. The incidence of deep venous thrombosis and pulmonary embolism was 0.2% either in 584 analysed extremities. The rate of skinburns was 0.3% (166 extremities), a phlebitis was observed in 3.8% of 1695 analysed extremities. The incidence of perioperative hypotension was higher with 12.6% in 1941 treated extremities. In the published single center studies the rate of recanalisation varied between 0 and 16.2%, average 10.9% in 516 examined legs. The follow-up period varied between 4.7 and 60 month, the average was 17.5 month. For RFO there are 5 prospective randomized studies with 116 treated legs. The recanalisation rate was 12.9% in average, follow-up of 18.5 month ranging from 2 to 36 month. For the new Closure Fast®-System there are data published from a European multi-center-study with a 99.6% occlusion rate 6 month postoperatively. The radiofrequency obliteration of the superficial venous system is a standardized treatment method. It seemed that the VNUS Closure Fast®-System the primary occlusion rate is higher in comparison to the VNUS Closure Plus®-System. The published data show that the pathologic recirculation is securely excluded with RFO. If you take into account, that the return to work is significantly shorter with RFO in comparison to stripping, as published in one of the prospective randomized studies, you can calculate, for Germany, that 406 555 days of inability to work can be spared per year.

CB3.7-4
Histological changes after endovenous radiofrequency therapy (VNUS closure/ closure fast)
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Aim. It is still a matter of discussion if varicose veins should be treated effectively with traditional methods or with endovenous radiofrequency and/or laser therapy. We know the 5-year results gained from a multi-centre clinical trial of the VNUS- Closure endovenous radiofrequency (RF) vein ablation versus stripping of the great saphenous vein (surgical treatment). However, there are no long-term results. It was our intention to make a contribution towards objectively analyzing the results after the Closure- FAST-therapy.

Methods. In our tests we made a mini-incision to remove a part of the great saphenous vein after radiofrequency treatment with the Closure- FAST- catheter for histological examinations.

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Results. In all our patients we see the same alterations: Complete destruction of the intima layer (fresh necrosis 0.1-0.2 mm deep), de-naturation of the collagen, subintimal oedema. After 4 months we see a complete obliteration of the vein and a thrombus in organisation with immigration of granulocytes in the tissue. A year after our patients were treated with Closure-Fast therapy the great saphenous vein is completely obliterated (duplex scan, MRT).

Conclusion. After the Closure-Fast treatment in varicose veins we have the histological proof for the destruction of the intima and the collagen with necrosis and destruction of the vessel wall. The result is the complete obliteration. Long-term results will be following.

CB3.7-5
Closure fast. A novel concept of endovenous thermal ablation for short saphenous veins. Techniques and initial clinical experience
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Endovenous radiofrequency (RF) ablation has been widely used for treating incompetent saphenous veins since 2001 and the durability of the procedure has been proven through previous studies. A new RF catheter with 7 cm-long heating element was available since 2006. Our center has treated 413 consecutive Short Saphenous Veins (SSV) between March 2007 and December 2008.

Methods. 339 patients with SSV incompetence were treated ultrasound assessed under tumescent local anesthesia and the data prospectively collected. Vein occlusion, side effects, clinical improvement were assessed pre-operatively and post-operatively. Duplex ultrasound assessments were performed after 7 days, 6 weeks and 1 year.

Results. In our follow-up we have examined 330 patients treated on 430 limbs. The occlusion rates were 100% at day 7, after 6 weeks and 99% after 1 year. 430 limbs (follow-up rate 100%), 355 limbs (follow-up rate 77.9%), 76 limbs (follow-up rate 17.7%) respectively. Patient average age was 55.5 [20-85] years, 67.4% were female. The average length of treated vein segment was 24.4 [14-60] cm and an average tumescent anesthesia volume of 293 [74-633] ml. No skin burns, DVT or other serious complications were observed. Paresthesia rate was 2.9%. 87.6% of limbs were complications free post-procedure. No skin burns, DVT or other serious complications were observed. Paresthesia rate was 2.9%. The vein was no longer compressible in 100% of the cases. Longer term patient follow-ups visits are ongoing and more complete results will be available at the time of the presentation.

Conclusion. The new-style catheter is highly effective and combines the favorable side effect profile of RF closure with the treatment speed of Laser. Longer term follow-up will bring more information about this promising new version of the RF treatment for Short Saphenous Veins.

CB3.7-6
The extent of necrosis of the vein-wall is determined by power and time of the applied bipolar radiofrequency-induced thermotherapy-histological results of an ex-vivo experiment
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Clinical studies have demonstrated the efficiency and safety of bipolar radiofrequency-induced thermotherapy (RFITT) of truncal varicose veins. So far, histological studies evaluating the effect of RFITT with varying application parameters in human veins are missing.

Aim. Does the extent of the necrosis of the vein-wall depend on the power and time of RFITT-application?

Methods. 15 patients underwent a stage-according surgical therapy of their varicosis independently of the study. With the patients' consent, 20 vein-pieces of 3-4 cm near the saphenofemoral junction were atramaurally extracted and immediately treated by RFITT ex-vivo. RFITT was applied with fixed and varied application time (fixed: 2 seconds, varied: up to the acoustic signal) and increasing power (5, 10, 15, 20, 25 watts). Respectively 2 vein-pieces got the same treatment. All preparations were subsequently processed histological (staining: Hematoxylin-Eosin, Elastica-van-Gieson).

Results. The post-therapeutic measured thickness of the treated vein-wall (intima and media) was 0.2 to 1.6 mm. A homogeneous necrosis of intima and media in the whole circumference of the vessel – that is probably necessary for a successful obliteration of the vein - was only reached at a power of 20 and 25 watts with an application time of 2.5 seconds. Heterogeneous necrosis of the intima and media in some parts of the vessel circumference were possible by elongated application of lower power (e.g. 5 watts, 20 seconds). In none of the experiments the generator turned-off as it is normally seen in vivo when the resistance of the tissue increased.

Conclusion. The extent of the necrosis of the vein wall is modified by both power and time of application. So an optimized and in comparison to an endoluminal laser therapy more homogenous coagulation of the intima and media without perforation can be achieved. The necessary time for RFITT-treatment in vivo is probably shorter than in the 0.9%-NaCl filled ex-vivo experiment.

CB3.7-7
The role of endovenous ablation in the treatment of recurrent varicose veins
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Endovenous ablation is an effective technique in the treatment of primary truncal reflux but may not be so useful in recurrent disease where saphenous veins have sometimes been wholly or partially removed.

Aim. We have analysed patients presenting with symptomatic recurrent varicose veins to determine how often endovenous treatment can be offered.

Methods. Duplex ultrasound was performed in 48 consecutive patients presenting with recurrent symptomatic varicose veins. It was noted whether reflux in the great (GSV), anterior accessory (AASV) or small (SSV) saphenous veins was responsible for recurrence. Endovenous ablation of all the affected trunks or large groin branches was attempted instead of open surgery. Patients underwent repeat ultrasound 4 weeks after the procedure and were followed-up clinically for 6 months.

Results. The median age of the 48 patients was 55 years (range 32-83). Venous surgery had taken place a median of 7 years (range 2-20) previously and was thought to have involved “stripping” in at least 30. Recurrence was bilateral in 14 patients but was not related to previous surgery in 12 others so 50 legs exhibited true local recurrence. In 22 (44%) of these GSV reflux was the underlying source (6 wholly intact, 16 residual) whilst the SSV was implicated in 6 cases. The AASV was incompetent in 7 cases, and large thigh or perforating branches responsible for the remaining 15 recurrences. Radiofrequency ablation (Closurefast, VNUS) together with minipaldelecomities was performed in 52 (64%) of the 50 legs and local excision or sclerotherapy in the remaining 18 (36%). Duplex imaging confirmed successful occlusion of the ablated segments and no patient required further treatment for residual veins during follow-up.
Conclusion. A large proportion of patients with recurrent varicose veins have underlying saphenous reflux. In these cases endovenous ablation is usually possible and avoid the need for redo surgery in the groin or popliteal fossa.

CB3.7-8
Radiofrequency ablation or endovenous laser therapy for varicose veins?

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Aim. Studies have shown similar venous occlusion rates and quality of life gains in patients treated with segmental radiofrequency ablation (RFA) or endovenous laser ablation (EVLA). The aim of this study was to evaluate early differences in post operative outcome.

Methods. A prospective observational study of patients treated with RFA or EVLA over one year were treated under general anaesthetic with concomitant phlebectomy. CEAP, VCSS and disease specific quality of life scores (Aberdeen Varicose Vein Questionnaire-AVVQ) were recorded pre and post-treatment. Patients were given diary cards with a 100mm visual analogue scale to document pain for 10 days after surgery.

Results. From January to May 2008, 72 patients underwent endovenous ablation, EVLA (n=29), RFA (n=43). CEAP scores were C2 (n=31), C3 (n=22), C4 (n=14), C5 (n=4), C6 (n=1). Initial median (range) VCSS and AVVQ scores were 4 (0-13) and 17.121 (2.46-42.517) respectively. Age, sex, CEAP and AVVQ scores were comparable between the 2 groups (p=0.61, p=0.58, p=0.85 and p=0.71 respectively). Average pain scores following RFA were lower over 5 days (13 vs 26mm) and 10 days (10 vs 25mm) compared to EVLA p=0.013 and p=0.002 respectively, Mann Whitney U). However there was no significant difference in return to normal activities (p=0.95). AVVQ scores improved significantly at 6 weeks in both groups (p=0.035 and 0.05 Wilcoxon Signed Ranks) with no significant difference between groups (p=0.6 Mann Whitney U).

Conclusion. Patients treated with radiofrequency ablation had significantly less post-operative pain than those receiving endovenous laser ablation. However, this did not translate into quicker recovery times or greater improvements in quality of life for RFA over EVLA.

CB3.7-9
Two years experience and one year follow-up results with radiofrequency induced thermotherapy (RFITT) of varicose veins

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During the last years many minimal-invasive methods have been developed to eliminate venous truncal reflux disorders. In September 2006 Celon has introduced a new bipolar radiofrequency system: the CelonLabPRECISION (Celon AG, Teltow, Germany) enabling endovascular RFITT.

Aim. To present the experiences with RFITT from 1/2007 to 1/2009 and therapeutic results with follow-up one year.

Methods. CelonLab Precision RF-generator and flexible Celon ProCurve electrode were used for the truncal reflux elimination. Great saphena was treated in 84%, small saphena in 12% and main tributaries in 4%. There were 329 treated veins total on 290 legs of 253 patients. The procedure is performed by continual extraction of the electrode. Power setting on generator which was used during the first phase (267 veins -group A) of the study was 25W with extraction speed in mean 1s/cm. During the second phase (due to complications) the power was 20W with extraction speed in mean 1.4cm/s (62 veins -group B). The energy into the wall of the vein was between 25-30J/cm. The procedure was applied in case of clinical stage of chronic venous disorder from C2 to C6 according to CEAP.

Results. The success rate of RFITT is in one year follow-up 94.6%; 7/131 veins (all from group A) were not completely closed. No failure was observed on duplex scan. All 7 cases were presented with partial reopening and were not associated with new varices. The reopened part was solved with foam sclerotherapy. After the surgery patients felt statistic significant drop of venous pain to 21 days after surgery (p<0.03). No deep venous thrombosis was observed. To most serious complications belonged superficial phlebitis (2 cases) and skin hyperpigmentation (6 cases).

Conclusion. RFITT is an effective, fast and safe endoluminal method which should be included into standard surgical procedures to eliminate venous reflux disorders.

CB3.7-10
Recurrence varicosity of Greater Saphenous Vein (GSV) after endovenous radiofrequency (RF) ablation - Retreatment and comparison with RFITT

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Endovenous radiofrequency (RF) ablation has been used since 2001 and has shown its feasibility and occlusion of incompetent saphenous veins. We have noticed increased recurrence varicosity rates, which make a new intervention necessary.

Methods. A total of 133 patients with 210 GSVs have been treated from the 1st January 2005 to the 31st December 2005 with the VNUS Closure PLUS 6 French catheter system of the first generation. Duplex-ultrasound control visits were performed after 7 days, 6 weeks, 1, 2 and 2 years. The recurrence varicosity has been classified in 4 groups. Recanalization of GSV (G1), reflux over accessorial veins (G2), fibrotic veins (G3) and new varicosity veins (G4).

Results. In our follow-up we have examined 133 patients treated on 210 limbs. After two years we saw 47 veins open (22, 4%, 42 in G1, 2 in G2, 2 in G3 and 1 in G4). Follow-up rate 100% (210 limbs) at day 7 and after 6 weeks, follow-up rate 72%-8% (152 limbs) after 1 year and follow-up 44.8% (94 limbs) after 2 years respectively. All recurrence varicosity in group 1, group 2 and group 3 were treated with the Closure PLUS or the Closure FAST catheter system. Recurrence varicosity in G4 was treated with foam sclerotherapy in three cycles. All veins are occluded.

Conclusion. The non-occlusion rate is pretended higher. The Closure PLUS 6-French catheter systems with 40 J per centimetre given off into the vein wall to occlude the vein is too little in comparison with the RFITT catheter (15 J/cm). It is possible to retreat the most recurrence varicosity with VNUS Closure FAST.

CB3.7-11
Endovascular radiofrequency induced thermo-therapy (RFITT) for the treatment of perforating veins

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During the last years many minimal-invasive methods have been developed in order to eliminate truncal venous reflux disorders. However, reports about the utilization of these methods for the ablation of insufficient perforating veins are rather poor.

Aim. The aim of this study was to use endovascular RFITT for the occlusion of perforating veins.

Methods. The ablation procedure for the treatment of perforating veins was developed based on the clinical experiences with RFITT of stem veins and the ex-vivo experiment on calf legs. The CelonPro-
Surge micro 100-709 RFITT applicator and the ColonLab PRECISION generator were used for this intervention. In the human part of the study the insufficient perforators were defined with a diameter of more than 3 mm and the regurgitation time longer than 0.5 s on the duplex scan.

**Results.** In total 32 interventions were performed on calf legs in a laboratory set-up. According to these in vitro experiments the optimal power of the RFITT generator was set on 6W and the optimal application time was set on 4 s (tested power 4W-10W, application time 3-7 s). The optimal energy was determined with 24J/cm. Unlike radiofrequency ablation of stem veins, the RFITT applicator is not extracted during the application itself, but only after full completion of the procedure. The Celon method was performed on 49 patients and 58 perforators were ablated in total in the human part of the study. To date 34 perforators of 25 patients were followed up 9 months post RFITT. Reopening was observed in 4 cases. Success rate at a 9 months follow-up is 88.2%.

**Conclusion.** After a relatively short learning curve Radiofrequency Induced Thermotherapy with the ColonLabPRECISION is a safe and effective minimal-invasive method for the successful treatment of perforating veins.

**PP3.8 - Endovenous procedures 6: Combined treatment**

**PP3.8-1**

Combined surgery with endovenous laser, Müller technique and videocopy

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From 2001-2008, the authors present their experience with the surgical treatment of 1713 cases, based on the classification of primary varicose veins from the Latin American Venous Forum consensus. We also used the CEAP classification. 100% of the patient went through a preoperative U.S. We performed the micro cuts surgery (known as ambulatory phlebectomy) associated with endoluminal laser for the saphenous trunk and videocopy surgery using Hauer’s technique in the cases that the incompetence of the perforator veins were not demonstrated. All the cases were performed by u.s guidance and instilled with tumescent anesthesia in the saphenous phasia. Over a total of 1713 venous surgeries, we did micro surgery in all of them, 275 videocopies, 83 were associated with endoluminal laser. 605 surgeries with endolaser guided by intravascular U.S. The reaming 855 surgeries were performed using an association between the invaginated saphenectomy (intraluminal resection) and the micro surgery. From 605 endovenous laser, 459 cases bilaterally, 401 long saphenous vein, 58 in the short one 146 cases were unilateral 119 in the long saphenous vein and 27 in the short one. All cases were evaluated by a preoperative u.s. the follow-up was performed by u.s 7 days after, 15 days, 1 month, 6 months, 1 year, and each year after that. Posoperative results: oedema 53 cases, lymphoedema 4, neuralgias in the long saphenous area 37, paresthesias 9, and infection in 1 case. The neuralgias disappeared in all cases 1 week after the surgery. All the patients used class II stocking 1 month after the surgery.

**Conclusion.** Endovenous laser compared with the saphenous stripping is painless, performed with local anesthesia, ambulatory, minimally invasive, with a low incidence of bruising and with good aesthetic and clinical results.

**PP3.8-2**

**Role on tributaries GSV to formation long stump after endovenous laser treatment**

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Endovenous laser treatment (EVLT) is an effective treatment for thermal ablation of primary venous insufficiency involving the great saphenous vein (GSV). This study was designed to learn about value of the residual GSV stump following EVLT.

**Methods.** In this prospective study from January to September, 2008, 110 EVLT procedures were performed in 105 patients with a mean age of 47.7 years (range, 25-68 years). Average diameter of a proximal GSV 8.7 mm (range, 5-12 mm). A 1050-nm diode laser and microphlebectomy and foam-form sclerotherapy were used. The laser tip was positioned 5 mm distal to the saphenofemoral junction. Patients had clinical follow-up visits, including duplex ultrasound examination, at 24 hours, 1 week, 1 month, 3 months, 6 month and were assessed for recanalization of the ablated vein, length of the GSV stump.

**Results.** A total of 106 great saphenous veins (96.36%) were ablated. Only in four cases (3.64%) the GSV recanalization was observed after 5 months. After 6 months the length stump GSV in 22.72% was <5 mm (n=25, group A), in 59.09% 5-8 mm (n=65, group B) in 19.18% >8 mm (n=24, group C). Group A: none reflux (100%), anterograde flow on tributaries (d≤3 mm) in 60% (n=15). Group B: anterolateral tributary (100%), reflux 10.76% (n=7), anterograde flow 89.24% (n=58), d≥5 mm in 25.08% (n=15). Group C: anterolateral tributary (100%), reflux 37.50% (n=9), d≤3 mm in 50.00% (n=12), posteromedial tributary (54.17%, n=13), reflux 16.07% (n=4), d≥5 mm in 33.53% (n=8).

**Conclusion.** In formation of length stump GSV plays a role anterograde flow on tributaries GSV (anterolateral and postermoidal). Long stump (more than 8 mm) are formed at diameter of tributaries more than 3 mm. In such cases for the purpose of improvement of result of treatment probably it makes sense to carry out in addition EVLT tributaries GSV.

**PP3.8-3**

**The effect of endovenous laser ablation on the restless legs syndrome**

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Restless Legs Syndrome (RLS) is a poorly-understood group of disorders affecting 5-15% of Americans and Europeans in which patients experience unpleasant “sensations” in their legs and compelling urges to move the legs in efforts to relieve the sensations. The vile sensations are triggered by sitting or lying down to relax and are temporarily relieved by movement. They wax in the evening and wane in the morning. The sensations and unrelenting urges to move prevent relaxation and sleep onset. This study examines the effect of using endovenous laser ablation (EVLA) to correct superficial venous insufficiency (SVI) in patients with RLS and duplex-proven SVI.

**Methods.** Thirtyfive patients with RLS completed an IRLS questionnaire to objectively rate symptom severity from 0-40 points, then underwent standard duplex examination. Patients with SVI were separated into non-operative and operative cohorts. The operative cohort underwent EVLA of refluxing superficial veins using CTEV 1320nm laser and ultrasound-guided sclerotherapy of associated varicosities with foam-sts. All patients then completed a follow-up IRLS questionnaire six weeks later. Baseline and follow-up IRLS scores of both cohorts were compared.
Results. Operative correction of SVI decreased the mean IRLS score by 21.4 points (an average 80% improvement). 89% enjoyed a decrease in their score of 15 points. 53% had a follow-up score of 5, indicating their symptoms had been largely alleviated. 31% had a follow-up score of zero, indicating complete relief of RLS symptoms. There was no change in the non-operative control group.

Conclusion. EVLA of refluxing superficial veins with CTEV 1320nm laser and foam-STS sclerotherapy of varicosities alleviates RLS symptoms in patients with SVI and RLS. This is the first study in the world to show that RLS symptoms can be treated via operative intervention, rather than managed with drug therapy. SVI should be ruled-out in all RLS patients before initiation or continuation of drug therapy.

PP3.8-4
Anatomical limits of endovenous laser obliteration in the great saphenous vein: combined treatment for optimal results
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For the treatment of the great saphenous vein (GSV), endovenous laser obliteration (ELO) is the best alternative to surgical resection. However, this method of treatment is not providing all patients with the best results. The reason is the anatomical variations of the GSV. Among patients with GSV insufficiency, more than 50% have a large refluxing collateral running parallel to the intrafascial GSV trunk in a superficial situation, often in direct connexion with varicose veins in the calf or thigh. The trunk of the GSV parallel to this vein is often competent or hypotrophic. In those cases, the treatment of the superficial collateral by ELO will result, even with generous subcutaneous anaesthetic infiltration, in increased post operative pain, induration and a durable linear pigmentation that can impair the cosmetic and functional result. In this anatomical pattern, the solution of choice appears to be association of 2 Methods: 1) Segmental invaginating stripping of the subfascial branch; 2) Endovenous laser obliteration of the distal GSV up to the sapheno-femoral junction. In our experience, this approach concerns one third of the GSV patients and combines the advantages of the 2 Methods: 1) Optimal hemodynamic and cosmetic results; 2) Minimal post operative discomfort. No dissecting of the sapheno-femoral junction responsible for neocangiosis. The procedure is performed under local anaestheisia through micro-incisions. The invaginating removal of the superficial branch is always associated with extensive peripheral phlebectomy. ELO is carried on further up on the distal segment of the GSV lying deeper in its ‘classical’ anatomical position. This results in obliteration of a shorter length of GSV with ablation of all refluxing branches below it, putting together all conditions for good long term result. All patients are leaving the clinic in walking 3 hours after the treatment. Indications and technical aspects of the procedure will be discussed with detailed intra and post operative examples from the last 500 patients.

PP3.8-5
One-stop treatment of varicose veins by radiofrequency ablation and mini-phlebectomies
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Unilateral endovenous ablation is often performed as the sole procedure in the treatment of symptomatic varicose veins. Further interventions may then be required for residual varicosities or contralateral saphenous truncal disease.

Aim. To determine whether a policy of treating saphenous reflux and all varicosities in both legs simultaneously is practical and effective in patients presenting with varicose disease.

Methods. 54 consecutive patients presented with symptomatic varicose disease and reflux of the great (GSV), anterior accessory (AASV) or small (SSV) saphenous veins. Radiofrequency ablation (Closurefast, VNUS) was performed to all affected trunks with simultaneous mini-phlebectomies. Local anesthesia, supplemented by sedation as required, was used in 32 patients and general anesthesia in 22. Patients returned for ultrasound after 4 weeks and any treatment of residual varicosities noted.

Results. Median age was 48 years (range 32-75) and 42 patients (78%) were female. Disease severity was CEAP 2-3 in 59 patients and CEAP 4-6 in 15. 28 (52%) of the procedures were bilateral (GSV/AASV in 22, SSV in 3, GSV and SSV in 3) whilst 26 (48%) were unilateral (GSV/AASV in 20, SSV in 6). 12 (43%) of the 28 patients undergoing bilateral procedures preferred local anesthesia, compared to 20 (77%), p<0.05) of the 26 patients undergoing unilateral treatment. Successful ablation of treated saphenous veins was confirmed by ultrasound in all 54 patients. In 10 cases the occlusion reached the junction with the deep vein, and this included all 5 patients who had both LSV and the AASV ablated. Only 3 (6%) patients required sclerotherapy for residual varicosities.

Conclusion. Varicose veins with bilateral or mixed saphenous reflux may be effectively treated by a single endovenous procedure with simultaneous mini-phlebectomies, and this can often be performed under local anaesthetic. A patent AASV, rather than the inferior epigastric vein, is often the cause of the short ‘stump’ seen after GSV ablation.

PP3.8-6
The first five minutes of the great saphenous vein after 808 nm diode laser ablation. Further details of the histological study.
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Poor information concerning the mechanism of action of endovenous laser in the ablation (ELA) of incompetent greater saphenous vein (GSV).

Aim. To evaluate the immediate venous morphologic alterations produced in the great saphenous veins by the endovenous Diode 808nm laser in the treatment of varicous veins of the lower limbs.

Methods. Twenty-four limbs of sixteen patients were selected by non invasive examinations (C.E.A.P. 2.0) with documented greater saphenous insufficiency and venous diameters between 3.9 and 17 mm (mean 8.0mm) without phlebitis, saphenous aneurysms, congenital malformations and deep venous insufficiency were studied. All limbs were subjected to saphenofemoral disconnection and GSV ELA was treated by Diode 808nm laser (Eufoton-Trieste-Italy), continuous emission, 12-15 Watts, variable retraction speed (<)>1mm/sec). Spinal or local anesthesia. Twenty-nine specimens, 3-5 cm long, of 20 proximal GSV were excised and studied by light microscopy: diameter and thickness of the venous wall, thermal damage of intima, media and adventitia.

Results. Histology: thermal injury to the intima in all specimen and intimal injury of full thickness in 22 specimens (75%), average penetration in 29 specimen of 194.40 micron (range: 10-900, 14.61% of the mean wall thickness); complete circular injury in 8 specimen in veins<10 mm. in diameter (27.5%); vaculization, delamination, coagulation, micro-haemorrhages and various capillaries thermal damage in the inner media, full thickness damage in 6 (20.7%) and perforation in 2 (6.9%).
Conclusion. The immediate effects of GSV ELA by 808 nm laser are represented by thermal damages which enables the thrombus formation and venous wall atrophic involution. A variable retraction speed, combined with saphenofemoral interruption, leads to sufficient inner vein wall thermal damage to assure venous occlusion with infrequent full thickness thermal injury or perforation. Optimal results can be obtained in veins of less than 10 mm in diameter.

PP3.8-7

1008 Endovenous Laser Treatment (EVLT) personal experience

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The world increase of the incidence of the venous pathology together with the disadvantages of traditional surgical procedures led to the peak of minimum invasive procedures, EVLT standing out among them.

Aim. To demonstrate the effectiveness and safety of EVLT, personal experience, in a private center.


Results. Average age 65.4 years, sex F 579, M 333, duration of the procedure: 46 minutes, SE 284 and SI 609, collateral (25/1), clinical diagnosis according to the CEAP, acronym C>of 3; preoperative data based on ecodoppler: reflux degree, 86% severe, 14% moderate; maximum basal diameter 0.92cm. Area, distal insufficient sector. Fluence 50/100/cm, fiber withdrawal speed 0.5/1mm/s; average of the treated segment 48.9 cm. Failures: week, 28 (2.77%) members (50% of photoobliteration failure 3 legs, of 30/40% 25 legs). Month, 9 members, 5 months, 10 members; 6 meses, 7 members with 30/40% of photoobliteration failure; there were not new failures in patients that completed the year of follow-up from 6 to 12 months 8% was repermealized without signs of insufficiency by ecodoppler.

Complications. Definition, classification (1: intraoperative-postoperative 2: minor-major). Statistics are presented. The use of ecodoppler was protocized 1)preoperative: diagnosis and ultrasound marking 2)intraoperative 3)postoperative 4) early detection of complications. Evolutionary control: week, month, 3 months (the number of patients who missed the follow-up is determined: month, 14 p; 3 months, 21p, 6 months, 45p.). a) Clinical: improvement of the CEAP by Ecodoppler. 5 parameters according to classification of modified SEACV. c) To determine the improvement of life quality according to SF 36.

Conclusion. Effective and safe procedure with scarce complications prescribed for pathology of big veins, high CEAP, longevity, severe associated illnesses and young people due to aesthetic reasons.

PP3.8-10

Is endothermal ablation the answer to patient satisfaction?

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Aim. Intended benefits of endovenous procedures for varicose veins include fewer complications, reduced recurrence rates and greater patient satisfaction compared with traditional surgery. The aim of this study was to evaluate patient satisfaction following endothermal ablation procedures.

Methods. Consecutive patients treated with endothermal ablation over 18 months were identified and invited to complete a postal survey of 12 multiple choice questions relating to symptoms, varicose vein recurrence, further treatments and patient satisfaction.

Results. Questionnaires were returned by 143/295 (48%) patients at a median of 12 months post intervention. 90/143 (63%) had primary varicose veins, 53/143 (37%) were recurrent. Preoperative symptoms included aching 115/143 (81%), swelling 69/143 (49%) and heaviness 58/143 (41%). 124/143 (86%) reported that their symptoms were better following treatment, of which 79/143 (55%) felt that they were cured. Symptoms were the same and worse in 8/143 (6%) and 11/143 (8%) respectively. Most patients reported no recurrent veins (106/143, 74%), although 22/143 (15%) reported veins as bad or worse than before surgery and 15/143 (11%) were the same. Further treatment was required by 35/143 (24%), including sclerotherapy 3/143 (2%), EVLT 2/143 (1%) and surgery 4/143 (5%). 69/143 (48%) reported no complications, temporary numbness, infection and DVT were reported by 37/143 (26%), 4/143 (3%) and 1/143 (1%) respectively. The majority of patients 123/143 (86%) were satisfied (43%) or very satisfied (43%) with their treatment. Of those who were dissatisfied, 14/19 (7%) were female, 15/19 (79%) had had previous surgery and 18/19 (95%) had recurrent veins.

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PP3.8-11
Use of CO₂ laser in lipodermatosclerosis
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Lipodermatosclerosis is an unwanted consequence of chronic venous disease; it has pathophysiological as well as cosmetic consequences.

Methods. We tried a new technique to help restore healthy skin in advances stages of chronic venous insufficiency. We recruited five patients with lipodermatosclerosis. The patients were treated with endovenous procedures to treat varicose reflux. Three sessions of dermal co₂ laser fractionated treatment were accomplished in order to resurface healthy skin by activating the inflammatory mechanisms in the dermis. Photographic follow-up was recorded.

Results. It seems that co₂ dermal laser could be an effective treatment in the regeneration of skin and subdermal tissues in patients with lipodermatosclerosis. This is a minimally invasive technique that seems to restore the normal processes in a previous altered area.

PP3.8-12
The value of ultrasound guided femoral nerve block in patients undergoing endoluminal laser ablation of great saphenous vein
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The endoluminal laser ablation (ELA) has emerged as a new method of treatment of insufficiency of great saphenous vein. However this is not a pain free procedure and requires realization of tumescent anesthesia. The purpose this study was to determine the safety and efficacy of ultrasound guided femoral nerve block in patients undergoing ELA of great saphenous vein. Two consecutive groups of 25 patients that underwent ambulatory ELA of GSV were studied. In the patients from group 1 tumescent anesthesia only was performed. In the group 2 prior to realization of tumescent anesthesia ultrasound guided femoral nerve block with 20 ml of 1% lidocaine was performed by the operating surgeon. The pain during the realization of tumescent anesthesia and ELA was evaluated by the patients according to the 5-point scale. The heart rate and blood pressure were monitored. The postoperative stay in recovery area was recorded. The postoperative stay in recovery area was recorded. The results were statistically analyzed No complications related to femoral nerve block were observed. The pain related to the realization of tumescent anesthesia as well as the pain associated with the ELA of GSV was significantly higher in group 1 (p<0.001). The volume of tumescent anesthesia administrated was smaller in group 2. The patients from group 2 experienced significantly less hemodynamic incidents during the procedure (p<0.01). The postoperative in-hospital stay did not differ between the groups. The ultrasound guided femoral nerve block is an safe and efficient option to reduce intraprocedural pain related to realization of tumescent anesthesia and endovenous laser ablation of great saphenous vein.

GE3.8 - Venous ulcer treatment: Grafts

GE3.8-1
The biotechnologies in the treatment of neuro-vascular ulcers of the lower limbs. Cultivated autograft of skin: fibroblasts and/or keratinocytes
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Approximately 600,000 patients in Italy, are affected with invertebrate and painful neuro-vascular ulcers, the 50% of them are by chronic venous insufficiency.

Aim. To verify the results obtained in 372 patient treated by means of biotechnologies during a period of 7 years and 8 months (Apr. 2001-Dec. 2008).

Methods. Biotechnologies are based on the biopsy of a small skin fragment (2-3 cm²). The essential components, dermalocytes and keratinocytes, are isolated from the skin fragments and separated. The process is performed in a specialised laboratory for cellular membrane culture, where tissue layers are developed 'in vitro'. Ulcers are properly prepared and tissue layers separately grafted on the ulcer surface.

Results. A clinical experimentation on 372 patients for a total of 808 grafts (364 dermocytes - 444 keratinocytes) was performed. 291 out of the 372 cases were followed-up, (mean 42.5 months, range 5 months-7 years and 8 months). The following results were obtained in the 372 cases: 326 ulcers completely healed (87.63%); 41 partially healed (11.02%); 5 failures (1.34%); 3 amputations (0.81%); 15/326 recurrence (4.69%).

Conclusion. These data overlap with the ones from the recent literature: 95% of good clinical results (ulcers partially/completely healed) and stable in the time. The advantages of the surgical graft seem to be of a remarkable clinical and social relief: 1-proved clinical effectiveness; 2-safety of the biotechnological procedure; 3-stable results in the long term; 4-Positive relationship between costs and advantages. It can be concluded that the described procedure is easy and fast to perform, it can replace the traditional and more complex methods reported in the literature.

GE3.8-2
Autologous cultured skin, Tiscover® for ambulant treatment of hard-to-heal leg ulcers: a revolutionary approach
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Full thickness cultured autologous skin, Tiscover®, is cultured from 3 mm skin biopsies. In 3 weeks time a 20-fold expansion is obtained resulting in 1.5 x 2.5 cm cultured skin. Tiscover® secretes a potent cocktail of growth factors and chemokines. Previously hospitalized patients with leg ulcers were successfully treated.

Aim. To investigate the practical applicability, efficacy and tolerability of ambulant treatment of hard-to-heal ulcers with Tiscover®
Methods. In a multicenter randomised study, therapy-resistant leg ulcers received Tiscover® or standard treatment. 27 patients with mainly venous, and mixed arterio-venous ulcers of 3 months to 50 years duration, size 3–100 cm² were included. Tiscover®, was placed without fixation after debridement. Adequate compression therapy was continued. In an exploratory study a group of 20 ambulant patients with 27 chronic wounds of diverse origin received Tiscover®.

Results. In the multicenter group 51% of the ulcers healed, versus 14% in the control group within 24 weeks. 31% of Tiscover® treated ulcers remarkably decreased in size. In the control group 64% showed no or little change in wound size. In the group of 27 chronic wounds 57% showed complete healing within 24 weeks, 26% remarkably decreased in size. Wound healing occurred by stimulation of wound bed due to cross talk between cultured fibroblasts and keratinocytes and direct take of Tiscover®. Tiscover® reduced pain instantaneously in many cases.

Conclusion. Full thickness autologous bioengineered skin, Tiscover®, is a simple, non-time-consuming treatment. A single application of Tiscover® is effective for ambulant treatment of hard-to-heal venous leg ulcers, but also chronic wounds of other origins (pressure and diabetic). Wound healing is induced by direct take or by stimulation of wound bed activity.

References
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GE3.8-3

Allograft in the treatment of nonhealing skin ulcers
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Aim. to investigate if allograft is effective in promoting ulcer healing in patients affected by hard-to-heal ulcers.

Methods. from September 2001 to September 2007 we treated 234 patients affected by 628 ulcers bigger than 50 cm² and lasting for more than 6 months despite a proper treatment including moist dressings and inelastic compression. 98% were affected by venous insufficiency, 69 by arterial disease (18 of whom by critical limb ischaemia), 25 by both, 27 by vasculitis; 15 patients showed no clinical vascular disease, ulcer’s surface was cm² 253±203 (50-1000 cm²), the duration of ulcers was 36,6±72,5 (6-480) months. Allograft was performed after ulcer debridment by means of moist dressings and/or Versajet; in 131 patients the graft was repeated; therefore 601 grafting procedures were performed, cryo-preserved skin was applied in 520 procedures; glycerolate-preserved skin was used in 81 patients.

Results. After grafting procedure 3 patients were lost at follow-up, 14 were amputated after grafting failure; 9 died, the results refer to 208 patients who completed the protocol. 183 patients (88%) healed, 22 patients (10,6%) improved; 3 (1,4%) patients remained unchanged or worsened; ulcer pain and secretion ceased in 65% and 52% of patients, decreased in 31% and 47% and remained unchanged in 4% and 1% respectively. No adverse reaction was reported.

Conclusion. Allograft is very effective in promoting ulcer healing. In our case report it induced healing or improvement of 91% of patients; ulcer pain and secretion were stopped or reduced. The treatment is repeatable, safe and not expensive also if some problems could be difficult to solve: skin banks are not widespread throughout the country and sometimes the available skin doesn’t fit the surgeon requirements.

GE3.8-4

Leg ulcers treatment with homologous graft
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Aim. We report the experience of 9 years utilizing homologous skin graft in leg ulcers treatment.

Methods. from January 2000 up to now we treated 797 leg ulcers of 381 patients with homologous skin graft presented in the “Skin Bank” of our hospital. All patients presented a VAS >8 with continuous pain in the 89,9% of the cases, more intensive in the nightly hours and graft was performed after surgical debridment. We performed 2.785 graft utilizing derma de-epidermized, glicerolized and cryoconserved skin for a skin total of 191.875 cm². The graft was covered with iodopovidone gauze, followed by oral antibiotic therapy for 3 days. The 21,4% of the ulcers are ‘resistant’ and the etiology was multiple. The area treated was 97,9% of the cases <100 cm² (50,5% <5cm²) in the normal group, while 75,9% <100 cm² (22,5% <5cm²) in the resistant.

Results. We recorded a benefit of 82,6% in the normal group (healing 75,5%, improvement 5,7%, in closure 0,2%) versus 58,1% in the resistant group (healing 51,7%, improvement 4,1%, in closure 2,3%). The analgesic factor was: pain disappeared in first week 18,2% - first month 47,8%; pain reduction 26,5%; no analgesia 7,8%. There were no host rejection. Infection of the graft compared only in 1,6% of the graft, in very secretive ulceres and in the summer time.

Conclusion. Homologous skin graft demonstrated to be efficacy in the treatment of leg ulcers and particularly presents a significative analgesic action.

GE3.8-5

Platelet gel in the treatment of distal leg ulcer
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Aim. we evaluated the effect of platelet gel in the treatment leg ulcers distal to point B (ankle-foot-toes).

Methods. From November 2003 up to now we treated 37 distal ulcers of 27 patients (21 female-6 male). The mean age was of 69,1 + 16,58 years (s.d.) for women (range 31-89 yy) and of 71,8 + 6,73 years (s.d.) for men (range 64-81 yy). The ulcer etiology was multiple: 2 varicose, 1 DVS, 6 arterial, 9 mixed, 5 diabetic, 5 traumatic, 1 after septic arthritis, 3 pressure, 3 stump lesions. The ulcer localization was 6 at the toes, 18 malleolar, 5 at the heel and 10 at the foot. The area media treated was of 6,07 cm² (range 0,25-96 cm²). Platelet gel characteristics were homologous and a platelet concentration of 1,2 milions/mL in absence of leucocytes. All patients signs an informed consent. We performed a weekly medication, followed by a control 5 days later.

Results. We considered the preliminary result only after four consecutive medication with platelet gel. The drop out rate during the first month of the study was of 13,5% (5 ulceres). All ulceres which reached four consecutive medication with platelet gel presented an improvement. The healing rate was of 71,8% (25 lesions), while 7 ulceres are still in therapy (21,8%) and 2 more lesions dropped out (6,7%). The mean time of healing was 6,6 months (range 2-21 months). No host reaction or collateral effects were notice.

Conclusion. Platelet gel has a few cost and it’s available in every hospital. We chose the homologous formulation derived from healthy donor, for excluding every contraindication: psychological for bloodletting, analgesic and ASA therapy for comorbidity. Platelet gel demonstrated its efficacy in the treatment of distal ulceres of the leg.
GE3.8.6

The soft-focused shock wave therapy activates the healing of long lasting and therapy resistant venous ulcers – Results of a pilot study
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Open, uncontrolled studies with heterogeneous collectives indicated a therapeutic success of extracorporeal shock wave therapy (ESWT) in venous ulcers. This study is the first pilot study with a standardized protocol to evaluate efficacy and safety of ESWT in patients with chronic, therapy resistant venous leg ulcers.

Methods. 6 patients with a long lasting (1-51 years) and recurrent leg ulcer without healing tendency during 2 months of therapy according to the guidelines were included in the study. 12 sessions of ESWT (1000 impulses, 240 impulses/minute) were added to the wound therapy according to the standards of care every 7-10 days. The maximal horizontal and vertical diameter of the wound as well as exudation, granulation and pain were assessed.

Results. The average of the maximal diameter was reduced from 47 mm to 42 mm (vertical, p < 0.5) and 21.8 mm to 16.6 mm (horizontal, p < 0.05). No ulcer recurred completely during the study but granulation and epithelization increased during the study. In 50% of the patients exudation increased after 3-4 sessions. Pain during the treatment was evaluated with 0-20 on the visual scale (0-100) by the patients. No additional analgesic treatment was necessary. No severe adverse effects occurred.

Conclusion. This pilot study shows the positive influence of ESWT to the healing of therapy resistant venous ulcers. The results should be reviewed in a placebo-controlled randomized trial.

GE3.8.7

Air-plethysmographic prognostic factors of delayed healing of venous leg ulcers
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A prognosis of healing of venous ulcers based on clinical data alone has not appeared to be satisfactory.

Aim. The aim of this study was to evaluate the correlation of air-plethysmographic findings with the results of treatment, to establish a new reliable prognostic factor.

Methods. Air-plethysmographic examination, including the assessment of calf muscle pump, and parameters of venous outflow and reflux, was performed in 129 patients with active venous ulcers. All patients were managed in a specialized outpatient leg ulcer clinic and standard management of ulcerations has been applied, including compression therapy, appropriate dressings and surgical interventions if needed.

Results. Healing time of ulcers was prolonged in cases with insufficient pump that has been revealed in 42.6% of extremities (supine position: 35.5%, upright: 22.5%, both: 12.4%). Regarding the subgroups with good clinical prognosis (patients with small ulcers or with a short history of ulceration), it was also found that insufficiency of muscle pump correlated with delayed healing. All these differences regarding healing time were statistically significant. In addition, patients with insufficient pump were older, and their ulcers were larger. Moreover, failure of the pump was found more often in patients who began the treatment after long, unsuccessful, non-specialized care. On the contrary, amount of venous reflux and features of obstructed venous outflow have not correlated with the results of treatment.

Conclusion. Impaired muscle pump function revealed in the plethysmographic examination can predict delayed healing of venous ulcer. However, assuming that the correct compression therapy is applied, venous reflux or impaired venous outflow do not significantly influence the healing of these ulcers. Consequently, ulcers with poor prognosis according to plethysmographic findings (muscle pump failure), and no quick recovery after standard management, should be considered for advanced therapies, such as skin grafting.

GE3.8.8

Multidisciplinary chronic leg ulcers service in Modena: data analysis.
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Chronic leg ulcers are related to a complex aetiology such as arterial, venous and metabolic diseases and show an incidence varying from 1 to 3% in a population older than 65 years. The aim of this study is to understand which aetiologies should be considered for advanced therapies, such as skin grafting.

Methods. Air-plethysmographic examination, including the assessment of calf muscle pump, and parameters of venous outflow and reflux, was performed in 129 patients with active venous ulcers. All patients were managed in a specialized outpatient leg ulcer clinic and standard management of ulcerations has been applied, including compression therapy, appropriate dressings and surgical interventions if needed.

Results. Healing time of ulcers was prolonged in cases with insufficient pump that has been revealed in 42.6% of extremities (supine position: 35.5%, upright: 22.5%, both: 12.4%). Regarding the subgroups with good clinical prognosis (patients with small ulcers or with a short history of ulceration), it was also found that insufficiency of muscle pump correlated with delayed healing. All these differences regarding healing time were statistically significant. In addition, patients with insufficient pump were older, and their ulcers were larger. Moreover, failure of the pump was found more often in patients who began the treatment after long, unsuccessful, non-specialized care. On the contrary, amount of venous reflux and features of obstructed venous outflow have not correlated with the results of treatment.

Conclusion. Impaired muscle pump function revealed in the plethysmographic examination can predict delayed healing of venous ulcer. However, assuming that the correct compression therapy is applied, venous reflux or impaired venous outflow do not significantly influence the healing of these ulcers. Consequently, ulcers with poor prognosis according to plethysmographic findings (muscle pump failure), and no quick recovery after standard management, should be considered for advanced therapies, such as skin grafting.
Aim. To outline the characteristics of Martorell's hypertensive ischemic leg ulcer (HYTILU) and the therapeutic consequences. Design: Retrospective medical record review. Setting: Department of Dermatology, University Hospital of Zurich, Zurich, Switzerland. Patients: 31 consecutive patients with Martorell's HYTILU. Interventions: Deep and large skin biopsy, debridement, negative pressure wound treatment, antibiotic treatment, split skin graft, percutaneous transluminal angioplasty. Main outcome measures: Clinical features and suspected diagnosis at initial presentation, cardiovascular risk factors, vascular examination, histology, surgical management and outcome were analyzed after a standardized protocol.

Results. 31/31 Patients presented with one or multiple painful necrotic skin ulcers at the laterodorsal leg, bilateral in 16/31 instances (52%). 16/31 (52%) were referred under the suspicion of PG and 12/31 (39%) were under systemic immunosuppression. All patients had arterial hypertension (100%) and 18/31 (58%) diabetes. All patients showed a histology of subcutaneous stenotic arteriolosclerosis, in 23/31 (74%) with medial calcification. Peripheral arterial disease was diagnosed and confirmed by angiography in 14/31 (45%). After establishing the diagnosis of Martorell's HYTILU, 29/31 (94%) underwent debridement and split skin grafting, in 12/31 (39%) at repeated occasions. Only 2/31 (6%) healed by conservative means. Three (9%) patients died from sepsis, two of them under immunosuppression for supposed pyoderma gangrenosum.

Conclusion. Martorell's HYTILU is defined by a characteristic clinical background and particular histology of subcutaneous arterioles. It must not be confused with pyoderma gangrenosum, since treatment is diametrically different, namely surgical in the first line.

Seasonal variations in the onset and healing rates of venous leg ulcers

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It is known that thrombotic complications such as peripheral arterial thrombosis and venous thromboembolism peak in frequency during the winter, while clinical symptoms related to chronic venous disorders are most severe in the summer.

Aim. The aim of this study was to assess the chronobiologic features of venous ulcers.

Methods. Basing on a retrospective survey of the case histories of 391 patients, rates of ulcer onset and healing in each month were analyzed statistically. Monthly aggregated rates of ulcer onset were assessed statistically. To assess seasonal variations and trends over time we constructed a time series. In addition, we evaluated the circannual variations in the healing rates of the ulcers.

Results. Monthly aggregated rates of ulcer onset revealed two peaks, one in spring and one in autumn, and two troughs, the first from late autumn to early spring and the second, much shallower, during summer. Although these fluctuations did not reach the level of statistical significance if compared with a theoretical distribution that is equal throughout the year, a more detailed analysis verified the statistical significance of the winter trough, while the summer trough was not significant. Using the Z-test, the statistical significance of lower onset rates during the colder part of the year as compared to the warmer part was shown. However, the R-squared regression analysis revealed weak circannual seasonality of monthly rates. Healing rates were also unequally and statistically significantly distributed throughout the year: ulcers that appeared in the winter or summer healed slower in comparison to ulcers that began in the spring or autumn.

Conclusion. Venous ulcers exhibit circannual fluctuations in their onset and healing rates. The exact cause of these variations remain elusive, still, in addition to exacerbation of chronic venous insufficiency, seasonal variations in immune system activity might hypothetically be responsible for this phenomenon.

Minimally invasive selective surgery of primary varicose veins of lower limbs

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Varicose veins with competent SFJ are increasingly founded. Venous reflux seems to start as a segmental and focal dilatation. ASVAL technique is now an established one. Endovenous procedures obliterate GSV 2cm or more below the SFJ. High ligation of SFJ seems to trigger a posoperative neovascularization. Following this data we start a selective surgical aproach according to UD data.
Aim. Retrospective analyse of patients operated on with a minimally invasive selective surgery (MISS).

Methods. 79 patients have been analyzed. 55 female and 23 males. 68 C2 and 11 C4. C1, C5 and C5,6 not considered as well as REVAS, SSV reflux and varicose veins with deep vein reflux. We use a personal UD reflux typology following the CEAP and Pittaluga Classification and selected according to this classification the type of surgery. Follow-up from 32 months to 6 months with clinical observation and control duplex ultrasound at random or in presence of recurrent varicose veins.

Results. Early deambulation. Return to normal life next day. Return to work 3 to 15 days according to type of work and extension of varicose vein branches excision. REVAS in 2 patients (2%). Symptomatic relieve 91%. Worthwhile surgery 93%.

Conclusion. This serie of patients showed good clinical results of this minimally invasive selective surgery approach, although the follow-up period and the number of patient still short. According to other authors, it seems that removing the varicose reservoir with preservation of the saphenous vein, when there is limited or no saphenous reflux is followed by good and maintained results. We need a consensus classification of saphenous reflexive patterns to accurately analyse results of surgery, endovenous procedures and/or sclerosing foam interventions.

CB3.8-3
Hemodynamic and selective surgery of safeno femoral junction in patients with portal hypertension
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Since the beginning of the twentieth century, the standard surgical technique for the ablation for stripping the internal saphenous vein was defined. Especially recommended, taught and transmitted to generations of surgeons was the section of the saphenous collateral near the junction safeno femoral several anatomical, histological and functional studies (Genovese and others) over time have demonstrated the different nature and function of the Superficial Epigastric Vein, compared to the other saphenous side branches. A new hemodynamic sensitivity together with the development of diagnostic echo Doppler allow today to propose a different recommended approach in selected cases of surgery of the safeno femoral junction. At the Transplantation Department of the University of Genoa, more than 600 liver transplantations have been performed in the last twenty years. Examining a population of patients with liver cirrhosis and portal hypertension before and after the resolution of the latter, we were able to describe changes in morphological and functional characteristics of the Superficial Epigastric Vein. Particular attention has been devoted to patients with evidence of a caput medusae on the abdominal wall. The results of our clinical trial, along with other studies conducted by our group on experimental animals, confirm the hemodynamic importance of the Superficial Epigastric Vein and suggest the use of a technique 'hemodynamic' and 'selective' in surgery of the safeno femoral junction.

CB3.8-4
Surgery of the small saphenous vein, a personal series
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Despite the introduction of many new methods of treating venous disease, the most effective management of a grossly dilated and incompetent SSV is by surgery. Approximately 20% of primary saphenous vein incompetence involves the SSV and it has been taught that simple ligation of the terminal SSV deep to the popliteal fascia is sufficient. However there is a high recurrence rate because the anatomy of the popliteal fossa is more complex than is generally appreciated. Even in expert hands the published success rate is unacceptable. Perrin (2003) in 76 legs reported a recurrence rate of 5% at 4 years. This suggests that precise assessment of the anatomy combined with meticulous surgery is required. We therefore undertook a detailed study of our results for surgery of the SSV. This involved 49 legs of 45 patients, 36 female and 7 male. 28 were primary and 21 were for recurrence. A full medical history and clinical examination was carried out and if reflux was detected in the popliteal fossa on HHD the leg was examined with Duplex Ultrasound; this recorded the diameter of the SSV, the level of the S-P junction and the size and presence of reflux in other veins in the popliteal fossa (Giacomini, Gastrocnemius and vein of the popliteal fossa). The Duplex study was made at the initial consultation, again for pre-operative marking and then repeated at 4 weeks post-op, 1 year, 3 years and to be repeated at 5 years. All but 1 patient were treated under General Anaesthesia as Day cases. There was a 100% follow-up. At 6 weeks there was 1 trivial recurrence detected in the lateral vein of the popliteal fossa with no signs or symptoms and it had not been detected preoperatively. At 1 year it was still the only recurrence without any signs. The 3 year results will now be presented.

CB3.8-5
Recruitment to valve trial: the pros and cons of eligiblity criteria
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Aim. The effectiveness of varicose vein treatments has been investigated in a number of clinical trials, although the eligibility criteria of these studies are variable. The aim of this study was to assess the recruitment pattern of a randomised clinical trial in order to assess the generalisability of such studies.

Methods. Consecutive patients were screened for inclusion to a single centre randomised clinical trial comparing endovenous laser therapy (EVLT) and segmental radiofrequency ablation (RFA [VNUS® ClosureFAST Ablation versus Laser for Varicose Veins (VALVV study)]. Patient recruitment and reasons for exclusion were recorded and analysed.

Results. Over a 6 month period, 155 consecutive patients were screened for inclusion in the VALVV study and a total of 74/155 (48%) met the eligibility criteria. Reasons for ineligibility included recurrent varicose veins in 55/91 (41%), absence of great saphenous vein reflux in 4/81 (5%), local anaesthetic therapy in 6/81 (7%) and learning difficulties in 1/81 (1%). Of the 74 eligible patients, 59 (80%) consented for inclusion. Reasons why eligible patients declined inclusion included language or reading difficulties (n=4), preference for a particular treatment (n=2) and unwillingness to complete questionnaires (n=9).

Conclusion. This study demonstrated that the majority of patients treated for varicose veins were not eligible for inclusion in the clinical trial and only 38% were recruited. Clinicians should recognise that the study population in clinical trials of varicose vein interventions may not accurately represent the patient population presenting for treatment.

CB3.8-6
Secondary care treatment of patients with varicose veins in NHS England - An NHS website study
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It is known that there are differences in the availability of treatment of patients with varicose veins in the National Health Service (NHS) in the United Kingdom. Referrals to secondary care services...
are usually guided by local rationing policies and treatments offered are commonly dictated by individual clinician preference and hospital availability.

**Aim.** This study aimed to assess regional variations in secondary care treatment of patients with varicose veins in NHS England.

**Methods.** Hospital Episode Statistics data for patients being treated for varicose veins, and UK Statistic Authority population estimates in all 28 Strategic Health Authorities (SHAs) in England from 2002 to 2006 were retrieved. Trends and regional differences over this period were assessed.

**Results.** Between 2002 and 2006 there was a 20% overall reduction (46 190 to 37 135) in the total number of varicose vein procedures performed in NHS England per year. The number of varicose vein procedures performed per 100 000 population per year varied significantly across the SHAs (P<0.0001), with up to a three-fold difference (49 -142 procedures in 2002/2003). Similarly, significant regional variations were also noted in the frequency of primary procedures of great and small saphenous vein (P=0.0001). The ratio of great to small saphenous vein procedures performed has changed from 10:1 to 8:1 over this period. During this time, injection sclerotherapy was only performed in 15/28 (53.6%) SHAs. The overall annual proportion of varicose vein procedures performed as daycases has increased from 56.0% to 65.8%.

**Conclusion.** From 2002 to 2006 there was an overall reduction in the total number of varicose vein procedures performed in NHS England. Over this period, the provision of secondary care treatment for a patient with varicose veins in NHS England seemed to depend heavily on the SHA of residence. National guidelines may help promote more equitable delivery of care for patients with varicose veins.

**Relapsed varicose disease - Etiopathogeny, methods of treatment**

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The varicose disease represents a very frequent cause of morbidity. The recurrences of the varicose disease may be consequences of some errors regarding the operator's indications, of insufficient or incorrect treatments or evolving characteristics of the disease. (24-60%) One of the recurrences' causes is due to tactical, technical, and strategic deficiencies at the first operation. The indications for treatment vary with the pathophysiology mechanisms and are different in post-thrombotic syndrome and congenital venous malformations comparing with varicose disease. We performed an experimental study on 15 dogs with the aim to follow-up the inflammation and neoangiogenesis following ligation with different types of material of the saphenofemoral junction. We observed that neoangiogenesis appeared in 40% of the dogs after 30 days. The clinical study is based on 493 cases of re-done surgery for recurrences of varicose disease corresponding to 6405 primary surgeries performed in the period 1974-2008 in First Clinic of Surgery, County Hospital Timisoara. The incidence of re-done surgeries for recurrence varicose disease is 6.4%. The majority of recurrences were found on magna saphenous system (72.4%), some perforans veins (18.2%), and parva saphenous vein (9.4%). The main investigation used is the venous echo-Doppler (360 cases). The phlebographies allowed us to establish the type of the primary surgery and the cause of the recurrence. The treatment is initially conservative: postural drainage, elastic stockings, drugs treatment. This treatment is not curative; the varicose disease is progressive so subsequently we perform surgical operations as phlebectomies, venous catgut inclusion, and sclerotherapy.

**Conclusion.** Neoangiogenesis is important in varicose recurrences. We need a correct clinical evaluation associated with data supplied by echo-doppler and phlebography for establishing a correct diagnosis for re-done surgery. 3. The treatment must be adapted for each patient's particular reflux mapping because there are many patterns of the varicose disease recurrences.

**Stump evolution after free crossectomy GSV saphenectomy: analysis in 500 cases**

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The inguinal flush ligation with tributaries ligation far from the femoral vein is the standard procedure to treat varicose veins of the GSV. Recanalization of missed little veins, or previous limphatic reflux or others unknown factors are the origin of the so called "neoangiogenesis" in 50%. It is possible to perform a free crossectomy great saphenous vein saphenectomy with high ligature. Aim of the study is to verify the stump evolution in 500 consecutive cases. 1200 legs were submitted to vv surgery (same surgeon with pre operative echo-guided mapping: 833 (69.4%) primary vv and 367 (50.6) were recurrence of which 658 (79%) were submitted to minimally invasive surgery without inguinal dissection and saphenectomy when necessary. 50% consecutive groin were examined with duplex in order to check the anatomical and haemodynamical evolution after free crossectomy great saphenous vein saphenectomy. The stumps have been subdivided in four groups concerning the presence of reflex at Valsalva manouvre (VM) the presence of physiologic drainage towards the groin collaterals, the presence of thrombosis of the stump, the presence of other reflux sources and the competence or incompetence of the terminal valve, left in place. Group 1: thrombosis, no reflux; Group 2: stump turbulence, no reflux during VM, normal drainage; Group 3: stump turbulence with reflux during VM, normal drainage at rest; Group four; No reflux at VM, normal drainage at rest, stump patency. FU at D6, M1, M6, Y1 and every Year, but in this series the FU has been closed after one year in order to have all groin checked. Differences have been found depending on FU between D6, M1 and Y1, in fact in D6 and M1 the group 1 was 34% and Group 4 56% while in Y1 some changes have been recorded with a drop in G1 (9%) and with the increasing in G4 (73%). Interesting feature is that in G3 after 1 year, a 10% of cases were present, that means the real recurrence rate was 10%. No major complication as TVP or Pulmonary embolism. The Authors discuss any correlation between groups and time and the natural evolution of the disease to demonstrate that standard crossectomy is an over-treatment in phlebological surgery.

**Recurrent varicosis and quality of life after varicose surgery: 6 years follow-up**

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Despite correct varicose surgery of the sapheno-femoral or sapheno-poplitealjunction and the introduction of new surgical methods, the problem of recurrent varicosis still persists. Both a clear definition of recurrent varicosis, as well as long term results for the quality of life in varicose vein patients are lacking.

**Methods.** In our study we re-examined 93 Patients 4-6 years after varicose vein surgery. The study group included 117 ligations of the sapheno-femoral and 14 ligations of the sapheno-popliteal junction. The follow-up examination quote was 48%. Using duplex scan and doppler ultrasound, the patients were divided into several groups ac-
Reduction of neovascularisation at the saphenofemoral junction by extensive crossectomy
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Neovascularisation (NV) at the saphenofemoral junction (SFJ) is an important cause of recurrent great saphenous varicose veins. Unfortunately, up to now no surgical technique at the SFJ could prevent neoreflux completely. We present a new technique at the SFJ with the aim to reduce the rate of neoreflux.

Methods. In a prospective study 100 patients (100 SFJ ligations) with extensive crossectomy were included. Extensive crossectomy means: Flush ligation of the SFJ, oversewing the endothelium of these side branches. Mean age 47 years (18-65), female/male 69%/31%, ASA-classification I-2 (100%), CEAP classification C2 59, C3 25, C4 16. All patients could be examined by colour duplex scan after one year and 68 patients after two years.

Results. Duplex imaging identified neoreflux at the SFJ in two patients (2%) after one year and in only one patient (1.5% / 68 patients) after two years. This female patient was pregnant (31st week) and had recurrent varicose veins with origin mostly from an insufficient Ddod perforator vein. The other patient with reflux at the first examination showed no more reflux after two years.

Conclusion. Recurrent reflux in the groin by neovascularisation was strongly reduced by our technique of extensive crossectomy. Up to now no other technique to prevent NV (oversewing the stump, barrier technique) has shown such favourable results. The technique is easily performed and has no further complication than a simple ligation of the SFJ.

Surgical treatment for varicose recurrence: is inguinal redo surgery justified?
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The aim of this study is to compare the results of traditional surgical treatment of varices recurrence (STVR) to the results of a less aggressive surgical approach focusing on treatment of the varicose reservoir (VR) avoiding inguinal redo surgery (IRS).

Methods. Retrospective study comparing two successive periods of STVR after great saphenous vein (GSV) stripping: the first period (T1) involved traditional STVR and the second period (T2) involved STVR focusing on the VR.

Results. We operated on 288 patients (236 women and 52 men) aged between 28 and 88 (mean age 57), 157 patients during T1 and 151 during T2. There was no significant preoperative difference between T1 and T2 in terms of demographic and hemodynamic data, CEAP classification and Venous Disability Score (VDS). We performed IRS in 69% of cases during T1 and in only 2.6% of cases during T2 (P<0.05). We did not use foam sclerotherapy in addition to STVR in any cases during T1 and T2. The postoperative complications rate was higher during T1 than during T2 (4% versus 0.5%, p<0.05), particularly due to the frequency of inguinal complications. After 3 years of follow-up, there was no significant difference for patients operated on during T1 or T2 with regard to the rate of iterative varicose recurrence (9.6% versus 8.6%), the absence of inguinal reflux (90.4% versus 91.7%) and levels of patient satisfaction (85.5% versus 93.5%). On the other hand, patients operated on during T2 had better results in terms of the VDS (0.36 versus 0.57, p<0.02) and cosmetic improvement (93.5% versus 81.3%, p<0.05).

Conclusion. STVR focusing on the VR and avoiding IRS led to a reduction in postoperative complications with good clinical and haemodynamic results in the medium term, particularly in terms of improvements to symptoms and cosmetic appearance, compared to traditional STVR with IRS.

AP4.1 - Talk to the experts: Interaction of detergent sclerosants with the coagulation system: an update
K. Parsi
Abstract not available

GE4.1 - Talk to the experts: Radiofrequency and laser venous ablation: results and complications
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The objective of this randomized, prospective, single center pilot study was to compare the covered tip laser fiber (AngioDynamics Inc., Queensbury, NY) to the radiofrequency catheter (Vmas Medical Inc., Sunnyvale, CA) to determine if there was a difference in treatment outcomes for endovenous thermal ablation of the GSV.

Methods. 49 patients (54 limbs) were retrospectively reviewed for ablation of the GSV, pain and bruising in the recovery period. 20 limbs were treated with 980 nm endovenous laser and 54 patients were treated with radiofrequency. The same surgeon performed all
procedures. Patients were monitored within 72 hours after the procedure with a duplex ultrasound and a postoperative visit to the physician at 1 week. Patients were required to fill out an analogue pain score for the first seven days (scored by patients on a 5-point analogue pain scale) and have a digital picture of the thigh taken at the postoperative visit. Digital pictures were used to analyze the degree of ecchymosis on a 5-point graded scale. Analysis and development of the bruising score was performed by a nurse who was blinded to the fiber use.

Results. The 49 patients (laser -18 female and 2 male; average age, 54.1; radiofrequency- 30 patients (22 female and 8 male; average age 58) completed treatment and follow-up examination. There was no statistical significance for efficacy, analogue pain or bruising scores.

Conclusion. Both the cover-tip fiber and radiofrequency electrode were effective in treating GSV insufficiency. Comparing recovery surrogates markers, closure rates, pain and bruising, there is no difference in outcomes. A multicenter, prospective, randomized study is planned to further evaluate these initial findings and to look at venous severity scores and quality of life changes.

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BO4.1 - Talk to the experts: DVT - how to treat in daily practice?

Deep venous thrombosis: how to treat in daily practice

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Acute deep venous thrombosis (DVT) is a common problem that is treated by anticoagulation alone in the majority of patients. A number of important principles should be adopted for the successful anticoagulation of patients with acute DVT. Sustained therapeutic anticoagulation is necessary from the onset of therapy. Early subtherapeutic anticoagulation is associated with a fifteen-times risk of recurrence. Current recommendations (Grade 1A) for initial anticoagulation include: 1) weight-adjusted subcutaneous LMWH; 2) monitored IV UFH; 3) monitored subcutaneous UFH; 4) weight-adjusted subcutaneous UFH; and 5) subcutaneous fondaparinux. Initial anticoagulation with a heparin compound or fondaparinux should continue for at least a five-day overlap with vitamin K antagonists (VKA) and the international normalized ratio (INR) should be >2 for 24 hours before heparin is discontinued. During initial therapy, patients should have their legs wrapped or a 30-40 mmHg ankle-gradient compression stocking applied and ambulate. Patients should remain in 30-40 mmHg ankle gradient stockings during their waking hours to speed recovery and reduce postthrombotic morbidity. The longer the duration of anticoagulation, the less the risk of recurrence. In patients with a transient risk for DVT, VKA for a minimum of three months is recommended. For unprovoked recurrent DVT indefinite anticoagulation is superior to six months of anticoagulation but with higher bleeding risk. Patients with malignancy are best treated with LMWH rather than a VKA. The duration of LMWH should be for the first 3-6 months and the patient reevaluated. Subsequent therapy with VKA or LMWH should continue indefinitely or until the cancer is resolved.

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PP4.2 - Varicose veins

PP4.2.1 Epidemiology of chronic venous disease

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In recent years five epidemiological studies have been published which are based on the CEAP classification. In the revised CEAP classification precise venous definitions have been given. The term “chronic venous insufficiency” implies a functional abnormality of the venous system, and is usually reserved for more advanced disease, including edema (C3), skin changes (C4), or venous ulcers (C5-6). Even in the recent CEAP-based studies there are still differences concerning recruitment of the study population, age and sex distribution and the definition of CVI. Only in three studies the participants were investigated by duplex sonography. The method by which pitting oedema was verified was only mentioned in the Bonn Vein Study. This may have caused differences in the prevalence of C3, varying between 1.1% and 14.9%. In the CEAP-based epidemiological studies the prevalence is comparable for most of the items. C3 and C1 together are prevalent in more than 60% of the population (48.7 - 70.6%). Varicose veins are present in more than 20% (21.8 - 29.4%) with a higher prevalence in women. Skin changes due to venous diseases, including venous ulcers, are present in below 10% (3.6 - 8.6%). The prevalence ranges between 0.6 and 1.4% for healed ulcers and between 0.0 and 0.5% for active ulcers. The main RF for VV are advanced age, female gender, pregnancies and positive family history. In CVI obesity plays an important additional role. Estimations of the overall annual costs of CVI vary from 600-900 million € (US$720 million-1 billion) in Western European countries, representing 1-2% of the total health care budget, to 2.5 billion € (US$3 billion) in the USA. Often, the cost of treatment includes reimbursement by the State and it is affected by government policies.

PP4.2.2 The role of saphenous tributaries in the development of primitive varicose veins

A. Caggiati, M. Franceschini

Currently, most studies on therapy of primitive varicose disease (PVD) deal with treatment of the Saphenous Veins (SVs) because these are considered the main target and the responsible of the disease. Treatment of other varicose veins seems to be a complementary procedure of SVs extirpation. The roles of SVs and of other superficial veins in the pathophysiology of RVD were evaluated by an anatomical approach (Duplex ultrasound) in 532 legs with PVD and in 88 not-varicose legs from patients with monolateral disease. Superficial veins have been designated as Saphenous Veins (SVs), Saphenous Tributary Veins (TVs) and Not-saphenous veins (NSs). NSs and TVs were varicose in about 98% of legs, whereas SVs in only 46%. In about 80% of legs, most of the varicose bed was in the epifascial plane (NSs and TVs). Dilatation of incompetent TVs was significantly higher than that of incompetent SVs. The prevalence of varicose SVs and incompetent junctions significantly increased with age and clinical severity (P less than 0.001). From the anatomical point of view, epifascial veins (TVs and NSs) are the main target of PVD. Anatomical findings suggest that SVs varicosities and junctional reflux are an evolutive phase of PVD, more than its “starting point”. In fact, the high prevalence of normal SVs in varicose limbs of all ages and their predominance in younger subjects (61%) do not support a crucial role of SVs in the onset of
PP4.2-3
Tributary treatment in saphenous insufficiency – Outcome after 4 years
P. Pittaluga
Abstract not available

PP4.2-4
Prevention of recurrent varicose veins after surgery
A. Van Rij
Abstract not available

PP4.2-5
Outcome after endovenous laser ablation of saphenous veins
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Aim. Endovenous laser ablation (EVLA) has developed to one of the standard treatment options for great saphenous vein insufficiency. After the first publication by Boné in 1999 many prospective case control studies and comparative studies have been published.

Results. Most of the prospective case control studies have been performed with 810 - 980 nm lasers differing in follow-up time, number of cases, used energy density and outcome parameters. The mean occlusion rate in all of these studies was approximately 95%. Up to now, 9 prospective randomised comparative studies have shown equal results for EVLA and stripping. EVLA and radiofrequency treatment. It has also been shown, that flush ligation in addition to EVLA of GSV does not improve the results in comparison to EVLA alone. In the first years EVLA was performed with relatively low energy densities around 30 J/cm. In these cases a higher rate of recanalisation was reported. Today LEED of 60-80 J/cm seems to be sufficient to occlude the majority of GSV. New developments: New developments around 30 J/cm. In these cases a higher rate of recanalisation was reported. Today LEED of 60-80 J/cm seems to be sufficient to occlude the majority of GSV. New developments: New developments in laser fibre provides further evidence that there is no need for laser tip wall contact and perforation by the jacket-tip is the plausible contributing factor to these differences in side effects. The NeverTouch® (jacket-tip) fiber decreases the power density because of the increase of the laser diameter from 600 microns to ~900 microns. This lower power density causes more of a coagulative effect rather than a cutting process. In addition, endovenous laser ablation with the use of a jacket-tip fiber provides further evidence that there is no need for laser tip wall contact to ablate the vein.

PP4.2-6
Laser up date: new wavelength or new laser fibers?
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All wavelengths are efficacious in the eradication of veins when delivered at the optimal LEED. Furthermore, the lower the wavelength the greater the hemoglobin affinity and the higher associated power delivered. This leads to an increase number of vessel perforations and a higher probability of short-term side effects. In addition, the specificity for water absorption demonstrated by the 1320 and 1470-nm wavelengths implies that their interaction with endothelial cells in the vein wall may be similar to the collagen shrinkage mechanism observed during radiofrequency (RF) procedures. This offers an explanation to the low rate of pain and bruising observed with both the RF and WSLW technologies. Although higher wavelengths have exhibited less vein perforations and less pain and bruising, inadvertent contact of a bare-tip fiber with the vein wall cannot be prevented with any certainty. While the newer wavelengths have improved treatment outcomes, the primary side effects of ecchymosis and pain still remain at the forefront as the shortcomings of EVL with bare-tip fibers. The jacket-tip fiber demonstrated the ability to prevent perforation and extravasation, thereby yielding considerably lower pain and bruising scores than the bare-tip fiber. These results reveal that use of a jacket-tip laser fiber produces a low incidence of short-term side effects and a more tolerable post-operative recovery. The prevention of vein wall contact and perforation by the jacket-tip is the plausible contributing factor to these differences in side effects. The NeverTouch® (jacket-tip) fiber decreases the power density because of the increase of the laser diameter from 600 microns to ~900 microns. This lower power density causes more of a coagulative effect rather than a cutting process. In addition, endovenous laser ablation with the use of a jacket-tip fiber provides further evidence that there is no need for laser tip wall contact to ablate the vein.

PP4.2-7
Do we need SFJ ligation in endovenous procedures?
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Aim. To evaluate whether ligation of the sapheno-femoral junction (SFJ) improves the 2-year results of endovenous laser ablation (EVLA).

Methods. Forty-three symptomatic patients (CEAP clinical class C2 venous disease) with bilateral varicose veins were studied in which one limb was randomly assigned to receive EVLA without SFJ ligation, and the other limb received EVLA with SFJ ligation. Recurrence of varicose veins and abolition of great saphenous vein (GSV) reflux on duplex ultrasound imaging, and venous clinical severity score (VCSS) were investigated at 6, 12, and 24 months after treatment.

Results. Two-year life table analysis showed freedom from groin varicose vein recurrence in 83% of 43 limbs (95% CI, 67-95%) in the EVLA without ligation group and in 87% of 43 limbs (95% CI, 75-97%) of limbs in the EVLA with ligation group (P=0.47). Thirty-eight (88%) treated GSV segments were ablated completely in the EVLA without ligation group and 42 (98%) in the EVLA with ligation group (N.S.). Groin recurrence was due to an incompetent SFJ/GSV (9%) and to incompetent tributaries (7%) in the EVLA without ligation group and due to neovascularisation (12%) in the EVLA with ligation group. The VCSS improved significantly and was comparable in both groups. There were no significant differences between the groups concerning bruising, pain score, tightness along the course of the GSV, and superficial thrombophlebitis. Wound complications occurred in four limbs in the EVLA with ligation group.

Conclusion. The addition of SFJ ligation to EVLA makes no difference to the short-term outcome of varicose veins treatment. Establishing whether SFJ ligation results in a poorer long-term outcome because of neovascularisation needs to be studied in larger populations with longer follow-up.

PP4.2-8
Foam sclerotherapy: the challenge of neurologic symptoms
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Several reports in the world medical literature of rare neurologic symptoms or events following the use of ultrasound guided foam
sclerotherapy (UGFS) have produced some degree of concern. In our institution, we have previously demonstrated that following injection of small volumes (1-3mL) of foam, emboli routinely travel from the leg to the heart within a matter of seconds, and in the presence of a right-to-left shunt, emboli reach the cerebral circulation. It is currently unknown whether there is a correlation between these emboli and neurologic symptoms and events. We recently studied 59 patients undergoing UGFS of saphenous and non-saphenous leg veins. Transcranial Doppler (TCD) monitoring of the middle cerebral artery demonstrated high intensity transient signals (HITS) in 52%. Interestingly, 63% of asymptomatic patients had HITS, while only 37% of symptomatic patients had HITS. The incidence of HITS was NOT statistically different between patients receiving <10mL of foam vs those receiving >10mL of foam. Nearly twice the number of patients receiving <10mL of foam developed symptoms compared to those receiving >10mL. Several methods to improve the safety of foam sclerotherapy by avoiding neurologic symptoms and/or events have been proposed. Some of these we have demonstrated to be effective in reducing cerebral emboli (e.g. use of non air-based foam) while others we have found to be ineffective (e.g., leg elevation and patient immobility). Barring further reports of an unacceptable level of serious complications with UGFs, and given new Level 1 evidence of the safety and efficacy of this technique (see the Bonn study or a successful Barring further reports of an unacceptable level of serious complications with UGFs, and given new Level 1 evidence of the safety and efficacy of this technique (see the Bonn study or a successful study in the Bonn study or a successful study), UGFS may well significantly reduce the use of other minimally-invasive techniques such as endovenous thermal ablation.

PP4.2-9
Physiopathology of visual disturbances occurring after foam sclerotherapy
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Visual disturbances (VD) are reported with an average rate of 1.4% after foam sclerotherapy (FS). The physiopathology of this trouble is not established. Some clues indicate that they could correspond to migraine with aura (MA). Our objective was to validate the hypothesis that VD occurring after FS correspond to MA and are not transient ischemic cerebrovascular event.

Methods. A prospective multicentre study was carried out by the French Society of Phlebology in collaboration with the Neurology Department of the Marseille University Hospital (France). Patients presented VD after FS were assessed both clinically and with a brain MRI. A specific form describing the procedures of FS and the neurological symptoms was set up and analysed by a neurologist specialized in migraine. A brain MRI (T1, T2, T2*, diffusion) was carried out in all patients within two weeks following the trouble and analysed by a neuroradiologist.

Results. The study is ongoing. Preliminary results are not available to date. Results, physiopathological hypothesis and conclusion will be presented in session.

PP4.2-10
New perspectives in collagen shrinking for venous insufficiency
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Heating therapies are increasingly used in the treatment of venous insufficiency. Unfortunately this is driven primarily by the availability of new technology, not by a detailed understanding of the biotherence-mechanics. Mostly research are aimed at shrinking collagen. Despite the wide application of heat-induced collagen shrinkage, serial collagen denaturation during the shrinkage process and the subsequent tissue remodeling have not been investigated in detail due to the lack of an appropriate tool. Without basic quantification of the underlying processes in terms of parameters that can be controlled clinically, identification of preferred interventions will continue to be based primarily on trial and error. The aim of this study is to identify new techniques for collagen shrinking of the venous wall. This should be achieved in an operator independent way by physical or chemical means. Our goal was to induce the collagen type III shrinkage of the tunica media without damaging the endothelium of the vein with an holmium laser. Our hypothesis was that the fluid blood is easily able, by thermal convection, to quickly cool the wafer-thin of the endothelium, while the tunica media, beings not in touch with the fluid blood and having a bigger thickness, compared to the endothelium, it builds up heating and cooling take place just by thermal conduction. Moreover, we know that thermal conduction process is slower than the thermal convection one and so, this increases thermal stress on the tunica media. We used the finite elements method to simulate light and thermal distribution inside the different vein layer, comparing mathematical data with histologies on samples treated with different laser settings. We found interesting results when the wavelength has an water absorption coefficient of water (alpha) in the range between 20-40 cm⁻¹. Future direction will evaluate the potential use of this very promising new technology.

PP4.3 - Guest lecture:
Chronic venous insufficiency - think obstruction

PP4.3
Chronic venous insufficiency - Think obstruction!
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Although CVI is recognized to have several contributing pathophysiological factors, the main emphasis has so far been on valve reflux. CVI has almost become synonymous with venous reflux. Percutaneous IVUS-guided endovenous stenting of iliac venous obstructions has resulted in major clinical improvement, even in the presence of remaining reflux, suggesting that obstruction is important in the clinical expression of CVI. Pelvic outflow obstructions are observed following acute DVT (only 20-30% completely recanalize). A “primary,” nonthrombotic iliac vein lesion (May-Turner syndrome, or “iliac vein compression syndrome”) may also in itself be more pathogenic than previously thought. In our experience of stenting more than 1000 obstructive limbs, approximately 40% had nonthrombotic blockage. A primary lesion might not become clinically significant until other components of the venous circulation fails and the extremity becomes decompensated. Unfortunately, it is not known at what degree a venous obstruction is hemodynamically significant. Thus, there are no reliable tests to measure a hemodynamically significant obstruction and diagnosis have to rely on morphological tests like phlebography, CT-venogram, MR-venogram or, preferably, IVUS. Findings of obvious stenosis, occlusion, and/or indirect signs like collateral formation and increased venous pressures should result in an increasing exploration of the iliofemoral vein segment with IVUS. Practical implications: 1) A more aggressive approach towards diagnosis and treatment of venous outflow obstruction is justified. 2) Existing routine tests, e.g., outflow air or strain-gauge plethysmographic tests, duplex Doppler ultrasound, and femoral or other pressure tests, can not be used to exclude significant venous
outflow blockage. 3) IVUS is the methods of choice for visualization of pelvic venous obstruction and should be generously used. 4) IVUS should be used in patients with clinical features (especially pain) out of proportion to detectable pathology, patients with no other detectable basis for their symptoms, symptomatic patients with visualized pelvic collaterals or increased exercise pressures, and patients with previous DVT.

**PP4.4 - UIP consensus venous oedema and skin changes**

**PP4.4.1**

**Development of a questionnaire to evaluate the burden of venous disease on daily life**

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In a context of economic hardship, the burden of public health is an increasing and legitimate concern for health authorities. Creating a tool available to health professionals to evaluate this burden is becoming necessary for an objective estimation.

**Aim.** To explore the disability generated by venous diseases in a broad sense in order to express the burden of the disease on the daily lives of patients by means of a questionnaire.

**Methods.** A strict methodological process was followed in the development of the questionnaire to ensure its credibility and reliability. A literature review and one-to-one interviews were conducted to identify the concepts related to the pathology.

**Results.** The exploratory evaluations showed that there were 5 possible dimensions for the concept of a burden: sensation of pain, daily life, family and personal relations, work, psychological impact and withdrawal into oneself. The first 66 items were therefore identified at the end of the first verbatim report. The 5 dimensions were retained and the items reduced to 36 after a primary analysis, making it easier to use. Three visual analogue scales, the first on psychological suffering, the second on physical suffering, and the third on living with, complement these 36 items thereby making it possible to put the burden in perspective. An evaluation of over 100 subjects will allow establishment of the level of scores.

**Conclusion.** Chronic pathologies such as venous diseases which remain a frequent and disabling disease are difficult to evaluate with clinical elements or the quality of life alone since their impact can be multi-dimensional. Several existing questionnaires attempt to evaluate one or the other of these dimensions, but only the venous disease burden (VDB) takes everything into consideration to express the global aspect of the disability.

**PP4.4.2**

**Recommendations for evaluation of outcomes after treatment of C0s-C4 patients**

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With the increasing number of options for treating varicose veins and increasing competition for healthcare resources and amongst manufacturers the evaluation of post operative success is extremely important. A consensus on a uniform reporting standard would allow an easier comparison of treatment modalities and provide guidance for clinicians. The publication of an international consensus on reporting standards in Chronic Venous Disease (CVD) in 1996 included recommendation for observations following surgery, which recommended recording clinical outcomes at 6 months as: +3 Asymptomatic, +2 Moderate Improvement, +1 Mild improvement or unchanged, -1 Mild worsening, -2 Significant worsening and -3 severe worsening. Incorporated into this was the CEAP Classification for CVD which was revised in 2004 and is a descriptive classification of venous disease, use in the majority of clinical trials, however it is not necessarily responsive to improvements following treatment and therefore cannot be used in isolation to assess outcomes after intervention. The introduction of minimally invasive endovenous ablation procedures has lead to the publication of further recommendation in reporting standards for post operative outcomes in 2007 (S Kundu et al 2007 JVS). The use of the venous clinical severity score in addition to CEAP classification in combination with an assessment of quality of life is recommended. The venous clinical severity score correlates well with the CEAP classification but has the advantage of allowing the evaluation of changes in reported clinical signs and symptoms following intervention. The short form 36 (SF36), short form 12 (SF12) and Euroqol (EQ 5D) are all generic questionnaires and have been successfully used in a number of clinical trials. The use of one of these generic QOL assessment tools to assess overall morbidity in conjunction of a disease specific questionnaire is recommended. Validated disease specific questionnaires include the Aberdeen Varicose Vein Questionnaire (Garratt A et al 1993), the VEINES-QOL (Kauln SR et al 2004), the CIVIQ-2 (Launois R et al 1996) and more recently the Specific Quality of life Response-Venous (SQQR-V) questionnaire, and have all been shown to be responsive to change following treatment. In those with mild-moderate disease for example those classed as C0-C4, patient reported outcomes may be more useful than physician reported outcomes at assessing improvement. The use of follow-up imaging, usually colour duplex, in the context of clinical trials is also required, however may not be done routinely in clinical practice. In summary the VCSS, a generic and disease specific quality of life questionnaire would seem to be the present standard to assess outcomes in patients with mild to moderate venous disease.

**PP4.4.3**

**UIP consensus in diagnosis and treatment of venous oedema**

A. Scuderi  
Abstract not available

**PP4.4.4**

**UIP consensus in diagnosis and treatment of CVI related skin changes**

A. Cornu-Thenard  
Abstract not available

**BO4.5 - Servier vein consult project**

**BO4.5.1**

**Chronic venous disease: magnitude of the problem and unsolved questions**

E. Rabe  
Abstract not available
An international Vein Consult Program: for what?
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In its endeavor to promote science, education, and communication, the UIP, in cooperation with Servier, is promoting the Vein Consult Program, a large international screening survey in chronic venous disease (CVD).

Aim. 1) To produce a snapshot of patients with CVD and of their management by general practitioners (GPs) and venous specialists in different geographic areas and, in the participating countries, to appraise better the disease stage at which specialists take over from GPs. 2) To assess the impact of CVD on patients' quality of life and on health costs.

Methods. Survey conducted in 2 complementary steps: step 1, within the framework of general practice, and step 2, among selected venous specialists for diagnostic confirmation of patients referred by GPs. Patients: all consecutive adult outpatients over 18 years of age, male or female, who have signed an informed consent form and are not consulting for an emergency. Quality of life assessment: use of the CIVIQ-14, a validated shortened version of the CIVIQ-20.

Results. A first set of five countries (Austria, Mexico, Romania, Russia, Spain) have started the Vein Consult Program and included 2000 GPs, 500 venous specialists, and 44 000 patients. A second set of countries from Europe, South America, and Asia will start in October 2009. Final data from all the countries involved in the program will be released in June 2011.

Conclusion. The Vein Consult Program, a joined initiative of the UIP and Servier, is the largest international screening program ever conducted in CVD.

Ultrasound guided sclerotherapy with micro-foam: a free, practical and illustrated guide with DVD
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Ultrasound guided sclerotherapy with micro-foam allows nowadays to treat successfully the majority of varicose veins even of a large diameter. This book is a practical guide on this technique. It is the result of 20 years of practical experience and 15 years of teaching of sclerotherapy. It gives a concrete help for practising. It is easy to consult, very structured with useful tables. It includes numerous pictures in particular ultrasound pictures. Aim. The aim of this guide is to enable to perform ultrasound guided sclerotherapy with micro-foam with a maximum security and efficiency. Security and efficiency depend on: 1 – Equipment and device; 2) Respect of necessary steps. The guide gives advice to take into account the specificities of the saphenous axis treated: III – Great saphenous vein IV – Short saphenous vein V – Front saphenous vein VI – Recurrences In each case, it gives practical information on location, position of the patient, technique of treatment, compression stockings. The last part of the guide is dedicated to: VII – The results VIII – The training Conclusion. This guide is the opportunity: 1) to transmit a practical experience of 20 years, 2) to be useful for the medical doctors that are willing to perform this non invasive technique for the treatment of varicose veins, that corresponds to the patients expectation.

Long-term results of a staged sequential sclerotherapy protocol for the treatment of junctional reflux
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A retrospective analysis was used to evaluate a staged protocol utilizing ultrasound-guided sclerotherapy for the treatment of reflux in the GSV from the saphenofemoral junction and the SSV from the saphenopopliteal junction. 315 legs were started on the protocol between 1999 and 2004. All patients underwent an initial treatment stage consisting of 2-3 sessions of ultrasound-guided sclerotherapy. Patients then underwent sequential sclerotherapy at 3 months, 6 months and 1 year after the initial treatments. At this point patients were placed into a protocol with yearly follow-up to evaluate recurrence and/or progression of their disease. Recurrence is defined as reflux in the GSV or SSV that was present at the initial treatment stage. Progression is defined as new refluxing varicocities not present at the the initial treatment.

Results. Only 63 (20%) of 315 legs followed up long-term, defined as greater that 5 years after the sequential sclerotherapy stage. Of the 63, 40 legs had junctional reflux at the time of their initial treatment. 25 of the 40 legs (62.5%) had recurrence requiring further treatment at follow-up. In addition, 16 of these 25 legs (64%) had progression of their disease process also requiring treatment. Of the 15 legs that did not have recurrence, 11 legs had progression of the disease process requiring further treatment. Only 4 out of the 40 legs (10%) did not need any further treatment. Future efforts will concentrate on evaluating those legs that were lost to follow-up to see if there is recurrence and/or progression in these legs, and more importantly if there are symptoms associated with the disease process.

Which data can we expect from the vein consult program?
S. Milic
Abstract not available
Conclusion. There was a high rate of recurrence and progression with this sequential sclerotherapy protocol. Further treatment was essential as is often the case post-surgery. This begs the question, are patients destined to life-long treatment once initiated regardless the modality?

PP4.6-3

A double-balloon catheter for foam-sclerotherapy of the great saphenous vein – Critical review on preliminary results

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The catheter-assisted foam-sclerotherapy of the great saphenous vein (GSV) can be performed with different types of catheters. So far, angography-catheters and catheters with a single balloon sealing the saphenofemoral junction have been used.

Aim. Can the efficiency and safety of a catheter-assisted foam-sclerotherapy of the GSV be improved by use of a double-balloon catheter?

Methods. 20 patients with varicosity of the GSV (11x Hach III, 9x Hach IV) were treated by use of a triple-lumen double-balloon catheter (1 balloon: saphenofemoral junction, 2 balloon: 20 cm below the first) and 3%-Polidocanol-foam. Controls were conducted after 1 day, 1 week, 6 weeks, 9 months, and 12 months.

Results. After 1 day, 1 week and 6 weeks in 19/20 cases (95%) a complete obliteration of the treated vein was seen. The medium-term and long-term results of the whole collective have not been completed yet. Up to now results of 7 patients are available. Here an occlusion rate of 95.7% after 6 months and of 97.1% after 12 months were regarded. Adverse events were haematoma at the puncture region (100%), a localised phlebitis in the treatment-region (15%) and once, an extended thrombohlebitis with subsequent hyperpigmentation. None of the patients had a thrombosis of the deep veins, embolism, scotoma or paraesthesia.

Conclusion. The foam-sclerotherapy with a triple-lumen double-balloon catheter is a save an effective treatment-option for the great saphenous vein. The short-term results are similar to those of other catheter-types. Doubtfully, the medium-term and long-term results of the whole collective show an advantage of the double-balloon catheter compared to an angography-catheter or a single-balloon catheter.

PP4.6-4

Foam versus liquid polidocanol in sclerotherapy of the great saphenous vein: a multicentre randomized controlled trial with a two-year follow-up

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Conflict of interest: none

Aim. To compare 1% and 3% Polidocanol (POL) foam in treating the great saphenous vein (GSV) by ultrasound guided sclerotherapy (UGS). A 2-year-follow-up multicentre, prospective, randomized double-blind trial with Ethics Committee approval.

Methods. 148 patients with GSV reflux (vein diameter of between 4 and 8 mm inclusive) were randomised to undergo UGS using either 1% or 3% POL foam in a single session. Foam production was standardised, obtained using a sterile disposable syringe kit including sterile air and the Turbofoam® machine. Duplex ultrasonography was used to assess the outcome at 3 weeks, 6 months, 1 year, 18 months and 2 years. No re-injection in GSV was performed irrespective of the immediate result. Main criterion of success was the disappearance of the pathological reflux. Length of occlusion of the vein (only measured at 3 week-echography assessment) was a secondary criterion.

Results. 74 patients were included in each group. Patient characteristics were similar in the two groups. The mean volume of foam injected was 4.4 ml for the 3% group and 4.6 ml for the 1% group. After 3 weeks, reflux was abolished in 96% (71 patients) of the 3% group and 88% (68 patients) of the 1% group (NS). The mean occlusion length of the vein was 38 cm for the 3% group and 34 for the 1% group (NS). After 2-years, reflux was still absent in 69% of the 3% group and 68% of the 1% group (NS). 14 patients were lost to follow-up.

Conclusion. In this study, rates of recanalisation after two years demonstrate equivalent efficacy for 1% POL and 3% POL foam in sclerotherapy of the GSV of less than 8 mm in diameter, it therefore confirms our previous 6 month-follow-up data published in 2005.

PP4.6-5

Comparison of 1% and 3% polidocanol foam in sclerotherapy of the great saphenous vein: a randomized, double-blind trial with 2 year-follow-up. “The 3/1 study” for the French Society of Phlebology

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Conflict of interest: none

Aim. To compare, with a 2-year follow-up, the relative efficacy of polidocanol (POL) foam in treating the great saphenous vein (GSV) by ultrasound guided sclerotherapy (UGS). A 2 year-follow-up multicentre, prospective, randomized double-blind trial with Ethics Committee approval.

Methods. 148 patients with GSV reflux (vein diameter of between 4 and 8 mm inclusive) were randomised to undergo UGS using either 1% or 3% POL foam in a single session. Foam production was standardised, obtained using a sterile disposable syringe kit including sterile air and the Turbofoam® machine. Duplex ultrasonography was used to assess the outcome at 3 weeks, 6 months, 1 year, 18 months and 2 years. No re-injection in GSV was performed irrespective of the immediate result. Main criterion of success was the disappearance of the pathological reflux. Length of occlusion of the vein (only measured at 3 week-echography assessment) was a secondary criterion.

Side effects were assessed.

Results. 95 patients were included, 47 randomized to the foam group and 48 to the liquid group. No significant difference between the 2 groups was found regarding general data and vein diameter. At 3 weeks, complete elimination of reflux was obtained in 17 of the 48 patients (35%) in the liquid group, versus 40 of the 47 subjects (85%) in the foam group (p <0.001, Chi squared). The incidence of immediate venous spasm and the length of occlusion measured by echography were significantly greater in the foam group. There was no difference in the incidence of side effects. Follow-up of 6, 12, 18 and 24 months confirms our early results published in 2003. In total only 5 patients were lost to follow-up at 2 years (all of them were in foam group). These patients were included in the final outcome analysis as treatment failures (success rates at 2 years: 53% in foam group and 12% in liquid group).

Conclusion. The sclerosant foam used in this study was more than twice as effective as the liquid from which the foam was prepared.
The reappearance of the foam as a sclerosant agent in 1996 has clearly modified the therapeutic approach of the varicose disease. The spectacular results obtained in the treatment of venous malformations have induced a great interest for this method so that the liquid form seemed to disappear.

**Aim.** The goal of this study is to summarise advantages and disadvantages of the foam compared to the liquid one and to evaluate the interest of each other depending on the type of varices that we have to treat.

**Methods.** A randomized study comparing foam to liquid is proposed. It uses duplex guided sclerotherapy of the great saphenous veins with Lutromacrogol 400 3%. Just after the injection of the agent in liquid form, an alternative compression with the probe at the level of injection point always induces the occurrence of a spasm.

The population studied is of 100 patients in two groups, one treated with foam ands the other one with the liquid form. After one session, we observe a disappearance of the reflux in 82% of the cases with foam versus 51% with the liquid form. The duration of contact with the venous wall explains the efficacy of this agent compared to the liquid form.

**Results.** The foam profited by the great mediatic interest it causes forgetting the results obtained by the liquid form. Today, the different properties of these two forms of sclerosing agents, associated or not, enable to drive almost all the problems that the varicose disease induces.

**Conclusion.** A reduction of diameter at the sapheno-femoral junction of less than 30% could be a predictive sign of clinical recurrency; the aim of this work is to summarise advantages and disadvantages of the foam compared to the liquid one and to evaluate the interest of each other depending on the type of varices that we have to treat.

In a former analysis we have shown that only half of all Duplex-proven failures develop into a clinical recurrency; the aim of this work is to determine which conditions enhance this tendency. Subclinical recurrences show just a reflux at Duplex-examination, while clinical recurrences are obvious. The time-lapse between first reflux and clinical appearance is the preclinical interval.

**Methods.** 1000 sapheno-femoral junctions measuring between 5 and 18 mm (at 3 cm below the junction) have been treated in one session applying Sigg's method. The Duplex-controls were done at 2-4-6-8-10 years. Persistent reflux at Duplex-examination meant therapeutic failure. All recurrences, clinical and subclinical, were divided into two groups. Group α had a reduction of the initial diameter of less than 30%, group β of more than 30%.

**Results.** We had 116 clinical recurrences and 230 Subclinical recurrences. Successful cases (clinically and at Duplex-examination) showed a decrease in diameter of more than 70%. Clinical recurrences had a reduction of less than 30% Subclinical recurrences had a reduction between 30 and 70%.

**Conclusion.** A reduction of diameter at the sapheno-femoral junction of less than 30% could be a predictive sign of clinical recurrency. We think that this could be the limit above which a recurrency could keep its subclinical status. A reduction of less than 30% would be insufficient to prevent the varicous veins to reappear.

**Conclusion.** The foam profited by the great mediatic interest it causes forgetting the results obtained by the liquid form. Today, the different properties of these two forms of sclerosing agents, associated or not, enable to drive almost all the problems that the varicose disease induces.

**PP4.6-8**

**Sclerotherapy modalities of the GSV and inflammatory complications**

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**Aim.** to describe the inflammatory reactions with occurred under Duplex guided sclerotherapy of the great saphenous veins (GSV).

**Methods.** in an open prospective study of a cohort of 5519 patients we analysed the occurrence of inflammatory reactions after treatment of the GSV. The sclerosing agents used were Polidocanol 3% (liquid and or foam and Sodium Sulfate tetradecyl 3%). The treatment was performed without compression therapy.

**Results.** A description of the population: 5519 patients having 4770 GSV: 715 men (19, 8%) 2893 women (80, 2%). Mean of age (H=61, 1, F=61, 5 years). A description of the GS: 2478 unilateral GS, 1146 bilateral GS. 2525 GS were associated with another varicose veins. Mean of sessions used: 4,3 (4,1 to 4,6 IC 95%). *Concentration of sclerosing agent 3% (96%). Mean of volume 2 ml (1 to 5). Both Polidocanol (Pol) 3% and STD 3% under liquid and foam form were used: Pol Liquid (40%), Foam Pol (17%), STD liquid (43%). *Description of complications: Aetoxi liquid 168 (8, 8%) Aetoxi foam 56 (6,8%) STD liquid 192 (9,4%) Significant difference pc.001. We have observed 14 deep venous thrombosis (DVT) included thrombosis of gastrocnemius veins (2, 9 out of 1000).

**Results.** The high concentration (3%) can explain the number of these complications but we can observe that we used more liquid than foam form. The number of inflammatory reactions is more significant than on small saphenous veins PVS pc.01) The number of deep venous thrombosis or on gastrocnemius veins represents a small percentage.

**Conclusion.** Although the absence of compressiontherapy after treatment and the use of high concentration, the percentage of inflammatory reactions and DVT is of low level in this cohort.

**PP4.6-9**

**Phlebectomy of varicose tributaries combined with transcatheter foam sclerotherapy of the saphenous vein**

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**Aim.** to assess the short-mid term efficacy and safety of the association phlebectomy (PHL) of the varices + concomitant trans-catheter foam sclerotherapy (FS) of the great, small and anterior accessory saphenous vein (GSV, SSV, AAVS).

**Methods.** since November 2006 nearly 140 patients underwent PHL+ transcatheter FS: 54 of them (49, 9%) were randomly reviewed at 125-520 (mean 428) days after treatment and the use of high concentration, the percentage of inflammatory reactions and DVT is of low level in this cohort.
5.04 ml (SD ± 1.33) of 3% STS or POL sclerosant foam (Tessari method + CO2/O2) were injected through an intrasaphenous 4-F long catheter; three patients underwent one adjunctive session of ultrasound-guided FS.

Results. As to efficacy, the outcomes were the following: grade 2 in 42 (78%) patients (no varices, improved symptoms, obliterated or patent 2.5 mm (SD ± 1.1) veins with antegrade flow), grade 1 in 10 (18%) patients (no varices, improved symptoms and partial recanalisation with <1 sec. reflux in reduced calibre veins); grade 0 in 2 (4%) patients with varices and recanalised saphenous veins having >1 sec. reflux and >3 mm calibre. The complications were one gastrocnemius vein thrombosis, two superficial thrombophlebites, four transient skin pigmentations.

Conclusion. The combination of PHL and transcatheter FS is a cheap, effective and safe procedure, which results in a low recurrence rate, a significant improvement of symptoms and remarkable duplex-based outcomes.

References

PP4.6-10
Cost minimization study comparing surgery vs duplex guided foam sclerotherapy of varicose veins: a randomised controlled study
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Great saphenous vein (GSV) reflux is the most frequent form of venous insufficiency in symptomatic patients and is commonly responsible for varicose veins in the lower extremities. This randomized prospective controlled trial was designed to answer the following questions: (1) which method is more effective in terms of recurrence (presence of reflux with one or more symptoms of varicose veins), (2) which method is more cost-effective and (3) does one of the treatments have a higher patient preference.

Methods. Between October 2005 and February 2008, patients with primary varicose veins of the great saphenous vein at the University Medical Center of Maastricht, Atrium Hospital of Heerlen and the Laurentius hospital of Roermond were assessed for the study. Inclusion criteria were amongst others: presence of reflux in a segment of minimally 20 cm of the great saphenous from the saphenofemoral junction, normal deep venous system and a general good health. The selected patients were randomly assigned either to 1) ultrasound guided foam sclerotherapy or 2) surgical stripping with a high ligation. 190 patients underwent foam sclerotherapy and 146 patients underwent surgery. Duplex examinations were performed by an independent ultrasound technician at different time points: before treatment, 3 months, 1 year and 2 years after treatment.

Results. The cohorts showed no statistically significant difference in sex, age and great saphenous diameter. After one year follow-up reflux with symptoms of varicose veins was confirmed in 21.5% (42/195) in the foam-treated group and in 27.6% (42/152) in the surgery group (P=0.2). Improvement of complaints was seen in 51.8% (101/195) in the foam-treated group and in 47.7% (72/152) in the surgery group (P=0.45).

Conclusion. We can conclude that both techniques are equally effective in terms of recurrences and improvement of complaints. No significant difference is seen between the two treatments. Like surgery, foam sclerotherapy is a good option in the treatment of incompetence of the great saphenous vein.

PP4.6-11
Foam sclerotherapy of saphenous veins and biological consequences on circulating blood. Controlled randomised study with or without compression stockings
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Conflict of interest: none

Aim. To study biological consequences on circulating blood of foam sclerotherapy of saphenous veins. To compare results of 2 randomized groups: with (CG) or without compression (WCG) stockings.

Results. Prospective, randomized study, with Ethics Committee approval.

Methods. 40 patients. Carriers of saphenous insufficiency (great or small saphenous veins), CEAP clinical class C2 to C6, received sclerotherapy treatment with standardized 1 or 2% POL foam (Turbofoam® machine). After injection then randomization, the patient had to either wear a medical-support stocking (Veinostim® 15-20 mm Hg) immediately and for 3 weeks (worn diurnally) or not wear a compression of any form. A laboratory work-up was done on D0 (before sclerosing injection), D1, D7, D14 and D28; assessment included coagulation activation, fibrinolysis, endothelial lesion, platelet activation and inflammation markers. A troponin analysis was done on D0 (before sclerosing injection), D1 and D7.

Results. Twenty patients were included in each group (females 90%; mean age 58) with homogenous repartition. On ultrasound criteria the success of the sclerotherapy was 100% on D28 in both groups. There was no deep or superficial venous thrombosis. Two minor gastrocnemial vein thrombosis occurred in CG and did not require specific treatment. The studied markers were: Fibrinogen, Factor VIII, Thrombomodulin, Thrombin-AntiThrombin complex (TAT), D-dimers, Platelet factor 4 and Troponin. In all the samples (D0 to D28) no significant biological change was observed in either the WCG or the CG. Troponin was normal in both groups.

Conclusion. In terms of biological effects on inflammation and coagulation, either with or without compression, the sclerosing foam injection seems to have a very localized effect and a minimal effect on the circulating blood. Also, in random patients, foam sclerotherapy does not appear to have an effect on the coronary risk.

PP4.6-12
Should we still remove incompetent short saphenous vein?
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Sclerocofoam treatment for incompetent large veins has been extensively described. As authors claim the advantages of minimally invasive procedures over traditional stripping, they also portray conventional surgery in a falsely unfavourable light.

Aim. The aim of the present study is to compare long-term results of two therapeutic methods for symptomatic short saphenous primary incompetence: invaginated stripping and echo guided sclerotherapy.

Methods. Assessments from 48 months follow-up are considered in this review: 33 patients and 43 legs in group A (echoguided sclerotherapy), 24 patients and 32 legs in group B (in-
but the treatment is repeatable and finally effective. This last method Recurrence after echoguided sclerotherapy seems a particular risk appropriate for all cases. Conventional surgery is safe and effective.

Analysis of previous studies revealed that only sclerotherapy is curative. The success rate of treatment depends on the type of procedure and on the patients' characteristics. This analysis is made through an Elan analysis of the study, which is a tool for the study of the impact of the treatment on the patients' health. It is a tool for the study of the impact of the treatment on the patients' health. It is a tool for the study of the impact of the treatment on the patients' health. It is a tool for the study of the impact of the treatment on the patients' health.


d of venous disease, body mass index, complaints, clinical status and ultrasound findings before and after procedure. Results. All the therapeutic procedures we get currently for venous insufficiency remain palliative. There is no single method of treatment appropriate for all cases. Conventional surgery is safe and effective. Recurrence after echoguided sclerotherapy seems a particular risk but the treatment is repeatable and finally effective. This last method shows some benefits.

AP4.6- Endovenous procedures 7: Complications

AP4.6-1

Postoperative pain and return to work following endovenous laser ablation of varicose veins

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Endovenous laser ablation (EVLA) for symptomatic varicose veins can be performed under local or general anaesthesia, but it is not known which of these is associated with a quicker or more comfortable convalescence.

Aim. To determine whether postoperative pain or the return to normal activities following EVLA is related to the method of anaesthesia used.

Methods. A questionnaire was given to 59 patients undergoing EVLA over a 6 month period and collected at their first postoperative review appointment 6 weeks later. All patient received 2 weeks of postoperative anti-inflammatory medication. Visual analogue scoring was used to determine the maximum pain felt during the postoperative period, ranging from 0 to 10. Pain scores from patients undergoing the procedure under LA were compared to those having GA, and a score greater than 5 was deemed to represent significant pain during the recovery period. The timing of return to normal activities (RNA), as defined by the patient, was also noted.

Results.

<table>
<thead>
<tr>
<th></th>
<th>LA (n=31)</th>
<th>GA (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain score 1-5</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Pain score 6-10</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Duration of pain &gt;1 week</td>
<td>19</td>
<td>18</td>
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<tr>
<td>Duration of pain &lt;1 week</td>
<td>12</td>
<td>10</td>
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<tr>
<td>RNA &lt;1 week</td>
<td>11</td>
<td>03</td>
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<tr>
<td>RNA &gt;1 week</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

This table shows that just over 40% of patients in both groups had significant pain during the postoperative period, although none required readmission or increased analgesia. Return to normal activity was quicker in those patients having the procedure under LA (55% vs 11%; p=0.05).

Conclusion. Although patients undergoing EVLA under LA have the same degree of postoperative pain as those having GA their convalescence appears to be shorter. This may be due to recovery from GA or patient perception regarding the magnitude of the procedure, and is the subject of another study.

AP4.6-2

Complications in EVLT

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Effective and safe procedure, non-free from complications. Complications: all the adverse effects occurred up to 30 days after the procedure. Classification: A) intraoperative/postoperative, B)1-Minor: They do not need specific treatment, they do not have sequelae and it includes a one-day period of hospitalization for observation; 2-Major: they need specific treatment, they have sequelae (mild ones imply a period of hospitalization shorter than 48 hs; severe ones, a period longer than 48 hs.)

Aim. To analyze the complications.

Methods. Period, 56 months, 01/10/03-01/09/08 Sample: 912 patients, 1008legs. Retrospective analysis. The diagnosis was clinical and by ecodoppler.

Results. 7 days later, 28 failures of 1008 members in control: 50% of fotoolbliteration failure (relasering) 3 members, 30/40% of fotoolblitration failure, 25 members (successes 980/97.2%). A month later, 9 members of 994 (success 96.37%), 5 months, 10 members of 973 (95.27%); 6 months, 7 members of 930 (94.50%), with 30/40% of fotoolbliteration failure. There were new failures from 6 to 12 months 8% was repermeabilized without signs of insufficiency by ecodoppler. Intraoperative complications: vein spasm: 100% difficulty in the vascular access. No EVLT turned to conventional surgery, no surgical access. Tortuosity of the target vein: multiple percutaneous accesses 293/29.06% legs. Psychomotor excitement: 1 patient. Extreme bradycardia: 1 patient. Postoperative complications: Pain mild 684/67.55%, moderate 283/28.07%, severe 41/4.06%, ecchymosis 100%, hematomata (more than 6 cm of diameter) 71/7.04%, induration 100%, superficial thrombophlebitis 63/6.25%, legs. Endovenous Heat-induced thrombosis (EHT) Kabnick classification: TYPE 1: 1004 legs 99.68% TYPE 2 4 legs 0.32% TYPE 3: no. Paresthesias: 37/3.67% legs, pigmentation: 33/3.27% legs secondary telangiectasis 155/15.37% legs. Arteriovenous fistulas, cutaneous thermal lesions, infectious complications, seromas were not detected. All the complications were small.

Conclusion. EVLT is an effective and safe procedure with small, not very frequent complications. The treatment for these complications was simple and its frequency diminished after the learning curve.

AP4.6-3

Are DVT rates higher for radiofrequency ablation of small saphenous veins?

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Aim. There is a paucity of literature regarding this treatment for the small saphenous vein (SSV). We report our initial institutional experience with radio-frequency ablation (RFA) of the SSV.

Methods. Information was obtained by chart review. Duplex ultrasound (DUS) at the completion of the procedure and one week postoperative was used to access ablation and DVT.

Results. 61 consecutive SSV cases were analyzed. The mean age of the patients was 49.5 +/- 14.6 years, and 69% were female. Presenting symptoms included pain (34.7%), pruritus (2.0%), and both (6.1%). The CEAP classification of the patients was as follows: C2 (80%), C 3 (12%), C4 (4%), C5 (2%), and C6 (2%). All SSV were closed initially and at 1 week. There were five asymptomatic postoperative DVTs (8.2%). Two were classified as EHT 2 and three were in non-contiguous tribular veins. Treatment of DVT was expectant in 2 cases, low-molecular weight heparin in 2 cases, and warfarin in 1 case. Res-
olition of all DVTs occurred at a mean of 28.3 days with or without pharmacologic therapy. There was a trend towards an increased incidence of postoperative DVT using the new as opposed to the original device 10.8% (3/37) versus 4.2% (2/24), respectively.

**Conclusion.** RFA of the SSV is safe and initially successful. The incidence of postoperative DVT in the SSV as compared to reported incidence of postoperative DVT in the SSV might be higher; however, they appear to be of minor clinical significance and may not uniformly require pharmacologic treatment. Our data suggests that the newer generation RFA system may be associated with an increased risk of DVT. We recommend careful technique to ensure an adequate distance from the sapheno-popliteal junction, as well as mandatory postoperative DUS screening.

**AP4.6-4**

How safe and effective is high energy endovenous laser ablation?

**T. King**

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**Aim.** Many currently recommend delivery of higher energy levels during ELT. The endovenous energy density (EED) of 70-80 J/cm is used; even higher for larger veins. When endovenous fluence equivalents (EFE), measured in J/cm2, is used to estimate energy requirements for ELT, large veins often necessitate the use of 100 J/cm or more. This study looks at the safety and efficacy of using more than 100 J/cm during ELT.

**Methods.** A prospective study of consecutive ELT cases requiring an LEED of more than 100 J/cm, as estimated by calculating EFE needed, based on vein size and laser wavelength. This was compared with a sex and age matched cohort who were treated with less than 100 J/cm due to their smaller vein size.

**Results.** To date, 171 successive cases (195 veins) using more than 100 J/cm have been performed. The range of LEED was 100-357.9 J/cm with an average of 132 ± 56.3. All had mild post-procedure discomfort and bruising requiring NSAID usage and GCS and other complications were mild and essentially equivalent in the higher and lower energy groups. The incidence of continued reflux through the SFJ and SFJ were 2.0 and 5.0% at 6 months follow-up in the higher energy group and 5.0 and 9.4% in the lower energy group.

**Conclusion.** It would appear that the use of LEEDs higher than 100 J/cm when performing ELT is as safe and more effective than using LEEDs lower than 100 J/cm, especially when treating larger veins. There appears to be no apparent difference with the type of laser used (980 nm and 1320 nm). It would also appear that these results provide further confirmation that EFE is a useful tool in determining energy delivery requirements for vein treatment, even when those energy levels are higher than typically used. Further study is ongoing.

**AP4.6-5**

Can saphenous and sural nerve paresthesia be prevented during ELT?

**T. King**

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**Aim.** To determine if it is possible to minimize the risk of thermal injury to the saphenous and/or sural nerves during the performance of ELT.

**Methods.** Using a Siemens Accuson X500 ultrasound machine with a 5-13 MHz transducer the zone of contact (ZOC) between the distal GSV and the saphenous nerve and the SS and the sural nerve were seen. The ZOCs were determined by observing the upper and lower points of contact (POCs) between the great and small saphenous veins and the corresponding nerves. The saphenous nerve POCs were measured from the medial malleolus. The sural nerve POCs were measured from the floor.

**Results.** The saphenous ZOC was measured in 202 consecutive legs undergoing ELT of the GSV. The sural ZOC was measured in 58 consecutive legs undergoing ELT of the SSV. The range of the saphenous upper POC was 7.0-29.0 cm above the medial malleolus (Average: 16.7 cm, Median: 16.5 cm, S.D.: 4.2 cm). The ZOC range was 2.0-20.5 cm below the upper POC (Average: 8.0 cm, Median: 8.0 cm, S.D.: 3.1 cm). The range of the sural upper POC was 18.5-31.5 cm (Average: 25.3 cm, Median: 24.5 cm, S.D.: 3.5 cm). The ZOC range was 4.0-9.5 cm below the upper POC (Average: 6.4 cm, Median: 6.0 cm, S.D.: 1.7 cm). There were no complaints of parasthesias after any of these procedures.

**Conclusion.** Identification of the saphenous and sural nerve ZOCs with the GSV and SSV is easily accomplished with only minor practice. If the desired result is to lose as much of the GSV or SSV as possible, the safest approach would be to introduce the fiber at a location determined by ultrasound visualization of the pertinent nerve. Without ultrasound nerve identification, insertion of the fiber at a location determined by ultrasound visualization of the pertinent nerve would appear to be of minor clinical significance and may not uniformly require pharmacologic treatment. Our data suggests that the newer generation RFA system may be associated with an increased risk of DVT. We recommend careful technique to ensure an adequate distance from the sapheno-popliteal junction, as well as mandatory postoperative DUS screening.

**AP4.6-6**

Minimization of thermally induced thrombosis of the sapheno-femoral junction during endothermal ablation of the great saphenous vein; safe position for catheter tip placement

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Heat induced venous thrombosis has been reported with endothermal ablation of the great saphenous vein (GSV). There are no uniform documented standards in terms of the distance from the sapheno-femoral junction (SFJ) for safe catheter tip placement. A prospective study was undertaken to determine the safe distance for thermal catheter tip placement from the SFJ during this procedure.

**Methods.** 100 consecutive patients were enrolled in this study. Three thermal catheter systems were used including 1320nm and 980nm lasers and radiofrequency. The catheter tip was sonographically positioned at approximately 2 cm from the sapheno-femoral junction before activating the heat source. Follow-up ultrasound was performed immediately and within 72 hours of the procedure. Within 72 hrs, the distance from the SFJ to the proximal end of the hyperechoic thrombus within the obliterated saphenous vein was measured.

**Results.** Successful obliteration of the GSV occurred in all cases. The mean distance of the catheter tip from the SFJ for the 100 patients was 2.10 SD 0.20. The mean distance of the proximal end of the thrombus from the SFJ at 72hrs. was 1.48 cm. SD 0.61. The mean difference being 0.62. These results showed highly significant differences between the pre and post catheter tip placement in terms of distance from the sapheno-femoral junction (p<0.001) based on the paired t-test proving the null hypothesis that the mean difference = 0. There were no thrombi extending into the common femoral vein.

**Conclusion.** Adequate distance of the thermal catheter tip from the SFJ is critical for safety and 2.0 cm appears to allow for thermal injury progression proximal to the catheter tip position in all cases.

**AP4.6-7**

Endothermal heat induced thrombosis: classification, natural history and treatment guidelines

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**Aim.** There has been a mounting concern by clinicians over the incidence of deep vein thrombophlebitis (DVT) and the risk potential for
Comparison between traditional and endovenous laser varicose veins procedure in terms of quality of life

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Measurement of quality of life (QoL) provides better understanding of impact of disease and treatment modalities on particular patient.

**Methods.** Patients with sonographically verified great saphenous reflux were divided into two groups - 59 patients (14 men and 25 women) were operated on with traditional open surgery (cross-sectionary, Babcock’s stripping and Smetana’s knife phlebectomy) and 206 patients (37 men and 169 women) using endovenous laser procedure (diode 980 nm or Nd: YAG 1520 nm) under tunescient local anaesthesia completed in all cases with Muller’s hook phlebectomy. We performed 40 traditional and 235 laser procedures. Before operation, all patients completed specific questionnaire for venous disease CIvIQ-2 and same questionnaire was filled up after 1 month, 6 months and 1 year. Total sick leave was also mentioned. For the assessment of QoL, the Global Index Score (GIS) ranging from 0 (worst quality of life) to 100 (best QoL) served as a standard scale.

**Results.** Preoperatively, there were no difference in GIS in both groups of patients (p>0.17). In traditional treatment group, GIS worsened from 84 to 77 after 1 month, whereas in laser group GIS (90 didn’t change during same period. This difference is statistically significant (p=0.001). Sick leave was also significantly shorter in laser group (median 0 days) compared to traditional group (median 40 days) – p<0.001. But 6 months after procedure, no difference in QoL was found between both groups (p=0.89) – traditional surgery GIS=97, laser surgery GIS=96. Similar results were observed after 1 year.

**Conclusion.** This study confirms that advantages of endovenous laser procedure in terms of quality of life can be seen mainly during immediate post-operative period. Afterwards, both treatment modalities bring comparable quality of life. But there are also other advantages of laser – cosmesis and possible reduction of recurrences due to minimal or neo-vascularisation.

Complications of endovenous laser ablation: review of the literature and special cases

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The last decade, minimal invasive techniques have been introduced in the treatment of lower extremity varicosities. Of these therapies, endovenous laser ablation is the most widely accepted and used treatment option for insufficient great and short saphenous veins.

**Aim.** To present a review of reported common and rare, and minor and major complications associated with endovenous laser ablation.

**Methods.** A systematic review of studies and case reports on endovenous laser ablation-induced complications. (1) The complications are classified as minor and major according to The Society of Interventional Radiology Standards of Practice Committee guidelines on reporting complications. Also, a case-series of complications after endovenous laser ablation in our centre and some device-related complications of affiliated colleagues will be presented.

**Results.** Ecchymoses and pain are frequently reported side-effects of this therapy. Nerve injury and skin burns occur occasionally and seldom are deep vein thrombosis and pulmonary embolism. Exceptions, but serious, are retained devices after the procedure. Ecchymosis, pain, induration, skin burns, dysesthesia, superficial thrombophlebitis, and hematoma were classified as minor complications. Deep vein thrombosis and nerve injury were classified as major complications. Also assigned to major complications are the device-related ones.

**Conclusion.** Endovenous laser ablation may be considered a safe treatment of lower extremity varicosities. The incidence of common side effects may decrease with more optimal laser parameters. Particularly serious are the very exceptional device-related complications, a correctly performed procedure and checking completeness of the devices is mandatory. 1. Endovenous Laser Ablation induced complications - review of the literature and new cases. Van den Bos RK, Neumann HAM, De Roos K-P, Nijsten T. Dermatol Surg; in press.

Does laser induced endothelial damage of the great saphenous vein extend into the saphenofemoral junction?

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Efficacy of endovenous laser ablation for treatment of incompetent great saphenous veins has extensively been documented. The most serious adverse event is propagation of the therapeutic throm-
bus into the common femoral vein. Several authors report extension in up to 7.7% even under standard treatment conditions. To investigate whether laser induced endothelial damage extends to the saphenofemoral junction area elevation of activation markers of coagulation and fibrinolysis (prothrombin fragment F1+2, D-dimer) and major cell adhesion molecules (soluble P-selectin, thrombomodulin), which are expressed by platelets and endothelial cells were monitored perioperatively while performing laser ablation of the great saphenous vein. 20 patients submitted to endovenous laser treatment for great saphenous vein reflux were enrolled. Blood samples were drawn before during and after the procedure from the femoral vein via central venous catheter and simultaneously from an anteceal vein. Commercially available ELISA kits were employed to measure plasmal evels of prothrombin fragment F1+2, D-dimer, P-selectin and thrombomodulin. Standard laser treatment was performed with a 810 nm diode laser in a pulsed mode. Plasma levels of F1+2 as well as D-dimer continuously increased within the femoral and brachial vein during endovenous laser ablation. We observed a 1.8 fold increase for F1+2 and a 1.4 increase for D-dimer. Statistical significance was only reached for F1+2. Although D-dimer continuously increased as well as F1+2 values remained within normal range. We could not observe any significant change of plasma levels of P-selectin or thrombomodulin. Our results rule out major injury of the endothelium of the femoral vein although minor endothelial irritation cannot completely be prevented. Blood samples from the brachial vein reliably reflect tissue trauma at the operation site.

GE4.6-2
Reversible neurological deficit after foam sclerotherapy
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A case report about a reversible neurological deficit after foam sclerotherapy is stated. A 57 year old male was treated with a total dose of 9ml of a 3% polidocanol foam. As an immediate side effect, the patient reported seeing dancing spots for a few minutes. No other immediate side effects occurred. Two hours after undergoing sclerotherapy the patient developed a speech disturbance for a couple of minutes. Besides a patent foramen ovale, no other pathological findings were found. Given the contrast between the high prevalence of PFO in the general population and the extremely low incidence of neurological deficits after foam sclerotherapy, it may be that these deficits arise only in patients who already have clinically insignificant neurological microdamage.

GE4.6-5
Sclero-mousse in great saphenous vein insufficiency; long term results
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In last years endovascular therapy of Great Saphenous Vein (GSV) insufficiency gained a wide consent for its low invasivity, low cost and patient’s intraoperative and postoperative comfort; “laser” and “scleromousse” are the most representative techniques of this new treatment modality. The Authors evaluated the long term results of their experience with “scleromousse” therapy for GSV insufficiency.

Methods. From 1/1/2002 to 31/12/2001 85 patients with GSV insufficiency (diameter 7-13 mm. at 3 cm. from the SF junction for “scleromousse” treatment. From 1/1/2002 to 31/12/2005, 174 more patients with GSV insufficiency (diameter 6-10 mm at Eccodordoppler examination) were enrolled in our study (group B); from year 2004 in all cases of GSV insufficiency with a coexistent insufficiency of the “preostial” femoral vein valve a crossectomy was also performed (43 pts., group C). Based on CEAP classification 187 pts. were in C2 stage, while 72 pts were in C3,C4,C5 stage. All operations were performed on Day hospital basis, on local anaesthesia; the “scleromousse” was injected with a catheter introduced in the GSV at the level of the medial condyle of the femur, and pushed at 2 cm. from the sapheno-femoral junction, under ultrasound control. Follow-up was at 30 days, 1 year and then every year, with clinical and Eccodordoppler examination. Mean follow-up was 49 months (max 84, min. 18 months). In group A recurrence was 42% (12% in the first year), in group B 51% (6% first year), in group C 13% (2% the first year). Indications for “scleromousse” in GSV insufficiency must be ruled by an Eccodolor-doppler study of superficial and deep venous system; GSV diameter ranging from 6 to 9 mm. with an associate crossectomy when femoral “preostial” valve insufficiency is present seems mandatory for good long term results.
GE4.6-4
Soft sclerotherapy of the hand veins
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Aim. Injection sclerotherapy is a well known and widely used method of treatment for varicose veins of the legs and can give excellent aesthetic results. The same sclerosing agents have been used for the aesthetic improvement of the dilated veins of the hand. The goal was only to reduce the calibre of the very dilated veins.

Methods. In this non randomized prospective study, 27 women with dilated veins of the dorsum of the hand were treated for an aesthetic improvement of their hands. All the patients were informed, that an overall aesthetic amelioration by the diminution of the dilated veins was the goal of the treatment. Polidocanol 0.5-1%, Sodium Tetradecyl Sulfate 0.25-1% and Scleremo 70-100%, all of them in their liquid form, were the sclerotherapeutic agents that were used. Various quantities were injected in each hand (max. 2.5cc), depending on the size and the number of the veins we wanted to treat. Both hands were injected in each session. No bandaging, elastic or not, was applied after the treatment. No precautions and no restrictions were implied after the treatment. The achievement of a spasm immediately after the veins have been injected was a good prognostic factor, for the response of the veins to the treatment. The result of the previous session implied our treatment tactics for the following session. The total result was regarded as satisfactory, when the diameter of the treated veins was such that the patient was overall satisfied.

Results. Minimum 1 and maximum 5 sessions were needed for an overall satisfactory result. All our patients supported the injections very well. There were no complaints during or after the treatment and method of treatment was not reported by us or our patients.

Conclusion. Soft injection sclerotherapy of hand veins can give good aesthetic results with safety and relative ease.

GE4.6-5
Ultrasound-guided foam sclerotherapy: which main conclusions to be drawn from the experience of 2440 procedures. Short-term results and three-year follow-up
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Aim. to investigate early results and three-year follow-up after ultrasound-guided foam sclerotherapy (UGFST) in C2 –C6 primary CVI.

Methods. 1503 consecutive patients were treated with UGFST (2440 procedures). There were 1452 Great Saphenous Veins (GSV), 289 Small Saphenous Veins (SSV), and 699 incompetent perforators (IP). The patients were divided in three groups: 1. Only sclerotherapy of GSVs or (and) SSVs - 1061 veins, diameter was 3-27 mm (GSV) and 4-16 mm (SSV). 2. Flush ligation and UGFST (512 veins, diameter was 4-26 mm). UGFST of IP, diameter was 2.5-8 mm.

Results. In the first group the rate of closure after the procedure was 98.9% for GSV and 97.7% for SSV. In six months 93.5% and 85.3% of the veins accordingly demonstrated absence of reflux. In 12 months 95.6% and 92.5%, in 24 months – 92.1 and 90.9% and in 36 months – 93% and 100%. In the second group one-month follow-up has shown absence of reflux in 99.6% of the GSV and in 100% SSV. In 6 months the numbers were 93.1% and 100% accordingly. In 12 months and further on 100% of the veins have demonstrated absence of reflux. In the third group the immediate results has shown 97.4% rate of closure of the perforators. In 6, 12, 24 and 36 months the numbers were 94.3%, 96.9%, 100% and 100% accordingly. Small veins had no any advantages over big ones. There were 25 (1%) complications.

Conclusion. UGFST provides good immediate and three-year follow-up results. There is no any clear evidence those big veins are resistant to UGFST. It represents a promising alternative procedure to the surgical intervention.

GE4.6-6
Outcomes of ultrasound-guided foam sclerotherapy for varicose veins of the lower extremities. Single center experience
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Aim. Ultrasound-guided foam sclerotherapy is gaining in popularity as a method to treat varicose veins of the lower extremities, a condition which is increasing in prevalence. Beginning in 2001, we started ultrasound-guided foam sclerotherapy for treatment of varicose veins of the lower extremities. The recent 5-years results of our treatment will be shown in this study.

Methods. Ninety one patients in 104 extremities underwent ultrasound-guided foam sclerotherapy over a 5 year period from January 2004 to December 2008 in Tokyo Women’s Medical University Hospital. The outcomes were studied retrospectively by chart review. The “recurrence” was defined as when the patient had clinical symptom CEAP C2. The average age, the sex rates and the recurrence rates were calculated. Then, the primary and secondary success rates at 24 months were analyzed by Kaplan-Meier Method.

Results. The mean age of the patients was 63.3 years, and 25 (27%) patients were males. Twenty-five (27%) patient in 35 (34%) extremities had recurrences and twenty seven (26%) extremities had a secondary sclerotherapy performed. Primary success rate was 59% and secondary success rate was 70% at 24 months.

Conclusion. Beginning in 2001, we started ultrasound-guided foam sclerotherapy for treatment of varicose veins of the lower extremities. The recurrence rates were poorer than those of surgical therapy. However, ultrasound-guided foam sclerotherapy can be performed easily in an out-patient clinic setting. The primary and secondary successful rates were nearly identical to other published data. The number of patient who underwent foam sclerotherapy is increasing in our hospital.

GE4.6-7
Pathological anatomy of the venous wall after treatment with endoluminal laser. Immediate and thirty days after surgery observations
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It is generally accepted at present as theoretically feasible that the damage in the endothelium produced by laser energy when discharged in the interior of the vein is caused by the caloric thermal action of vapor bubbles that are abundantly feeded during the ablation process suffered by the blood contents during its exposure to laser rays, a mechanism experimentally proposed by R.A. Weiss in 2002. There is no similar agreement concerning the alterations of the venous wall anatomy caused by the impact of the laser energy. The details of the changes produced in it have not yet been exposed with sufficient precision, in spite of the remarkable development and diffusion of the endoluminal ablation technique. The objective of the present study is to demonstrate the histological changes suffered by the anatomical structure of the venous wall when endoluminally impacted by laser energy discharges. With this purpose, 66 consecutive
non-selected patients aged 25 to 78 years, affected by a severe insufficiency of the internal and/or external saphenous territory (CEAP 2, 3, 4 and 5) are presented. Their venous territories, deep and superficial, were studied by means of Doppler sonography. Pre-surgical preparation consisted in clinical examination and general hematological analysis, with special reference to detect hemostatic deficit. Cardiological evaluation was performed by means of thoracic X-ray and ECG and, in doubtful cases, by means of ecocardiogram. All interventions were performed under block epidural anaesthesia. Samples for anatomo-pathological study were collected. The immediate ones, just after the laser discharge, taking advantage of block anaesthesia. The other ones were collected 30 days later, using local anaesthesia. All samples were processed for conventional optical microscopy and electronic microscopy.

Results. in progress show two types of anatomical alterations: the most frequent are fibrosis, caused by the effect of laser discharge, and in other cases abundant vessel neoformations caused by wall perforations.

GE4.6-8
Michel Perrin for the transatlantic interdisciplinary group: the vein-term transatlantic interdisciplinary consensus document
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Reasons to elaborate this consensus document were legion. In the past ten years, huge effort have been accomplished to have standardized practices with uniform terminology with the set-up of the universally adopted Clinical, Etiological, Anatomical, Pathophysiological (CEAP) classification together with the nomenclature of the veins. Despite this, still many terms created interpretive problems pointing to the need for a common scientific language in the investigation and management of chronic venous disorders (CVD).

Aim. To report recommendations of uniform usage of venous terms reached by consensus by a transatlantic interdisciplinary faculty of experts.

Methods. A transatlantic interdisciplinary faculty of experts under the auspices of the European Venous Forum (EVF), the American Venous Forum (AVF), the International Union of Phlebology (IUP), the American College of Phlebology (ACP), the International Union of Angiology (IUA), and the Society for Vascular Surgery (SVS) met in order to provide recommendations for fundamental venous terminology. After two meetings and between and after them a draft of these was circulated by open e-mail communications to the entire faculty for further refining comments. All recommendations raised by the experts were incorporated into a final draft reflecting the consensus of the assembled faculty.

Results. The consensus document includes thirty-three broadly used venous terms related to the management of CVD of the lower extremities, which were agreed to have variable applicability and interpretation in reports in the venous literature. The terms selected for inclusion in the VEIN Term consensus document are stratified into three different groups: clinical, physiological and descriptive. This VEIN-TERM consensus document is intended to provide those involved in the management of CVD around the world, who may report their experiences in the English literature, with clarifying refinements in venous terminology. Hopefully it will result in a more precise usage of venous terms in English language articles on CVD in the future.

GE4.6-9
Compression bandages influence of techniques of use on their clinical efficiency and tolerance
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A bandage is characterized by its components and by its properties evaluated in vitro: stretch, rheotological pressures calculated with a dynamometer. A bandage is also characterized by properties evaluated in vivo: interface pressures at rest and during contraction.

Aim. To evaluate interface pressures and stiffness of medium stretch bandages to vary the techniques of bandage in order to obtain a bandage with the lowest possible resting pressure and the highest possible working pressure.

Methods. The interface pressures of Biflex 16 bandages of 7 m x 8 cm and of Biflex 17 of 5 m x 8 cm were measured with the Kikuhime device. Five techniques to make a bandage were used. Two with an overlap of 50% and 75% and a stretch of 30%. Two with a superimposition of 2 bandages used in the same conditions. And one in spica (one of 8 technique).

Results. The achieved pressures are in relation with the technique to make a bandage and the number of layers at the measurement points. The best result is obtained with the Biflex 16 with an use in spica without stretch, the resting pressure is low and the working pressure is high. The stiffness index and the low resting pressure are sufficient to give a good clinical efficacy. This technique of use authorize the treatment of trophic disorders with an satisfactory effect of auto-massage and a maximum of safety even in a patient confined to bed or with a decreased ABI (between 0.6 and 0.9).

GE4.6-10
Friction index of medical compression stockings
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High-compression stockings (MCS) over 40 mmHg are often difficult or even impossible to apply. The superimposition of MCS is frequently used to overcome this problem. In vivo, the measured interface pressures under 2 MCS are about 10% lower than the sum of each MCS measured alone. We know little about the stiffness of superimposed MCS.

Aim. To compare the stiffness index of MCS used separately or superimposed on different healthy legs. To propose a friction index of the superimposed MCS.

Methods. MCS of 10-15 mmHg and 15-20 mmHg made in cotton and in lisle thread (Venoflex City - Thuasne) have been used. Interface pressures were measured at the reference point B1 with a small Kikuhime probe in 3 different positions: supine at rest, and during muscular contraction then in standing position. The Static Stiffness Index was computed (difference of pressure between standing and supine position) and the Dorsi Flexion Stiffness Index (difference of pressure in supine position between rest and contraction).

Results. 810 pressure measurements have been performed on 3 healthy subjects, with a variation coefficient less than 2.5%. In vivo the stiffness index is lower (about -15%) than the sum of the stiffness index of each stocking put separately. The stiffness of superimposed MCS seems to be in relationship with the friction of superimposed MCS. We propose for studying this phenomenon a friction index: the Superimposition Friction Index (SFI). SFI = ∑SI of Superimposed CS - Sum of SI of each CS used alone. The friction index of different MCS seems to be correlated with the quality and the stiffness of the different textiles.
Conclusion. In case of superimposed MCS, the increase of stiffness (SSI and DFSI) seems to be correlated with the increase of in vivo pressures and the friction Index with the quality and the stiffness of the textile.

GE4.6-11
Link between etiological aspects of veins thrombosis and clinic image of the disease
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Venous Thrombosis (VT) is vascular disease with incidence of 160 to 100.000. The importance of the VT lies with potential complication –pulmonary thromboembolism, syndrome postthrombotic. Venous thrombosis is consequence of genetic or gained thrombophilia. Of our study is causal correlation analyses of venous thrombotic and clinic image characteristics of postthrombotic with high condition. Angiology department of Belgrade Institute for Dermatology diagnosed 152 patients with venous thrombosis, confirmed by echosonography, Wells parameters, D-diameter values and clinical findings, during 2006-2008 period. Within patients group, 62 female with average age of 40 (21-64) and 70 male, average age of 38 (18-66). 2/3 of patients had thrombosis of superficial veins and 1/3 deep venous thrombosis of subungival region. With 23 patients, genetic examination confirmed heredital thrombophilia with resistance to APC factor V Leiden (8), hyperhomocisteinemia (2), mutation of prothrombin 20210 (1), co-association of APC factor V Leiden with deficit of protein S (1), deficit of Antithrombin III (2) and fibrinogenemia (2), increase antithromphiloid antibodies (4) and protein S deficit (3). Characteristics of patients with heredital thrombophilia: early development of thrombosis (at age 18-27), the first thrombosis at age 24, located at more then 2 veins simultaneously, female to male ratio 2:1, development of risk factors are trauma, heredital factor at all patients, recidivate thrombosis at 7/23, pulmonary thromboembolism 2/23, dermatological stasis syndrome 18/23, lymphoedema 18/23, veins ulcerations 14/23. Characteristic is rapid development of postthrombotic consequences, which is resulting in disease severity, affecting work capability and quality of life of very young population group. Studies of other authors have found very comparable results. Patients with heredital thrombophilia are at high risk for development of venous thrombosis, acute complications and rapid manifestation of syndrome postthrombotic. Due to increased risk for recidivant thrombosis and thromboembolism, this group of patients required permanent anticoagulant therapy and constituents of deficit anti thrombotic factors.

GE4.6-12
Ulcers healing and platelet growing factor
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Aim. We present our experience in refractory leg Ulcers healing with a high power preparation obtained from autologous platelets by fractional laser procedures, mounted on a creamy carrier, with high rate of platelet healing factors that we call FLAP, for 14 year time in our healing center.

Methods. FLAP is an autologous Transfusion Medicine preparatio. It is a care and good wound rules, first obtaining debridement with fluid parallel jet with saline solution and oxygen, and topical specific antibiotic local therapy, for a week. Pain is treated with Phentanyl patches (Duragesic- Janssen). The frequency of applying is daily with dry cure technic. We classify ulcers in smooth, moderate and severe with a 20 clinical parameters score, including extension and deep, pulses presence, tendon or bone exposure, ulcer age and general clinic exam of the patient. Weekly follow-up have been ever done by the same Medical and Nursing team and this variable is not considered operator dependant. We use plebotropic therapy (Diosmina Micronizada+Hesperidina 1gr.dia) and (Cylcostazol 100 mg/dia) complementary. Chirurgical Therapy of venous reflux o direct revascularization or Therapeutic Angiogenesis at ischemic. We treated 156 patients of diverse etiologies, venous, arterial, mixed, by pressure and microangiopathy, diabetc and vasculitic.

Results. Class Healing time in weeks.

<table>
<thead>
<tr>
<th>Class</th>
<th>Heal</th>
<th>Percent 25</th>
<th>Percent 75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Serious</td>
<td>16</td>
<td>8</td>
<td>32</td>
</tr>
</tbody>
</table>

Conclusion. From score proposed as moderate, ulcers treated with FLAP are cured in 7 weeks of treatment. All patients follow-up was made.

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GE4.6-13
Giant leg ulcers: are they actually venous ones?
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Giant leg ulcer, although relatively rare, are the real clinical problem. Moreover, the pathogenesis of such big ulcerations remains unknown.

Aim. The aim of this work was to evaluate clinical and epidemiologic data of giant leg ulcers. An ulcer was regarded as giant if it affected more than 3/4 of the leg circumference.

Methods. There were assessed clinical and epidemiologic data of 28 consecutive giant leg ulcers with suspected venous background.

Results. There were analysed 20 circumferential and 8 nearly circumferential ulcerations in 25 patients (5 patients with bilateral giant ulcers). Patients were aged 42-85 years, median: 69 years. Ulcers’ history was 0.5-30 years, median: 6 years. Interestingly, all but one patients were women. Sonographic examination of venous system was performed in 15 cases, and only in 3 cases a significant reflux has been detected in great saphenous vein, 4 patients were found varicose veins with normal saphenous vein, while 8 patients had no pathologic changes in the superficial venous system. Deep venous system was normal in all assessed cases. Only 16 patients continued the treatment, the remaining 7 patients ceased the therapy after one or two visits. Skin grafting was required in most of cases, 7 ulcers have completely healed, 9 cases have improved (ulcer’s area has decreased), while the treatment of 4 ulcers has failed despite grafting. Results of treatment were better in patients with an obvious venous pathology in the superficial venous system.

Conclusion. Observations that sonographic examinations of giant ulcerations often reveal normal venous system or only slight pathology, and findings that treatment results are conversely correlated with degree of venous pathology may imply that such ulcers are not actually venous ones. Taking into account their high incidence in women, these ulcers might be suspected to be associated with autoimmune process, perhaps due to microchimerism.

GE4.6-14
Practical way to compare and document outcome on leg vein lesions treatment
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Digital photography facilitated medical documentation. The most popular way to evaluate outcome on phlebology procedures is to

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compare before and after photos. Mandatory photo documentation also provides proof of service and helps on, if not avoids, eventual lawsuits. So, accurate photographic documentation has become essential for phlebologists, both for clinical and scientific purposes. Nevertheless, obtaining standardized and consistent digital images on leg vein lesions is particularly challenging.

**Methods.** A recently developed system (IntelliStudio – Canfield) developed for dermatologic and plastic surgery photo documentation was adapted to phlebology. This system bears a digital camera and three surrounding flash lamps. It is mounted on two vertical tracks that allow sliding. In this particular assembly, the whole composition was mounted hanging from the ceiling, parallel to the ground. Patient is photographed on four basic positions: dorsal, ventral and laterals. The camera is controlled by software that authenticates the picture and allows pre-treatment photo “ghosting” to facilitate a post-treatment photo positioning (Mirror). This software is also directly linked to the patient’s EMR (NexTech).

**Results.** Full documentation is done in about 2 minutes, increasing staff productivity - Zoom and high resolution allows rich visualization of fine detail - Easy reproducibility in a difficult part of the body (legs) - Convenient data access for storage, backup and transfer - Allows precise positioning with the Mirror software (‘ghost effect’) for treatment phase comparison and evolution - Patient data is automatically transferred to the NexTech software (EMR system) - The ceiling mounted IntelliStudio sets a standard for pictorial documentation.

**GE4.6-15**

**Antioxidant/anti-inflammatory effects of calcium dobesilate (DoxiumR) in human varicose veins**

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**Aim.** Animal studies showed that calcium dobesilate (DoxiumR) protects against diabetic retinopathy, via its antioxidant/anti-inflammatory action (Rota et al. Eur J Pharmacol. 495:217-24, 2004). Here, we investigated if calcium dobesilate can act in chronic venous insufficiency by similar antioxidant, anti-inflammatory mechanisms.

**Methods.** Calcium dobesilate was tested in vitro for its protective actions against oxidative/inflammatory stresses in human varicose veins. Varicose greater saphenous veins were obtained from 14 patients (11 males, 3 females) aged 53–65 years. Oxidative stress was induced exogenously in the vein segments, with the couple PMS (phenazine methosulfate)/NADH. TAS (total antioxidant status) and MDA (malondialdehyde) contents were used as markers of oxidative stress.

**Results.** Calcium dobesilate significantly prevented both phenomena in the micromolar range. PMS/NADH-dependent, TAS decrease was fully prevented with IC50 = 11.4 +/- 2.3 µM (n=6 veins), whereas MDA increase was fully prevented with IC50 = 102 +/- 3 µM (n=6 veins). The reference compound, rutin, acted qualitatively like calcium dobesilate. Comparison with pharmacokinetic data suggests that calcium dobesilate can act at therapeutic concentrations.

**Conclusion.** Calcium dobesilate protected varicose greater saphenous veins against oxidative stress. These results suggest that calcium dobesilate acts in chronic venous insufficiency, by similar antioxidant, anti-inflammatory mechanisms as in diabetic retinopathy.

**GE4.6-16**

**Home health care in angiology: practice and evidence based recommendations**

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Demographic, epidemiological and social trends in Serbia are challenging and continuing traditional patterns of health care in dermatology and angiology. The coming decades will see increased rates of care-dependent people and non-communicable diseases as the leading cause of chronic illness and disability. The break up of traditional large family group, increase in single or small old families and urbanisation will lead to gaps in care of older population cohorts. Such changes are requiring different approach in health policies and services, since disease oriented approach alone is no longer appropriate or sufficient. Angiology department (Institute for Dermatology, Belgrade) has organized home care since 1984, provided services to 211 home-based vascular patients. Patients treated through home care programme are constituting up to 0.075% of total vascular patients (372.000 vascular patients during 25 years). Most of patients were older than 65, female - male ratio 2:1, with following vascular diagnosis - cellulitis, venous and arterial ulcerations, decubitus, vein thrombosis and superficial veins. Ratio of the first and second examination is 15:1 and ratio of examinations and interventions is 3:1. Frequency of visits per patients was 1-4. Home care team consisted of specialist in dermato-angiology, nurse. Angiology services were: angiologic examination, CW Doppler, Doppler index, bandaging of wound, control of arterial pressure, to place elastic bandage, laser therapy, laboratory tests, educational support (life style, risk factors, etc.). Advantages of home care in angiology should be categories as those with effects to patients (1) and benefits for the organisation of the health care (2): 1. Quicker positive outcome, prevention of complications, higher quality of care. 2. Decreased or avoided hospitalisation and reduced treatment and care costs costs (up to 90% compared to hospitals costs and 40% to out-patient service cost). Possibilities for home care in angiology are significant and enables improvement of health and reduces of medical treatment cost.

**GE4.6-17**

**Treatment for panniculitis, using mesotherapy: a study of 10 consecutive patients**

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Panniculitis, complication C4 in CEAP, is considered as a complication of deep venous disease with without incompetent perforators. Usual treatment is high pressure compression and/or surgery. Evolution is the alternance of subacute/acute episodes with asymptomatic episodes. The lesions are located at the lower third of the leg (may be circumferential). There is no consensus of the treatment of the acute phase.

**Methods.** 10 consecutive patients treated with mesotherapy for the acute phase. 8 women and 2 men, included between march 2007 and march 2009.

**Results.** Treatment provided once a week during three consecutive weeks. Treatment: 1. Cleaning the skin according to the protocol with Chlorhexidine 2.Intra-dermal injections of 0.01 ml at a depth of 0.5 to 1.5 mm, using a portable mesotherapy injector with a program to precisely deliver the dose and with a device to precisely determine the depth of the injection. The needles are classical 30 G Luer 0.30 x 4 mm for mesotherapy. Injection is completed by Injection is completed by Injection is completed by Injection is completed by Intra Epidermal injections (tail Perrin Technique) of a total volume of 0.5 ml on the zone. The injection is a mixture of equivalent volume of Piroxicam (20mg/1ml), Procaine 2% and Thiocholchicoside 4mg/2ml. 3. Compression stockings (French Classe III) delivering a pressure of...
30 to 35 mm Hg at the ankle. Pain and discomfort have been evaluated with an analogic scale.

**Results.** After 3 treatment session, a statistical difference is noted: the pain is lowered from 7 ± 1.5 to 3 ± 0.7. Discomfort is modified from 8 ± 1.3 to 4 ± 1.5.

**Discussion.** The treatment is primarily a preventive one. Treatment of the established disease is the compression. Patients condition is significantly improved with the mesotherapy.

**Conclusion.** treatment replaces oral drug therapy and is more efficient.

**GE4.6-18**

**Manual lymphatic drainage improves the quality of life in patients with chronic venous disorders**

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Chronic venous disorders (CVD) decrease Quality of Life (QoL). Manual lymphatic drainage (MLD) is one of several conservative treatment options of CVD, which by decrease in pain level and clinical stage may improve the QoL in venous disease.

**Aim.** To determine influence of MLD on treatment results of CVD patients.

**Methods.** Patients with CVD qualified for elective surgery of venous system were randomly divided into 2 groups. MLD group (n=38) and control group (n=32). In preoperative period MLD group underwent series of MLD 5 times a week, through a period of 2 weeks. Control group did not undergo MLD preoperatively. Both groups were evaluated for CVD staging at the day of qualification for surgery and between 25 - 30 days post-op. CVD staging was evaluated by: QoL, questionnaire, Venous Reffiling Time (VRT), CEAP classification and Foot Volumetry (FV). Additionally, MLD group was evaluated after series of MLD. For statistical analysis U Mann Whitney, Wilcoxon, Spearman and Pearson tests were applied.

**Results.** Parameter values gained in MLD group (before treatment/after MLD/after surgery): QoL 54.4/43.8/38.2, VRT 15/13/15.6, CEAP 2.23/2.15/2.10, FV 3625/3472/3418. Parameter values gained in control group (before surgery/after surgery): QoL 51.9/38.7, VRT 13/14.9, CEAP 2.4/2.12, FV 3581/3555. CVD patients statistically improved QoL, VRT CEAP staging and FV in both groups (p<0.05).

**Conclusion.** After surgery, MLD group as compared to control group gained better results in QoL, VRT, CEAP score and significantly better results (p<0.05) in FV. MLD alone significantly improved (p<0.05) QoL, CEAP score and FV. MLD can be an alternative or a supplementary procedure for patients surgically treated.

**GE4.6-19**

**Electrolyte balance in pulsatile and non-pulsatile patients undergoing coronary artery bypass graft**

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**Aim.** To determine whether the absence of a pulse during the perfusion phase of cardiac surgery had any effect on fluid exchange and electrolyte balance.

**Methods.** Patients were divided into two groups who had undergone pulsatile and non-pulsatile type of coronary artery bypass graft surgeries (60 patients). Blood samples were taken at ten time points (pre-induction to 96 hours after bypass) and underwent analysis of number of factors, including routine electrolytes, collodio osmotic pressure and plasma histamine.

**Results.** Sodium ions in the both group of patients remained constant throughout and immediately after bypass. Potassium levels were increased in these patients. In the case of calcium, chloride and bicarbonate levels, there were a slight increase during the period of bypass. There was a significant drop (p<0.005) in COPs with pore sizes of 10,000 and 100,000 Daltons, systolic, diastolic, mean pressures, haemoglobin, haematocrit and calcium during bypass and all these parameters returned to normal after bypass except COP which after normalising continued to rise again up to 96 hours. The difference between pulsatile and non-pulsatile groups of patients in terms of plasma histamine was highly significant (p<0.0001). Summary: There was no significant difference between the groups except histamine levels in patients undergoing CPB assisted open-heart surgery.

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GE4.6-21

Minisurgical concept in the treatment of varicose veins (preserve of the saphenous vein - miniphlebectomy)
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We submit to your attention a surgical method for the treatment of varicose veins through the interception of the channels of their filling up. Our experience in practicing this procedure is of over 12000 surgical interventions performed over the past 15 years. The Method:
- Under local anesthesia incisions of 1-4 mm in the previously marked places are performed - The varicose veins are intercepted, sectioned and ligated; the same procedure is applied for pathologically dilated collateral veins and for insufficient perforant veins; in this manner both the venous flux and reflux are eliminated - The varicose veins remain in place but they become just empty, nonfunctional tubes taken out of the venous circuit

Results. A 5-year follow-up shows that the appearance of new varicose veins after VANST occurs in 4.3% of the cases. The Method's Advantages:
- The present method is at the same time a radical one by eliminating the venous reflux and permanently taking the varicose veins out of circuit; and a conservatory one because it preserves the patient’s normal venous capital. - It can be applied in a great variety of cases: truncular insufficiency of the GSV and of the SSV including the giant varicose veins, nonsaphenous varicose veins, varicose veins complicated with lipodermatosclerosis or leg ulcer, superficial thrombophlebitis, recurrent varicose veins. - It is a minimally invasive, ambulatory and practically nontraumatic method. - All surgical maneuvers are performed by direct viewing (a ciel ouvert). - There is no intraoperative bleeding, no postoperative ecchymosis or hematoma. - It does not require postoperative compression. - The postoperative evolution is practically painless. - Aesthetic postoperative appearance.

Conclusion. Taking into consideration its advantages VANST can be recommended to the endovenous techniques for the treatment of varicose veins, actually proving to be superior in terms of its wide application.

GE4.6-22

Varices' ambulatory non-stripping surgical therapy (VANST)
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In the treatment of varicose veins crossectomy and stripping is unfortunately still common. The idea that due to a radical operation, with ligation of the saphena at the saphenofemoral junction, complete elimination of the branches and removing the saphena, the disease can be cured. But even then you can not solve the problem of recurrency. On the other hand you have the problem of damaging lymphatic vessels, the appearance of post operative lymphedema, damaging cutaneous nerves and bad cosmetic results because of big scars. Endovenous treatments seem to be less traumatic, but there is still the problem of recurrence, painful indurations through the remaining obliterated saphena and the high costs of these procedures. We preserve the saphena or just do a ligation or remove a short part of it even if it is incompetent. Through removing the extended branches the pressure in the former incompetent saphena decreases and the diameter reduces. So the reflux at the sapheno femoral junction disappears or reduces. In case of extended veins we split the operation and do it in two steps. After the first operation through the reduction of the pressure in the remaining veins they shrink, so it is much easier to remove these veins in a second step. In between and after the operation we proceed sclerotherapy. The operation is done in local anesthesia with the miniphlebectomy method acc. to Várady. The patients are mobilised immediately. So we reduce the operativ trauma at a minimum, achieve very good medi- cal and cosmetic results through very small incisions, less trauma ta an protection of the lymphatic vessels and cutaneous nerves. This concept is performed at our clinic for decades, with a very good ac- ceptance and satisfaction from the patient side. We demonstrate this method, show color duplex pictures and pictures of patients before and after operation.

PP4.7 - Venous diagnosis 2

PP4.7-1

The nutcracker syndrome
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A high percentage of patients presenting pelvic congestion syn- drome might be related to a left renal vein compressive syndrome which derives in the flow inversion of the left gonadal vein producing secondary pelvic varicocities.

Aim. To obtain the diagnosis of these compressive syndromes and a therapeutic guidance, assessing that this syndrome is well known in a permeable morphologic profile but a stranger in the development of the pelvic venous disease.

Methods. In March 2004 – December 2008, 28 patients with this syndrome were studied and treated. We present the study protocol, the medical history, the abdominal colour Echo-Doppler and the selective pelvic phlebography with pressure measurement. Optionally, in several patients an Angio-Tac was performed. The treatment consists on the embolization of pelvic varices and the insufficient axis as well as the placement of an auto-expandable stent in the left renal vein of those patients presenting pelvic varices and a gradient in renal-cave function lower than 5 mmHg.

Results. The initial success rate in all treated patients was 100%, based on the stent permeability and pressures normalization. The embolization of the insufficient axis improved the pelvic clinic and the lower limbs in 85% of the cases.

Conclusion. We believe that the nutcracker syndrome in varices is the origin of the pelvic venous congestion. Therefore, it is very important to be able to diagnose and treat it to obtain very satisfactory results without complications according to our experience.

PP4.7-2

Diagnosis and treatment of venous pelvic. Syndrome congestion pelvic. Vulvar varicose vein
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The pelvic congestion syndrome, as well as vulvar varicose veins, are experienced by 8% of all pregnant woman and by 0.8% of the whole population of multiparity women. This may be caused by congenital, mechanical, hormonal, hemostasis and procoagulant factors. Dispareunia and pelvic pain are experienced by more than 80% of examined women. Transvaginal eco doppler leads us on the existing backflows. Both selective embolization with coils in hypogastric and ovarian tube veins as sclerosis with 2% polidocanol and/or 1% sodium tetradeyl sulfate in vulvar varicose veins turn out into a long term recurrence under 2%. The syndrome of pelvic congestion, and the varicose veins vulvares, appears in 8% of the pregnant women and in 0.8% of the population of women with multiparity. Congenital factors, circulatory, hormonal mechanics, hemostasia and procoagu-
lantes they can cause it. The dispareunia and the pelvic pain suffer more than 80% of the examined women. The ecodoppler transvaginal or laparoscopy, selective ovariography and pelvic phlebography were made.

Methods. 46 female patients studied with combined transvaginal and transabdominal duplex. Pelvic and abdominal phlebographies with pressures gradient measurement in ilio caval and recanalization sectors were performed in all patients with suspected syndrome in duplex scan.

Results. Clinical data: mean age (44.22), pregnancies (3.27), pelvic symptoms (56.5%), hematuria (8.7%), left flank pain (17.4%), non-saphenous vein varices (39.1%). Main parameters in transabdominal duplex: left renal vein velocity ratio (14.14), left renal vein hilat diameter (10.63), left renal vein aortomesenteric diameter (1.8 mms), left renal vein diameter ratio (6.77), left gonadal vein visualization with flow inversion (87%, 47.8% helical flow, 39.2% non helical flow), left gonadal vein diameter (9.52 mms). Main parameters in transvaginal duplex: left pelvic plexus veins diameter (9.3 mms), right pelvic plexus veins diameter (6.27 mm), pelvic veins velocity (10.4 cm/sec). Left renal vein venography: Renocaval pressure gradient: 4.53 mm Hg.

Conclusion. We conclude that the duplex ultrasound is an excellent screening tool that allows an adequate and non invasive orientation of the patients with LRVCS. A ratio of velocity greater than 5 in left renal vein, left gonadal vein with spontaneous flow inversion in transabdominal duplex, high flow pelvic varicocele of left predominance in transvaginal duplex, and the presence of pelvic symptoms, hematuria, left flank pain or non-saphenous varices in the legs suggests LRVCS.

PP4.7-5
Risk factors of technical failure during endovascular treatment of post-thrombotic femoro-iliac venous obstructive lesions
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Stenting is nowadays recognized as the method of choice for treatment of femoro-iliac vein obstructive disease. The goal of study is to determine whether predictive factors of technical failure exist.

Methods. All patients admitted for endovascular treatment of post-thrombotic obstructive lesions of femoro-iliac veins were included. From September 1998 to December 2008, there were 45 limbs in 41 patients (29 women, median age 49 years), classified CEAP C3 in 28 limbs, C4 in 4, C5 in 1 and C6 in 12. Median delay since DVP was 147 months (6-564). All of them were symptomatic and disabled (median VDS and VCSS of 3 and 11, 29 had venous claudication). Seven patients had had deep vein direct surgery. Thrombophilia was present in 21 patients. Preoperative work-up included duplex-scan and angioCT scan. Lesions were bilateral in 5 cases, the IVC and the common femoral vein were respectively involved in 4 and 28 cases. Moreover 56 limbs had at least one occluded venous segment including 7 on a previously operated vein. The endovascular procedure was performed in the operating room through percutaneous access. Flo-cavography was performed. In case of occlusion recanalisation was performed.

Results. Technical success rate was 82% but 75% only when recanalisation was needed. Recanalization failure occurred in 8 limbs in 6 patients. Of these, 7 had history of direct surgery of the thrombosed segment. One of these patients had stenting of the ipsilateral ascending lumbar vein. Factors of technical failure were history of deep vein surgery (p = 0.001), thrombosis of a deep vein which had history of direct surgery (p <0.001) and common femoral vein thrombosis (p = 0.035).

Conclusion. History of previous direct surgery of an occluded deep vein (common femoral, iliac vein or IVC) is an independent factor of failure to recanalize.

PP4.7-6
Reflux of the proximal femoral vein valves can be corrected by an angioscopically directed Valsalva spiral
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This study investigated the optimization of indications to external valve support using the Valsalva Spiral for primary deep veins.
reflux based on the femoral vein proximal (ostial) valve anatomy type.

Methods. The external Vedensky Spiral was used for correction of valvular insufficiency in 28 extremities of 24 patients (18 women, 6 men) during 1998 to 2002. Patients were a mean age of 54.6 years (range, 32-76 years). The clinical manifestation was C4 in 10 limbs and C5 in 18 limbs. Primary axial deep reflux was present in all 28 extremities, and axial superficial reflux was also present in 26. Duplex scanning and descending phlebography were used to estimate the functional condition of the deep vein valves. Fiberopticscopy intraoperatively to study the anatomic status of the femoral vein valves and for checking the repaired valve function was used.

Results. Phlebography showed the following anatomy of ostial valves of the femoral vein: 16 valves had wide separation of cusps, 11 had elongation of cusps, and one had a monocusp. The competence of femoral vein ostial valves was completely restituted in all cases with widespread separation of cusps. Multiple corrections were performed in cases with incomplete competence of the ostial valve (valve with elongation of cusps or monocusp). 3

Conclusion. External valve support by the Vedensky Spiral is an effective and simple method of correction of incompetent femoral vein valves in limbs with primary deep venous reflux. The technical success of the intervention depends on the type of valve insufficiency of the correct choice of spiral diameter.

PP4.7-7  
Prevalence of reflux in the great saphenous vein as a function of diameter

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Methods. Evaluation for chronic valvular insufficiency of the GSV was performed in the standing position in 309 extremities of Ecuadorian women and 47 of Ecuadorian men. The duplex equipment used was the Taron laptop-based machine, and all examinations were conducted by the same RVT (SSC). The relationship between mid-thigh GSV diameter measurements and reflux longer than 1 second was reported herein.

Conclusion. Diameter measurement can be an effective second-ary variable in the evaluation of valvular insufficiency of the great saphenous vein (GSV) in the thighs of a series of Ecuadorian patients.

PP4.7-8  
The prevalence of bilateral saphenous reflux and abnormal venous refilling times in patients with varicose veins

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Patients presenting with unilateral varicose veins often undergo unilateral imaging and treatment because disease in the “asympto-matic” side is considered infrequent or unimportant. Aim. We have performed bilateral duplex ultrasound on patients with symptomatic varicose veins to determine the prevalence of bilateral saphenous reflux, and also performed photoplethysmography to provide objective assessment of the severity of disease.

Methods. 80 consecutive patients presented with symptomatic unilateral or bilateral varicose veins. All patients underwent bilateral duplex venous ultrasonography and venous refilling times in the greater (GSV) and small (SSV) veins and anterior accessory (AASV) saphenous veins was noted. Bilateral digital photoplethysmography (Vascular Assist, Huntleigh UK) at the ankle was also performed to ascertain whether patients had abnormally prolonged venous refilling times.

Results. 51 patients presented with unilateral symptoms and 42 (82%) had underlying saphenous reflux (GSV, SSV, and AASV). Duplex of the asymptomatic leg also detected saphenous reflux in 21 (42%) of the patients (9 GSV, 1 AASV, 1 SSV). In the 29 patients presenting with bilateral symptoms there was bilateral saphenous reflex in 12 (40%) cases with a further 5 (16%) patients exhibiting unilateral saphenous reflux only. Venous refilling times were abnormally prolonged in 63 of the 92 (68%) legs exhibiting saphenous reflux compared to 25 of the 68 legs (37%, p=0.01) with no truncal reflux. 15 of the 21 (70%) patients with asymptomatic saphenous reflux had abnormal refilling times.

Conclusion. Bilateral saphenous vein reflux is found in a high proportion of patients presenting with varicose veins, regardless of whether symptoms are unilateral or bilateral. In these cases the degree of superficial venous dysfunction, as measured by photoplethysmography, is often as severe in the asymptomatic leg as the symptomatic side. We therefore advocate bilateral investigation of all patients with varicose veins, and consideration of endovenous treatment to the “asymptomatic” side if appropriate.

PP4.7-9  
Distribution of venous reflux in chronic venous insuf-ficiency of the lower limbs, by duplex investigation.  
Haemodynamic and clinical implications

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The choice for treating chronic venous insufficiency (CVI) of the lower limbs (LL) is mainly based on the site, extension and combinations of venous reflux (R) mainly studied by duplex ultrasound (DUS). Aim. To verify the distribution, combinations, haemodynamic relevance of R and their clinical implications.

Methods. 2,098 LL of 1,049 patients affected with CVI and/or other pathologies of the LL were selected by DUS. Venous anatomy, morphology, location of R were studied and C.E.A.P. classified. In 2,122 LL of 606 patients the venous pressure index (VPI) measurements were performed by Doppler method. Deep venous (DV) and perforating veins (PV) R combined with superficial R was evaluated by exclusion maneuvers (rubber ties occluding the superficial veins at various levels).

Results. 1906 examined LL LL with R R1509 (79.1%) SFJ+greater saphenous vein (GSV)n°590 (=39%); isolated SFJ n°22 (=1.4%); total
PP4.7-10
A method for the diagnosis and record of venous insufficiency with pocket doppler’s use

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It is universally accepted that the precise diagnosis of venous diseases is performed with the USG color Doppler (CD), however many doctors don’t have this equipment in their office and they only have the Pocket Doppler (PD). Here we propose a system for the functional evaluation and record of the venous system of the leg using the PD. It evaluates the superficial, deep and perforating venous function at the commonest and most accessible places for a general diagnosis: Deep system: Femoral vein (VF), popliteal vein (VP), anterior tibial vein (TA) and posterior tibial vein (TP). Perforating system: In the more frequently affected: Hunter (H), Dood (D), Boyd (B), May (M) and Cockett I, II and III (CI, IIC and CIII). Superficial system: Great saphenous vein on the half third of the thigh (1), on the superior third of the leg (2) and on the saphenous begin just anterior to the median ankle (3). The small saphenous is evaluated on the saphenopopliteal junction (4) and on it begin posterior to the medial malleolus (5). Only positive to reflux places are registered. In 20 patients with varicose veins in the C.C.A of Mexico City, we did an evaluation using a clinical diagnosis, next using the PD and finally with the CD, each evaluation was done by a different doctor. The results obtained in the evaluation corresponded to a relation of certainty of 89.4% in the evaluation for PD and 72.6% for CD. We concluded than this evaluation system permits a therapeutic decision in places where there is no CD available and it is a good system to record graphically the phlebologic diagnose.

PP4.7-11
The role of ultrasonography in surgical treatment of acute thrombophlebitis of great saphenous vein

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Superficial thrombophlebitis is local inflammation of superficial veins associated with thrombosis leading to partial or full obstruction of the vein. In most patients the diagnosis of ST is based upon physical examination. If disease has acute presentation ultrasonography examination is mandatory. Depending on clinical findings and localization of phlebitic process treatment can be conservative or surgical.

Aim. To determine the role of ultrasonographic examination in acute superficial thrombophlebitis of great saphenous vein and its impact on indication for urgent surgical treatment.

Methods. From 141 patients operated due to acute superficial thrombophlebitis of great saphenous vein above the knee (January 2004 - December 2007), 63 patients who underwent ultrasonographic examination prior surgery were selected and statistically examined.

Results. Out of 63 operated patients in 38 duplex ultrasonography revealed that proximal level of process was higher than the one found during physical examination (60.5%). In 25 patients there were no differences between ultrasonography and physical examination (39.7%). Statistical analysis confirmed that there was significant difference between ultrasonographic and physical examination findings (Chi 2 = 6.5, p <0.01). Furthermore, when the process was localized above and around the knee the difference between ultrasonographic and physical examination findings was more frequent.

Conclusion. This study presented statistically significant difference between ultrasonographic and physical findings in patients with acute superficial thrombophlebitis of great saphenous vein. Ultrasonography was confirmed as highly reliable, precise, fast and non-invasive diagnostic method that was necessary in examining, course-following and making decision for operative treatment of these patients.

PP4.7-12
The value of doppler venous pressure index in the diagnosis of chronic venous insufficiency of the lower limbs

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The haemodynamic evaluation of chronic venous insufficiency (CVID) of the lower limbs (LL) is mainly based on duplex ultrasound (DUS). Further investigations as venous pressure measurements are systematically performed in few Centers. Non-invasive measurement is mainly influenced by venous valvular function and still is considered not sufficiently validated. It should be preferably named venous pressure index (VPI).

Aim. To verify the value and significance of VPI in the diagnosis of CVID of the LL.

Methods. 2.098 LL of 1.049 patients affected with CVID and/or other pathologies of the LL were studied by clinical and DUS investigations. 1.212 LL of 666 patients with CVID were systematically subjected to VPI measurements. LL with venous malformations were excluded. VPI were detected by Doppler method in standing position and after 10 tip-toeing exercises (ambulatory VPI), at the ankle in correspondence of the greater saphenous (GSV), smaller saphenous (SSV) and posterior tibial (PTT) veins. The VPI mean values were correlated with the site, extension and various combinations of reflux and analyzed. The C of C.E.A.P. of every single limb was correlated with the mean VPI values.

Results. Standing VPI are significantly related with the site, extension and combinations of venous reflux (R), while ambulatory VPI are more frequently influenced by exercise and muscle-skeletal alterations. Mean VPI values: GSV>SSV; GSV with isolated R at the leg>GSV at the thigh; additional R in perforators increases VPI in all the districts, superficial R increases VPI in PT. The mean VPI values are significantly related with the C of C.E.A.P. (P<0.05-0.001).

Conclusion. Standing VPI are the expression of valvular incompetence of the various venous districts. R in GSV at the leg and in perforators increases VPI and the severity of the disease. Superficial venous hypertension leads to secondary deep venous hypertension. Doppler VPI measurement is a highly predictive investigation.
AP4.7 - Thromboembolic diseases

AP4.7-1

Venous thromboembolism prophylaxis methods in the trauma and emergency surgery intensive care unit patients

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To evaluate the efficacy and safety of low molecular weight heparins (LMWH=4000U/day Enoxaparine Sodium, Cleaxane-Sanofi-Aventis-France) compared to elastic stockings in combination with intermittent pneumatic compression (ES+IPC Response Kendall-Tyco-USA) in venous thromboembolism (VTE) prophylaxis in the intensive care unit (ICU) of trauma and emergency surgery.

Methods. From June 2005 to June 2007, 259 patients, who were on mechanical ventilation in the ICU were assigned to two groups, which were either LMWH or ES+IPC. This patients had a VTE risk score of about 10 according to Caprini. The study design fulfilled the guidelines of our institutional review board. The patients were randomly allocated to either group. Color flow doppler sonography was carried out on 3rd and 7th days. LMWH group was consisted of 152 patients whilst the ES+IPC group induced 94 patients. Statistical analysis were done with SPSS. Groups were compared using X2 analysis test.

Results. Deep venous thrombosis was revealed in 5 (2%) of the LMWH whilst one (1%) in the ES+IPC group. The frequency of VTE was 1.5% (4/259). Minor bleeding were in 15 patients. Two patients suffered from fatal PE in total of 4 patients with PE.

Conclusion. We believe that the protocol, which is applied for VTE prophylaxis in Istanbul Medical Faculty Emergency Surgery Department is effective and safe one in such group with high mortality and morbidity.

AP4.7-2

Travellers' thrombosis: airlines still not giving passen- gers the wright advice!

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The World Health Organization's Research into Global Hazards of Travel (WRIGHT) Project has reported the need for travellers to be given appropriate information regarding the risks of Travellers' Thrombosis.

Aim. To elucidate the impact of the WRIGHT Project's phase one report on the information given by Airlines to their passengers regarding Travellers' Thrombosis.

Methods. Official websites of all Airlines flying from Heathrow (UK) and JFK (USA) were located through links on the websites of these two busy International Airports. In June 2007 each site was scrutinised by three independent researchers to identify if Travellers' Thrombosis and its risk factors were discussed and what methods of prevention were advised. This exercise was repeated a year after the publication of the WRIGHT report.

Results. 119 International Airlines were listed in 2007 (Twelve excluded from analysis: seven websites were unable to be accessed and five links redirected to parent Airlines). A quarter (27/107) of Airlines warned of the risk of Travellers' Thrombosis. A year later, 5 Airlines were no longer operational and there had been no increase in the discussion of Travellers' Thrombosis (25/102). Additional risk factors discussed in June 2007 vs September 2008 were: Previous Venous Thromboembolism (16%, 15%); Thrombophilia (14%, 15%); Family History (11%, 9%); Malignancy (12%, 14%); Recent Surgery (19%, 16%); Pregnancy (17%, 16%) and Obesity (11%, 12%) Prophylaxis advice given in June 2007 vs September 2008 were: In-flight exercise (34%, 42%); Hydration (30%, 34%); Medical Consultation prior to flying (20%, 18%); Graduated Compression Stockings (13%, 12%); Aspirin (<1%, <1%) and Heparin (5%, 7%). In-flight exercise and hydration were often discussed without direct reference to Travellers' Thrombosis.

Conclusion. 75% of World Airlines continue to fail to warn of the risk of Travellers' Thrombosis or offer appropriate advice. Alerting passengers at risk gives them an opportunity to seek medical advice before flying.

AP4.7-3

Deep venous thrombosis investigated with ultrasound contrast agent

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Aim. We sought to investigate vascularization of deep venous thrombosis as a sign of thrombus organization in vivo utilizing the application of contrast ultrasound. The process of deep venous thrombosis organization is only known from autopsy studies, and there is no reliable information about the time course of thrombus in vivo. Contrast ultrasound investigation allows the detection of very small vessels such as newly growing capillaries into a thrombus.

Methods. 31 patients (7 female, 24 male) with proximal deep venous thrombosis of the femoral veins at a median age of 62.9 (27.4 - 76.9) were included in the study and received the ultrasound-contrast agent sulphur hexafluoride (Sonovue®) injected into a foot vein. Contrast ultrasound analysis was performed at the time of diagnosis (visit 1), after 3 weeks (visit 2) and at 3 months (visit 3).

Results. Median (Interquartile range) of the relative intensity increase after contrast agent application is seen in the vein wall adjacent to the artery (visit 1: 4.5 (6.5) and visit 3: 11.9 (13.9) p = 0.05) as well as in the centre of the vein (visit 1: 3.5 (2.65) and visit 3: 12.4 (14.8) p = 0.05) after 3 months.

Conclusion. Contrast enhanced ultrasound (CEUS) is an excellent method to determine the time course of organization of femoral deep venous thrombosis.

AP4.7-4

Gender difference in clinical presentation of deep vein thrombosis

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Usage of clinical prediction rules based on DVT signs and symptoms is the established basis in the diagnostic workup of DVT. To date, the accuracy of this instrument has not prospectively been compared between men and women. To compare prospectively clinical signs, symptoms and risk factors in men and women presenting with suspected DVT, as well as the extent of diagnosed DVT and the accuracy of the clinical prediction rule.

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Methods. A total of 203 consecutive referral patients with PE were included. The distribution of DVT was evaluated with compression ultrasound (CUS), and all patients were then followed for 12 months for investigation of recurrence of venous thromboembolism (VTE) and fatal events as adverse outcome.

Results. The mean age of the patients was 62.8 years, and 78 (38.4%) were male. DVT was found in 118 (58.1%) patients. Of these patients, 61 (30.0%) had proximal DVT Multivariate analysis demonstrated that active cancer, inadequate anticoagulation, leg symptoms, male gender, presence of DVT, presence of proximal DVT, and previous DVT were independent risk factors for adverse outcome. A clinical risk score ranging from 0 to 10 points was generated on the basis of multivariate regression coefficients. Receiver operating characteristic curve analysis showed that an appropriate cut-off point for discriminating between the presence and the absence of an adverse event was 4. Using this category, 166 (81.8%) patients were classified as low risk and 37 (18.2%) as high risk for adverse outcome. The adverse event rates were 6.0% for the low-risk group and 59.5% for the high-risk group.

Conclusion. This study has confirmed the clinical significance of surveillance CUS in patients with a first episode of PE. Furthermore, a simple risk score on the basis of available variables can identify patients at risk of an adverse outcome in patients with PE.

AP4.7-7
Blood flow increase via a novel method of electrical nerve stimulation in the lower leg is suitable for DVT prevention
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The aim of this study was to investigate the safety & efficacy of a novel method of neuromuscular stimulation of the lower leg for the augmentation of blood flow in the lower limb.

Methods. 50 healthy volunteers were positioned in an airline seat. Each subject had one leg connected to the stimulator and the other leg acted as control. 15 different electrical stimulation patterns were applied for 5 minutes each, followed by a 5-minute recovery phase to allow vascular re-equilibration prior to the next sequence. The following parameters were measured before, during, and after stimulation: Photoplethysmography (PPG), Strain Gauge Plethysmography (SPG), laser Doppler flux, transcutaneous oxygen tension (TCPO2), pulse oxymetry, skin temperature, superficial femoral vein blood flow velocity & vessel diameter and discomfort.

Results. Significant increases in blood volume flow and velocity, skin capillary blood flow & temperature and maintained skin oxygen levels support the efficacy of electrical nerve stimulation. Maintained oxygen saturation, stable heart rate & blood pressure and no change in vessel diameter throughout the study support the safety of the method. All stimulation patterns were tolerated well by the volunteers.

Conclusion. Electrical nerve stimulation of the lower leg - using a newly developed technique – significantly increases blood flow and is therefore a promising tool for the development of a DVT prevention device. As the method is virtually pain free this approach to DVT prevention has promising applications in the community setting as well as in hospitals.

AP4.7-6
Presence of lower limb deep vein thrombosis and prognosis in patients with symptomatic pulmonary embolism
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Aim. To investigate the presence of lower limb deep vein (DVT) thrombosis and prognosis in patients with symptomatic pulmonary embolism (PE).

Methods. Over a 3-year period we registered the presence and extent of varicosity in all patients presenting in our vascular ultrasound laboratory with clinically suspected DVT. We compared patients in whom DVT was confirmed by ultrasound with patients in whom DVT could be ruled out. Three hundred consecutive patients without leg symptoms served as a control group. Presence and extent of varicosity were examined clinically and by color-coded Doppler ultrasound in upright patient position using CEAP classification criteria.

Results. Of the 955 patients examined for suspected DVT, 192 had the diagnosis confirmed. CEAP C 2-6 was found in 36.5% of patients with leg symptoms suggestive of DVT and in 24.7% of control patients. The rate of C2-6 in patients with DVT was 36.7%, and in those in whom DVT could be ruled out it was 36.3%. In patients with advanced varicosity (C3 and higher) the probability of DVT was not higher than in patients with only little varicosity (C1+2). A. Johnston 2

Conclusion. Our study did not confirm any role of varicosity as a risk factor for DVT in patients with symptoms suggesting DVT neither the presence nor the extent of varicosity correlated to the probability that DVT could be confirmed. However, the incidence of varicosity was clearly higher in the patients with leg – symptoms than in the control group. More studies are needed to decide whether guidelines for DVT prophylaxis should be revised with respect to varicosity as a risk factor.

AP4.7-5
Deep venous thrombosis and varicosity
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Most recent scientific papers on and guidelines for the prevention of venous thromboembolism specify varicosity as an important risk factor for deep venous thrombosis (DVT). However, the pathophysiologic background for such a correlation seems questionable and published research on the issue is sparse. In a prospective trial we re-evaluated the significance of varicosity for the incidence of DVT.

Methods. Over a 3-year period we registered the presence and extent of varicosity in all patients presenting in our vascular ultrasound laboratory with clinically suspected DVT. We compared patients in whom DVT was confirmed by ultrasound with patients in whom DVT could be ruled out. Three hundred consecutive patients without leg symptoms served as a control-group. Presence and extent of varicosity were examined clinically and by color-coded Doppler ultrasound in upright patient position using CEAP classification criteria.

Results. Of the 955 patients examined for suspected DVT, 192 had the diagnosis confirmed. CEAP C 2-6 was found in 36.5% of patients with leg symptoms suggestive of DVT and in 24.7% of control patients. The rate of C2-6 in patients with DVT was 36.7%, and in those in whom DVT could be ruled out it was 36.3%. In patients with advanced varicosity (C3 and higher) the probability of DVT was not higher than in patients with only little varicosity (C1+2).

Conclusion. Our study did not confirm any role of varicosity as a risk factor for DVT in patients with symptoms suggesting DVT neither the presence nor the extent of varicosity correlated to the probability that DVT could be confirmed. However, the incidence of varicosity was clearly higher in the patients with leg – symptoms than in the control group. More studies are needed to decide whether guidelines for DVT prophylaxis should be revised with respect to varicosity as a risk factor.
AP4.7-8
Prospective determination of candidates for pharmaco-mechanical thrombolysis
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Aim. To determine the distribution, extent and chronicity of deep venous thrombosis (DVT) in patients presenting with acute signs and symptoms of venous thromboembolism and identify candidates for pharmaco-mechanical thrombolysis (PhMT).

Methods. This was a HIPAA compliant study that was approved by our institutional review board. Five hundred seventy-six consecutive patients (291 male, 295 female; mean age 58) referred for lower extremity DVT assessment between November 2007 and April 2008 were included in the study. Documented cases of DVT were categorized by age (acute, chronic and acute on chronic), anatomic location and extent. Patients with iliofemoral and femoropopliteal DVT were evaluated for thrombolysis using the quality improvement guidelines developed by the CIRSE and SIR Standards of Practice Committees.

Results. DVT was found in 19% of patients (112/576). Of these, 31 (27.7%, 31/112) had isolated calf DVT, 61 (54.5%, 61/112) had proximal vein thrombosis extending into the femoropopliteal venous segments, and 20 (17.9%, 20/112) patients presented with iliofemoral DVT. Using the CIRSE and SIR guidelines, twelve patients were identified as candidates for PhMT. This equates to an incidence of 2% (12/576) in the population studied. When considering only patients with acute proximal DVT, 26.1% (12/46) were candidates and 4 of 14 patients (28.6%) with acute iliofemoral DVT would be eligible.

Conclusion. When screening patients from a vascular lab who undergo imaging for evaluation for DVT, the incidence of potential candidates for thrombolysis is low. Using current recommendations, one out of four patients with acute proximal DVT are eligible for thrombolysis. These data should be considered when recruiting centers to participate in ongoing clinical trials assessing the efficacy of these techniques.

AP4.7-9
Safety and efficacy of low-molecular-weight heparin (Dalteparin) in pregnant women at increased risk of venous thromboembolism: a prospective stratified multicentre trial
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Aim. To determine the distribution, extent and chronicity of deep venous thrombosis (DVT) in pregnant women at higher risk of venous thromboembolism. Design, Setting and Participants: A prospective trial (Efficacy and of Thromboprophylaxis as an Intervention during Gravity [EThIG] study) of 810 pregnant women, assigned to one of three pre-defined prophylactic-mechanical thrombolysis, according to pre-defined risk factors related to prior venous thromboembolic history and thrombophilic profile. Interventions: Low-risk women (group I), received 50-100 IU dalteparin per kg body weight per day for 14 days postpartum, or earlier when additional risk factors occurred. Women at intermediate (group II) or high risk (group III) received dalteparin from enrolment until six weeks postpartum (50-100 IU and 100-200 IU per kg per day, respectively). Main Outcome Measures: Symptomatic venous thromboembolism, bleeding, thrombocytopenia, osteoporosis, and pregnancy outcome.

Results. Objectively confirmed, symptomatic venous thromboembolism occurred in 5 of 810 women (0.6%, 95% confidence interval [CI], 0.2 to 1.8%). Thrombosis occurred in 5 of 810 women (0.6%; 95% confidence interval [CI], 0.0 to 2.2%) was possibly heparin-related. There was no evidence of heparin-induced thrombocytopenia, one case of osteoporosis, and rates of miscarriage and stillbirth were similar to previous, retrospective studies.

Conclusion. Risk-stratified heparin prophylaxis was associated with a low incidence of symptomatic venous thromboembolism and few clinically important adverse events. Antepartum heparin prophylaxis is warranted in pregnant women with idiopathic thrombosis or underlying thrombophilia.

AP4.7-10
Superficial thrombophlebitis – Complications and treatment
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The thrombosis of the great saphenous vein (GSV) and its crossa is a frequent complication of neglected varicose disease reported to the surgical patients. The thrombosis may be located at the collateral varicose veins, at the trunk of the GSV or also at the trunk associated with the crossa of the GSV. The pulmonary embolia is possible in some situations: thrombosis extended to deep veins, after sclerotherapy or at operated cases. In the First Clinic of Surgery Timisoara, we followed 94 cases with GSV thrombosis in the period 01.01.2001-01.01.2008. We applied initially NSAİ and anticoagulant treatment with heparin and LMWH. In the cases with extended venous thrombosis we continued with surgical treatment as a delayed emergency and we performed saphenectomy by stripping and phlebectomies (+4 cases), crossectomy with femoral thrombectomy (30 cases – in 2 case bilateral crossectomy, femoral-iliaic thrombectomy (8 cases) and 2 non-operated. Postoperative we continued the anticoagulant treatment for 3 months with oral anticoagulant drugs at the patients with deep venous thrombosis respectively aspirin 100 mg/day, anti-inflammatory and phlebotonic treatment in cases with superficial thrombophlebitis. The postoperative recovery was good in 82 cases, the only important complication was a non-lethal pulmonary embolia, for which the patient was transferred to the cardiology unit. The postoperative follow-up exam (at 5 to 24 month, mean 14 month) showed good results, without relapse of disease, edema or any complaints from the patients. The 2 non-operated cases were patients with digestive malignancies and saphena magna thrombosis extended to femoral and iliac vein
with late presentation to surgeon. Surgical treatment of extensive GSV thrombosis is needed as a delayed emergency and consists in high ligature of the crossa and thrombectomy. Stripping or phlebectomy are electively indicated, depending on the patients condition. Pulmonary embolism is a possible complication after superficial thrombophlebitis operated.

**AP4.7-11**

**Diagnosis and treatment of deep venous thrombosis caused by pelvic tumor**

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Deep venous thrombosis (DVT) is a common seen disorder mostly caused by abnormal blood coagulation status which can be explained by Virchow's theory. Some patients apparently presented as the DVT symptoms and signs, but without the evidence of predisposition to thrombosis. Further examination revealed compression of the iliac vein by pelvic tumor.

**Aim.** To summarize the clinical characteristics and therapeutic approaches of DVT caused by compression of pelvic tumor.

**Methods.** The patients suffered from pelvic tumor induced DVT between January 1997 and April 2009 were enrolled for analysis. The predisposition factors, duration of presentation, pharmaceutical treatment, imaging diagnosis, diagnosis and treatment of pelvic tumor, management of deep vein were included for analysis.

**Results.** Thirty-six patients were diagnosed as DVT caused by compression of pelvic tumor. Among this cohort, there were 28 males and 8 females, the average age was 48.6±6.7 years, 22 cases involved the left limb, 14 cases involved the right limb. The occurrence of limb swelling was chronic and progressive with no telling of how long the patients were suffering from symptoms and signs, but without the evidence of predisposition to thrombosis. Further examination revealed compression of the iliac vein by pelvic tumor.

**Conclusion.** DVT can be a precursor of pelvic tumor, a thorough consideration of this possibility is important with chronic progressive limb swelling, further imaging examination to exclude the pelvic tumor compression is necessary in this kind of patients. Surgical resection of the pelvic tumor and conservative therapy of the involved limb may become the therapeutic principle.

**GE4.7 - Short free paper session III**

**GE4.7-1**

A case of combined therapy for the arteriovenous malformation in the thigh - surgery and interventional radiology

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A 30-year old man had had a history of painless swelling in his right (rt) popliteal region for 12 years. He sustained no trauma. In his rt upper popliteal region, pulsating tumor was detected and vascular bruit was audible. Laboratory examinations showed no abnormality, while CT and angiogram showed numerous vascular patterns in his rt knee, that diagnosed Arteriovenous Malformation (AVM). There were not rt leg overgrowth, functional disorder, congestive failure and no sign of arterial obstruction. CT and angiogram findings were as follows: 1. 60 X 45mm sized aneurysmal formation was diagnosed, connecting to popliteal artery by one short stalk. 2. Subsequent numerous nidi surrounding aneurysmal substance were diagnosed, those feeder vessels were descending genicular artery, superior / inferior lateral genicular arteries and some fistulae from the aneurysm. Interventional radiology and operative procedures were as follows: At first, we performed TAE for the descending genicular artery at the time of diagnostic angiography. Two weeks later, we performed surgical procedure. Ligation of the connecting fistula between popliteal artery and aneurysm. And then aneurysm was opened. Thrombus was removed and Intraluminal closure of fistulae, connecting to surrounding nidi were done. Next three weeks after, we performed TAE for superior and inferior lateral genicular artery. Agents for the embolization were N-butylcyanoacrylate (NBCA) and metallic coils. One month later, CT for treatment evaluation showed that abnormal venous fillings were decreased to about 20% of pretreatment. One, three years follow-up CT showed no recurrence and no regrowth of abnormal vascular patterns.

**AP4.7-12**

**Five modalities for mini-thrombectomy of epifascial veins**

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Foam sclerotherapy is efficient in the treatment of diseased epifascial veins, but painful phlebitic reactions may occur in spite of compression bandages.

**Methods.** 200 consecutive cases with symptomatic postcuresant phlebitis were randomized to treatment with one of five Methods. Thrombus expression (TE) using puncture with a cannula (C) of 1.5 mm diameter, 2) incision with a straight scalpel blade (S), puncture with a venula (V) of 2.2 mm diameter, and by use of a minithrombectomy device (MTD) prototype. Small local anaesthesia was used in all procedures. Follow-up examinations were performed after 1, 2 and 8 weeks. Parameters were the intensity of pain before, during and after TE.

**Results.** Pain relief was induced by all techniques. TE using simple expression was well feasible in smaller superficial veins. Scalpel incisions go along with small scars but will yield thrombotic material much easier and with less compression pain. If generation and aspiration techniques are combined (C, V) the procedure will be better tolerable for the patient. In cases cor-related to very sensitive patients or very painful situs, the MTE is very helpful as thrombotic material can be extracted without any external pressure.

**Conclusion.** TE using punctures or incision is efficient to achieve pain relief. As a side effect, vein regression and thus a good cosmetic result seems to correlate to TE success. Aspiration techniques are tolerated much better than simple expression.
Endovenous thermal ablation with 1320nm of an arm venous malformation

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Venous malformations have traditionally been treated surgically and with sclerotherapy. New endothermal ablation techniques are possible using microcatheters and prior venodilation.

Aim. To treat a congenital arm VM with endovenous laser ablation, EVLA.

Methods. A 48 year old woman had a symptomatic congenital VM on her ventral left forearm. Surgery and polystyrene embolisation 16 years prior was ineffective. Duplex US demonstrated a central 1.4mm diameter superficial anterior ulnar vein (SAUV), and excluded proximal great saphenous vein (GSV) and small saphenous vein (SSV), and infragenicular varicosities.

Results. Pain resolved and fatigue markedly improved at 20 months.

Conclusion. Appropriately-chosen patients with Klippel-Trenaunay Syndrome can be successfully treated with minimally invasive techniques.
was in 80% and from 2 to 1 degree – in 20%. The relapse of venous trophic ulcers and bleeding from varicose vein for period examination didn’t appear. 3 patients were performed surgical treatment due to pain syndrome and phlebitis in the zone of sclerotherapy.

Conclusion. The surgical treatment has been shown as the first step of treatment for removal horizontal and vertical reflux of superficial venous system in lower extremities. Choosing the method of sclerotherapy requires additional examination in system of hemostasis and individual approach to everybody. The treatment of patients suffering from dysplastical superficial veins requires stage by stage, complex approach, permanent examination in dynamics.

GE4.7-7
The C.E.A.P.-L classification for lymphedemas of the limbs. Our experience
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Lymphedema is a chronically debilitating disease and requires targeted intervention, an early diagnosis and long term follow-up. Although The International Society of Lymphology (ISL) Consensus Document for the evaluation and management of peripheral lymphedema has been repeatedly revised and integrated, there is clearly a need to formulate a more detailed and inclusive classification for lymphedemas of the limbs. The lack of communication between physicians, mostly due to the absence of universally accepted parameters and different interpretation of diagnostic tests, adversely affects epidemiological studies. We currently lack a classification method which considers all aspects of lymphedema and is elastic enough to be used to describe each evolutionary phase of the illness. The aim of our study was to gather and analyse all information deriving from the physical examination and the instrumental tests of the affected limb in order to build an accurate, easy and practical classification for lymphedema and therefore standardize classification. We structured our classification on the basis of the C.E.A.P classification for venous insufficiency. We therefore identified four key-questions to answer in order to obtain the best description for each patient. These were: the clinical appearance of the limb, the etiology of the lymphedema, the anatomical distribution and the pathophysiological mechanism responsible for the disease. Each question was answered with the information obtained from the physical examination and the instrumental tests and each answer constitutes a separate section. It is this flexibility that makes the C.E.A.P. – L classification dynamic. Moreover for the first time we introduced 2 aspects to the classification: the level of disability and the gravity score. We believe that this classification will help the formation of standardized, intercommunicating database registers and improve the epidemiological studies on the incidence and prevalence of lymphedema both regionally and worldwide.

GE4.7-8
Relationship between interface pressure and operative volume reduction in patients with lymphedema of the extremities
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Compression therapy by bandaging with non-elastic short stretch bandages plays a major role in the multidisciplinary treatment of chronic lymphedema. In irreversible, end stage non-pitting lymphedema a new operative technique circumferential suction assisted lpectomy (CSAL) is available in which compression is also mandatory. Aim. To elucidate the interface pressure and volume following CSAL of the arm and leg.

Methods. This study included 8 patients: 6 patients with leg lymphedema and 2 patients with lymphedema of the arm. Pressures were recorded at predetermined positions for a period of two weeks postoperatively with a six-hour interval. Leg pressures were recorded at four locations and arm pressures at three locations. The interface pressure was measured using pressure sensors (Picopress, MicroLab Elettronica Sas, Italy). Arm volume was measured with an Inverse Water Volumetry and leg volume by opto-electric volumetry (Perometer 400T, Pero-System MessgerStte GmbH, Wuppertal, Germany).

Results. Short stretch bandages (Rosidal, K. Lohmann & Rauscher, Germany) were applied postoperatively with a pressure gradient between 57 and 14 mmHg on the legs and with between 41 and 27 mmHg on the arm. Pressure loss was significant within 6 hours after bandage application. Median pressure loss after 24 hours was 25% for the arm and 27% to 32% after 48 hours for the leg. A total reduction in arm volume of 54% was achieved by surgery after two weeks. An additional reduction of 27% was achieved by means of postoperative bandaging of the arm. In the leg the reduction was 55% with an additional reduction of 7% during postoperative compression therapy.

Conclusion. Postoperative pressure profiles indicate a rapid decrease in pressure due to postoperative swelling reduction within 6 hours after bandage application. Our results suggest that objective pressure measurement and frequent bandage renewal could contribute to optimise perioperative compression therapy in CSAL.

GE4.7-9
Lymphangiogenesis in the rabbit ear using stem cells from peripheral blood under stimulation by G-CSF (Filgrastim)
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The author works as a researcher at the Institute for Experimental Surgery of the School Hospital Eva Perón, National University at Rosario, Argentina. Living in a third world country, without public or private funding for research, and after developed with other investigators several angiogenic protocols, decided to develop autologous material derived from the patient, prior stimulated with G-CSF to demonstrate lymphangiogenesis.

Methods. We will employ 20 New Zealand rabbits, in which we will develop surgical lymphedema. After that, will obtain hematopoietic progenitor stem cells from manual extraction of withe stem cells from peripheral blood prior stimulated with G-CSF (Filgrastim).

Results. Forty weeks after the induction of lymphedema, group A of animals will receive a single dose of the buffy coat volume, while animals of group B will receive whole blood. Lymphoscintigraphy and immunohistochemistry will performed as clinical control of the effectiveness of the protocol. This project could not be developed because of the absence of funds. I am sorry.

GE4.7-10
Efficacy of sound waves in the upper limb lymphedema treatment
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Sound waves (SW) has been said to be useful in lymphedema treatment diminishing volume and other symptoms, but there is slight scientific information about it.

Aim: To evaluate the efficacy of sound waves treatment in upper limb chronic lymphedema. To compare SW with manual lymphatic drainage (MLD).

August 2009
Methods. Women with chronic breast cancer related lymphedema were recruited in an outpatient hospital rehabilitation setting. They were randomly assigned to 10 daily sessions of MLD and then 10 daily sessions of sound waves (SW) treatment or first the SW sessions and then the MLD sessions. There was at least a month of clearance time between MLD and SW treatments. Investigators and outcome assessor’s physicians were blinded for assigned treatment. Every patient was explored just before the first and just after the 10th session of every treatment. Upper limb volume was registered, and visual analogic scales (VAS) for pain, heaviness and tightness were done. Differences in volume and VAS were obtained. Wilcoxon paired test, Spearman correlation and Man-Whitney tests were done at a significance level of p<0.05

Results. 14 patients were recruited: 8 did first MLD, and 6 did first SW. The upper limb volume reduction measured at the end of SW was an average of 105.64 cc (p=0.007) while the volume change at the end of MLD was not significant. By the SW pain VAS reduced an average of 10.5 mm (p=0.017), heaviness VAS reduced an average of 15.5 mm (p=0.005) and tightness VAS change was not significant. By MLD treatment only tightness VAS reduced an average of 19.5 mm (p=0.006). There was no order treatment application influence in the results.

Conclusion. The SW treatment was effective in reducing volume, pain and heaviness in women with related breast cancer lymphedema. It was more effective than MLD in the same outcomes.

GE4.7-11
Treatement of cystic retroperitoneal lymphangioma
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Cystic lymphangiomas are uncommon, congenital benign tumors. They can occur at any age in different localisations. They develop due to the failure of developing lymphatic tissue to establish normal communication with the remainder of the lymphatic system. We want to present case of 38 old female patient suffering of abdominal pain of 6 months duration. CT revealed 13x9 5x4 cm large cystic tumor with density 10-12 HU. This tumor was thin-walled multiseptate mass localised in central abdomen in front of inferior vena cava and abdominal aorta, behind pancreas. Diagnostic US guided fluid aspiration proved milky fluid in the tumor. Patient was indicated for operation. Resection procedure was impossible due to the size and localisation of the mass. Cystic mass was identified after cholecystectomy behind duodenum and pancreas firmly attached to all surrounding tissues. About 300ml of milky fluid was evacuated after incision of the cystic mass. Roux-en-Y cystojejunostomy was used to decrease size of the lesion by creation of internal fistula to the small bowel thus evading the risk of external lymphatic fistula. Histopathology of the wall of the mass proved cystic lymphangioma. Symptoms of abdominal pain gradually subsided and CT done 3 months after operation proved that cystic mass almost completely disappeared.

Conclusion. Roux-en-Y cystojejunostomy seems to be effective treatment of such benign tumor.

GE4.7-12
Targets and a robust delivery model are required to stop hospitalized patients being put at risk from venous thromboembolism
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Aim. The efficacy and cost-effectiveness of thromboprophylaxis for hospitalized patients is continually demonstrated. Despite this healthcare professionals worldwide fail to deliver optimal thrombo prophylaxis and compromise their patients’ safety. Our aim was to devise an evidence based prophylaxis delivery model that could be utilised by any healthcare organisation.

Methods. Guidelines published by Department of Health (DoH) and National Institute of Clinical Excellence (NICE) were used as a basis to identify current recommendations and practices in the UK, as well as studies on quality improvement strategies for VTE prevention. Additional studies were identified with Medline and Pubmed searches using a comprehensive list of search terms. Consequently, we devised a comprehensive thromboprophylaxis delivery model supported by a review of the current literature on VTE prevention and quality implementation strategies.

Results. Central to our model is patient risk stratification that should be performed using a standardised risk stratification tool. Once this process has taken place checks are made by the patient and multiple healthcare professionals (Doctors, Nurses, Pharmacists) to ensure the appropriate prophylaxis is prescribed and then delivered. This is supported by reminder tools, multifaceted educational strategies (for Doctors, Nurses, Pharmacists, Patients), expert advice, National guidelines and regular audit coordinated by a designated individual. This is then overseen by a Thrombosis and Anticoagulation Committee who have to meet National targets.

Conclusion. Healthcare Organisations need a new strategy to ensure that all hospitalised patients receive the appropriate thromboprophylaxis and benefit from the high quality evidence that exists. We believe that we have identified the essential evidence based components of the process and used these to create our model. The UK now has a standardised risk assessment tool. In order for this to be used appropriately and effectively there needs to be a robust process driven by the requirement to meet national targets.

GE4.7-13
Superificial thrombophebitis: a case report with a life threatening complication
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Aim. A 32 year old white male with previous history if superficial thrombophebitis was referred by his primary care physician for evaluation and treatment for potential recurrence. Complaining of one week of pain and inflammation of an anterior thigh tributary, and symptoms of non productive cough and mild dyspnea, this gentleman demonstrated palpable superficial cords above and below the knee with inflammation and tenderness to palpation. There were no other physical findings, and his vital signs were normal. Whole-leg venous mapping revealed an extensive superficial phlebitis involving the GSV and the AAGSV from the saphenofemoral junction to the anterior arch and posterior arch veins. (Figure 1) The deep venous system was normal. Due to extensive superficial phlebitis, and symptoms of dyspnea, therapy was instituted using thigh high compression stockings, LMWH, thrombophila workup was initiated, and pulmonary CT scan was performed to rule out pulmonary embolism.

Results. Spiral CT scan with PE protocol revealed multiple acute pulmonary emboli. A comprehensive thrombophilia workup revealed a fasting hyperhomocysteinemia level. Sequential evaluations have revealed continued symptom control and lack of further complications on warfarin.

Conclusion. Superficial thrombophebitis harbors dangerous sequelae and patients must be educated on this potential complication. Multiple bouts of superficial phlebitis suggest the presence of thrombophilia and warrant a full thrombophilia workup. Hyperhomocysteinemia is a common acquired and inherited clotting disorder. Recent research has suggested that lower homocysteine level may not offer sufficient protection from recurrent thromboembolism.
Polycthemia rubra vera (PRV) – Venous thrombosis risk factors

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PRV is expansion consequence of one or all hematopoetic elements, most frequently erythrocytes. This is middle age disease, frequently at males. Diagnostic criteria are based on A and B group criteria, determined by Polycythemia Vera Study Group. PRV is characterized with increased blood volume of blood, increased hematocrit and hemoglobin. It’s correlated with range of diseases (lung, hart, etc.) and conditions (dehydratation, stress, burns, shock, etc.). PRV is secondary hyper-coagulation with slowed circulation. One of frequent PRV complications is venous thrombosis and thromboembolism. Our study is analysing 2 patients with primary PRV, 1 with secondary PRV and recidivant vein thrombosis. Diagnosis is based on laboratory findings by PRV criteria, myelogram, ultrasound abdominal examination and veins ehosonography. Female patient, 63, PRV with confirmed A1 and 3 B criteria, treated by phlebotomy (250-300 ml), showing migrant venous thrombosis of right leg VSM. The patient was treated for 2 weeks with low molecular heparin (Fraxaparin), after which superficial venous thrombosis returned. Introduction of anticoagulant therapy (Tbl Sintrom and Bisulfan), thrombosis was cured. Male, 69, PRV (all A and 1 B criteria) with recidivate venous thrombosis and cardio respiratory insufficiency. After thrombosis of V. femorals comm. the patient developed pulmonal thromboembolism. PRV was treated with phlebotomy and Tbl. Litalir. The patient is on permanent anticoagulant therapy. Male, 31, treated for pulmonal tuberculosis for years, has developed deep veins thrombisis (V. poplitea, V. saphena, V. tibialis post., V. femoris spc., left leg). Anticoagulant therapy for 2 years has been prescribed. Laboratory findings show erytrocitosis, increased hemoglobin and hematocrit. PRV is secondary thrombofilia. Other patients (n=71, 25,9%) had massive DVT involving iliac veins and ven aca inferior. The type of treatment for DVT in nonspecialized and specialized surgical facilities was analyzed. Surgical tactics regarding DVT differed significantly. About 28,2% of patients of an-giosurgical hospitals underwent surgical intervention for VTE prevention. The DVT incidence among adult population was revealed to be 0,4/1000. In 29 cases (6,3%) venous thromboembolism (VTE) was recorded, two (0,4%) of which were fatal pulmonary embollism. At clinical and ultrasonic verification the fact of venous thromboembolism was found only in cases of pathological process above the crack of knee joint. Deviations in the system of clinical practice for DVT treatment in nonspecialized hospitals were revealed. This requires the introduction of modern treatment protocols for this category of patients.

Deep venous thrombosis: an overview of hospital treatment

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In 2007 461 patients with deep venous thrombosis (DVT) in Ekaterinburg’s hospitals were analysed. All patients were divided into two groups: 177 patients (mean age - 54,3 ± 19,2 years) of the first group were treated in general surgery hospitals and 284 patients (mean age - 55,3 ± 15,5 years) of the second group were hospitalized in vascular surgery departments. Two-thirds (n=118 or 66,7%) of Group 1 and almost a half of Group 2 (n=128, 45,2%) were hospitalized during the first 7 days of DVT onset. The rest patients received medical aid more than 1 week after DVT onset. In 156 cases (29,5%) no risks DVT factors were found. The level of DVT involvement after ultrasound examination: one third (n=70, 25,5%) of the patients of Group 2 had DVT to the level of popliteal vein, in half of the cases (n=135, 48,6%) - to the level of common femoral vein. Other patients (n=25, 8%) had massive DVT involving iliac veins and vena cava inferior. The type of treatment for DVT in nonspecialized and specialized surgical facilities was analyzed. Surgical tactics regarding DVT differed significantly. About 28,2% of patients of angi-surgical hospitals underwent surgical intervention for VTE prevention. The DVT incidence among adult population was revealed to be 0,4/1000. In 29 cases (6,3%) venous thromboembolism (VTE) was found only in cases of pathological process above the crack of knee joint. Deviations in the system of clinical practice for DVT treatment in nonspecialized hospitals were revealed. This requires the introduction of modern treatment protocols for this category of patients.

Risk of DVT in wheelchair-bound or bedridden patients with multiple sclerosis: a prospective study

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Multiple Sclerosis (MS) is characterized by progressive deterioration in mobility leading to limb paralysis. Venous and lymphatic stasis constitutes risk condition for venous thromboembolism (VTE). There is, however, no data on frequency of VTE complicating the evolution of MS. Aim of this study was to assess the frequency of deep veins thrombosis (DVT) in patients with late-stage MS coming to a Neurology Centre for rehabilitation. Methods. 132 patients were enrolled, 87 women and 45 men, mean age 50± 11 years. The onset of disease had occurred on average 18,7 years before, the bedridden hours were 9.5 a day and the wheelchair-bound hours were 14,3. Only 25 patients reported a residual ability to walk autonomously or with help. 113 patients presented lower limb oedema, bilateral in 41 cases. At admission all patients underwent an extendedCUS examination. Their plasma D-dimer levels were also assessed. No antithrombotic prophylaxis was given.

Results. The presence of DVT was found in 32 patients (24%). 18 of them had history of previous VTE. 20 (62%) DVT patients presented chronic lower limb oedema, in 14 cases it was bilateral. In patients with confirmed DVT, D-Dimer levels were significantly (p=0.001, Mann-Whitney Test) higher in comparison with patients with no DVT (594±657 vs. 254±140). D-Dimer was elevated (700±684) in 22 individual cases (68%). Of the remaining 100 patients without DVT, 74 had normal D-dimer values (193,37±67,28) and 26 high values (387,61±318,42).

Conclusion. The frequency of DVT in late-stage MS may be over 20%. The long history of the disease does not allow the onset of each episode to be certainly dated. A number of positive patients at CUS examination had negative D-dimer values suggesting a remote VTE event. However the amount of DVT risk we noticed, should lead one to consider taking long-term preventive measures systematically.

Management of spontaneous SFJ/SPJ acute thrombosis - a vasculab survey

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Aim. The acute superficial venous thrombosis (SVT) has been considered a common and benign disease. However, ascending thrombosis extending to Sapheno-femoral junction or Sapheno-popliteal junction can become a very dangerous condition due to the possibility of thrombosis propagation to deep venous network and pulmonary
embolism (PE). There is a lack of consensus regarding the treatment of SVT in SFJ and SPJ. Searching for an answer in literature we could not find a consensus word. This data tries to fill this gap, analysing the specialists preferences among the different kinds of treatments currently available.

Methods. Specialists all over the world have answered a web survey regarding SVT management (Surgery, anticoagulation, compression therapy, laboratory analysis and others). The answers were considered in graphic analysis and then were studied.

Results. 51 Specialists have answered to almost all questions. Depending on the extension of the thrombus, the percentage of proposals for immediate surgery decreased from 44% in case of indwelling thromb, to 2% in case of thromb in side branches. The choice for therapeutic anticoagulation varying from 82% in the first case (indwelling) to 8% in the last one (thromb in the side branches). prophilatic anticoagulation increased from 15% (indwelling cases) to 52% in case of distal ones. No anticoagulation was proposed by 4% (indwelling cases) to 44% (side branches cases).

Most of the participants proposed compression for 3 weeks to 3 months.

Conclusion. We reported here all kinds of current treatments available in order to supply a better understanding on this issue. More well conducted studies are needed to best take the right conclusions. We also believe that the main message of this work is that we are actually very far from a consensus word on this field.

GE4.7-18

Four-dimensional computed tomography perfusion imaging for DVT/pate application

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Aim. To assess the viability of four-dimensional (4D) computed tomography (CT) in describing the change of perfusion defects within the lung parenchyma with anticoagulant therapy in patients after an episode of acute deep vein thrombosis (DVT) and/or pulmonary artery thromboembolism (PATE).

Materials. 23 patients after DVT/PATE aged 34-85 were received anticoagulant therapy: 4D CT perfusion imaging by intravenous application of contrast medium compared with routine clinical setting. Other important diagnostic tests such as ultrasonography of the lower limbs, plasma D-dimer, chest radiograph, echocardiography were conducted at hospitalization and follow-up. These patients were followed up for 3-6 months. The Wells Score was established the presence of absence of PATE.

Results. Among 14 (60.9%) patients with PATE, 14.2% had PATE limited to subsegmental branches of the pulmonary artery. A total of 29 perfusion defects were clearly assessable downstream of occluded subsegmental branches by 4D CT scans, showing lower or missing enhancement compared with normally perfused lung parenchyma.

Seven of these findings were reclassified as definitely being caused by occlusion for DVT/pate application.

Conclusion. Four-dimensional CT assesses lung perfusion with acceptable precision. This instructional evaluation can become a better approach to quickly diagnose and treat DVT/PATE.

AP5.1 - Talk to the experts:
Foam sclerotherapy and phlebectomy - What are the best strategies?

A. CAVEZZI

Abstract not available

GE5.1 - Talk to the experts:
US guided foam sclerotherapy: references and practical applications

E. RABE

Abstract not available

BO5.1 - Talk to the experts:
Iliofemoral obstruction - How to treat the disease?

P. Neglen, S. Raja
River Oaks Hospital, Flowood, MS, USA

IVUS-guided percutaneous stenting is the “method of choice,” attention to detail is important. Arterial techniques are not necessarily transferable to the venous side. Perform in a fully equipped endovascular/angiographic suite. Intravascular ultrasound (IVUS) is mandatory to achieve optimal outcome. Stenting is mandatory of venous obstruction. If not stented, the venous stenosis will recur early. Ultrasound guidance of venous access has largely eliminated access complications. Access femoral vein below the suspected obstruction. Popliteal veins access is rarely used and not possible when postthrombotic segmental occlusion of the distal femoral vein is present. When treating stenosis closed to the confluence of the common iliac veins, especially when using Wallstents, the stent has to be placed well into the IVC. If not, the stent seems to frequently be “squeezed” distally due to external compression, and a proximal restenosis may develop. The “kissing” balloon technique at the confluence of the common iliac veins or insertion of bilateral stents is not necessary, unless bilateral occlusion is present and simultaneous “double-barrel” stenting is performed. A large stent (14-18mm diameter) is recommended. IVUS-guided percutaneous stenting is the “method of choice,” attention to detail is important. Arterial techniques are not necessarily transferable to the venous side.

BO5.1

Iliofemoral obstruction - how to treat the disease

P. Neglen, S. Raja
River Oaks Hospital, Flowood, MS, USA

IVUS-guided percutaneous stenting is the “method of choice,” attention to detail is important. Arterial techniques are not necessarily transferable to the venous side. Perform in a fully equipped endovascular/angiographic suite. Intravascular ultrasound (IVUS) is mandatory to achieve optimal outcome. Stenting is mandatory of venous obstruction. If not stented, the venous stenosis will recur early. Ultrasound guidance of venous access has largely eliminated access complications. Access femoral vein below the suspected obstruction. Popliteal veins access is rarely used and not possible when postthrombotic segmental occlusion of the distal femoral vein is present. When treating stenosis closed to the confluence of the common iliac veins, especially when using Wallstents, the stent has to be placed well into the IVC. If not, the stent seems to frequently be “squeezed” distally due to external compression, and a proximal restenosis may develop. The “kissing” balloon technique at the confluence of the common iliac veins or insertion of bilateral stents is not necessary, unless bilateral occlusion is present and simultaneous "double-barrel" stenting is performed. A large stent (14-18mm diameter) is recommended. IVUS-guided percutaneous stenting is the “method of choice,” attention to detail is important. Arterial techniques are not necessarily transferable to the venous side.
PP5.2 - Deep venous insufficiency

PP5.2-1

Three year follow-up of patients with DVT monitored in the TULIPA registry
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Studies performed in selected patients revealed an incidence of the post-thrombotic syndrome after a first episode of DVT of around 50%. Compression treatment for two years can lower it by 25%. Outcome data of treatment under real world conditions are lacking.

Aim. To assess the outcome of outpatient treatment of DVT three years after diagnosis. Patients were entered in the TULIPA registry which was established to monitor the practice of DVT management offered by vascular centres in Germany.

Methods. 4,976 consecutive patients were examined for suspected DVT and entered into TULIPA, the nationwide registry supported by 326 centres of vascular medicine. DVT was diagnosed in 1,588 (28%) patients. Details of thrombosis and initial management were recorded. After three years, a follow-up examination was performed in a representative subset of that cohort. Information was gathered on the modality of oral anticoagulation, including duration of anticoagulation and leg compression. Clinical outcome was assessed using the Prandoni score. Venous morphology and function was examined with colour-coded duplex ultrasound. The analysis of this survey is currently in progress. The results will be presented at the UIP congress.

PP5.2-2

The time sequence of the development of axial deep reflux following lower limb DVT – A prospective study over 5 years
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Aim. To describe the sequence of events in the deep venous system that lead to the development of deep venous reflux following DVT.

Methods. 122 limbs in 114 patients following DVT were sequentially monitored with duplex ultrasound, air plethysmography and clinical assessment as well as clinical severity scoring. Limbs were grouped according to site and extent of the initial thrombus to determine which was more likely to develop axial reflux to the knee or below. Particular attention was given to the sequence of thrombus resolution, the development of segmental reflux and subsequent axial reflux.

Results. There was an inverse relationship between clot resolution and development of deep reflux by ultrasound assessment and venous reflux index (VFI). The rate of DVT resolution was similar in all sites. Segmental reflux was common as recanalisation occurred, but when DVT was confined to calf, popliteal or femoral vein segments this did not go on to axial reflux. However in ilio femoral thrombosis segmental reflux incrementally increased in length to finally change to full axial deep reflux. At 5 years this was still increasing and had occurred in 45% but a further 28% of this group still had extensive segmental reflux with the potential to go on to axial deep reflux. VFI and clinical severity was worse in the group developing axial deep reflux. A VFI of >2,5 ml/sec at 6 months was the best predictor of a poor outcome.

Conclusion. Most clot resolution and development of reflux occurs within the first year of a DVT but continues beyond this. In those with isolated segment of thrombosis this is functionally unimportant but with iliofemoral thrombosis this may continue to worsen with the extension of segmental reflux to develop axial deep reflux and worse clinical outcomes even after 5 years.

PP5.2-3

Iliac vein stenting – Indications and long term results
S. Raju
Abstract not available

PP5.2-4

Long-term results of stenting for femoro-iliac veins obstructive lesions
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Stenting was recognized as the method of choice for treatment of femoro-iliac veins obstructive disease on the basis of mid-term results. The goal of study is to present long-term results.

Methods. From January 1996 to December 2008, 104 limbs in 98 consecutive patients (79 women, mean age 44 years) had stenting for femoro-iliac veins obstructive disease in our department. They were classified CEAP C2 in 15 limbs, C3 in 69, C4 in 8, C5 in 2 and C6 in 10. All patients were symptomatic and disabled (median VFS and VCSS of 2 and 9). 28 had pelvic congestive syndrome and 61 venous claudication. Etiology was primary in 57 cases, secondary in (35 postDVT and 5 retroperitoneal fibrosis) and congenital in 1 case. Lesions were bilateral in 7 cases; the IVC and the common femoral vein were respectively involved in 8 and 21 cases. Moreover 39 limbs had at least one occluded venous segment. The endovascular procedure was performed in the operating room through percutaneous access. Recanalization was performed when needed then self-expanding stent (s) was (were) deployed.

Results. In one patient recanalization failed and the left ascending lumbar vein was stented. No perioperative death occurred but 2 patients had early thrombosis (one had venous thrombectomy). During a median 46 months follow-up (3-157), 7 restenosis had iterative endovascular procedure and 4 late thrombosis were diagnosed (2 had venous thrombectomy and one Palma procedure). Primary, assisted primary and secondary patency rates were respectively 91.6%, 95.9% and 96.8% at 1 year and 84.3%, 93.3% and 97.5% at 10 years. Median VDS at the end of the follow-up was 1. All C6 limbs but one had healed.

Conclusion. Late results confirm that stenting is not only a safe and effective technique but also a durable way to treat femoro-iliac veins obstructive disease.

PP5.2-5

Prevention of post-thrombotic syndrome by compression therapy-evidence from comparative studies
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Compression therapy for the prevention and the management of the post-thrombotic syndrome (PTS) is still underused and underestimated.

Aim. To review available data from the literature concerning the use of compression in the acute stage of deep vein thrombosis and in the following years as an important part of treatment.

Methods. A review concentrating on published randomized controlled trials and meta-analyses is given on definition, incidence, risk factors and methods for prevention and therapy of the PTS.

Results. Compression stockings worn for two years after deep vein thrombosis (DVT) are able to reduce the incidence of a PTS to about one half. A deciding practical recommendation is to start anti-stasis measures (compression and walking exercises) as early as possible, in mobile DVT patients already in the acute phase. Exact anticoagulation is able to reduce recurrent DVT but can not replace compression. On the other hand compression can not prevent recurrent DVT. In patients with manifest signs and symptoms of PTS compression is the...
Impact of iliofemoral thrombosis on the development of postthrombotic syndrome

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Aim. Determine the impact of iliofemoral thrombosis on the development of chronic venous disease (CVD).

Methods. This prospective study included patients with proximal acute DVT. Patients were separated into those having thrombosis above the inguinal ligament (Group A) and to those below (Group B). Group A was separated in limbs with isolated suprapingual DVT (A1) and those with supra and infrapingual involvement (A2). Patients received anticoagulation and had >2 years follow-up. Patients with previous DVT or CVD, thrombolysis, life expectancy <2 years or interruption of anticoagulation were excluded. Clinical severity was graded using the CEAP classification.

Results. Over a 3-year period 6412 limbs were evaluated of which 20% had DVT. There were 864 limbs (15.5%) with a first episode of acute DVT, 196 (3%) with chronic and 277 (5.5%) with acute-on-chronic. 563 limbs were excluded leaving 301 limbs available with a mean follow-up of 3.8 years (range, 2-8). Limbs that remained normal or had minimal disease (C0, C1) decreased from year 2 to year 5 (p=0.0007; RR 11.6, 95% CI 8.5-15.9). Similarly, limbs with progression to skin changes (C4-C6) increased from year 2 to year 5 (4/301 vs. 24/194; p=0.002). There was no difference in the incidence of skin changes between Groups A1 vs. A2 and A1 vs. B. However, there was a higher incidence of skin changes in limbs with iliofemoral DVT (A2) compared to limbs with femoropopliteal DVT (A1) and to those below (Group B). This difference was not present at year 2 (p=0.24), but was at year 5 (p=0.002) and years 6-8 (p=0.033).

Conclusion. Significant deterioration is observed in postthrombotic limbs as shown by the decline of normal limbs at long term. The thrombotic burden has a marked impact on the development of postthrombotic syndrome. Isolated iliac thrombosis has good prognosis, whereas iliofemoral thrombosis has a significant role on progression to skin damage.

Neovalve in post-thrombotic syndrome: long term results

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It is widely recognized that severe chronic venous insufficiency produces a deficit in quality of life. Symptoms and trophic lesions significantly reduce the quality of life of patients affected. The most severe clinical forms are those related to deep venous system pathologies, predominantly caused by post-thrombotic syndrome. When conservative therapy is not able to control symptoms, it may be necessary to restore axial flow or to neutralize reflux. In the cases of valve insufficiency, the correction of reflux consists principally in reconstructing the valve, when still present, or creating an antireflux mechanism when valves are completely destroyed. Neovalve construction is a possible technique, which was first applied in December 2000. From December 2000 to December 2008, 51 consecutive neovalve construction operations were performed in patients affected by severe chronic venous insufficiency (C 5-6, S E S-C A 5,D,P P R,R,O). At December 2008 the mean follow-up period was 42 months (range 1-90). The efficacy of this technique has been evaluated in the short to medium term. The analysis of these results led to a surgical variation intended to prevent the flap collapse and to enhance the neovalve continence rate. The cumulative neovalve competence rate was 86%; valve failure was detected in 6 out of 19 regarding the first series and 1 case out of 32 in the second series, after the technical enhancement. The cumulative patency rate was 92.2%. Cumulative ulcer healing was 91% and recurrence rate 5.8%. Class C5 patients presented a significant improvement in disability score. Minor complications occurred in 9 cases (17.5%). Mortality rate was 0 and no pulmonary embolism was detected. Long term results are promising.

The future of artificial venous valves

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WHAT HAVE WE LEARNED? From surgically implanted venous valve studies, we have learned that foreign tissue does not perform well unless the recipient can rapidly come to recognize the valve as self. Clinically, only those replacement valves made of autologous vein or vein wall have demonstrated any longevity with only minor exceptions. Percutaneously implanted venous valve substitutes have been investigated experimentally and clinically. To date, none has been successful in the long term but the experiences have demonstrated that the stent component is generally well tolerated with some minor concerns. The material used to make the valve is the challenge due to early thrombosis or delayed fibrosis. Eventually, a return to autologous vein appears to be the solution to this dilemma. What is in the future? A percutaneous approach will likely win over an open approach, all things being equal. Self expanding metal designs with minimal bulk and minimal metal exposed to blood flow have and may perform well. Other possibilities include bioabsorbable organic biopolymers or corrodible metals still to be studied in the venous system. There is some research to suggest that we can manufacture, to some degree, an autologous valve by modifying decellularized allograft valves. Maybe we can make an autologous valve from scratch. Certainly we have the tools to make a vascular tube of smooth muscle cells lined with endothelium. It is conceivable that these vascular tubes could be reshaped into a valve much has been done with native veins. Designer xenografts developed in disease free and immunologically conditioned animals could be a source of artificial valves. The challenges are many here but could be cultivated on a more limited scale. The artificial venous valve delivered by a percutaneous approach remains in it’s infancy with so many exciting options still unexplored.

Embyology of the venous network

O. Maleti
Hesperia Hospital - Chirurgia Vascolare, Modena, Italy

It is widely recognized that severe chronic venous insufficiency produces a deficit in quality of life. Symptoms and trophic lesions significantly reduce the quality of life of patients affected. The most severe clinical forms are those related to deep venous system pathologies, predominantly caused by post-thrombotic syndrome. When conservative therapy is not able to control symptoms, it may be necessary to restore axial flow or to neutralize reflux. In the cases of valve insufficiency, the correction of reflux consists principally in reconstructing the valve, when still present, or creating an antireflux mechanism when valves are completely destroyed. Neovalve construction is a possible technique,
The stage of the primitive fibular (peroneal) vein. Second stage: The stage of the sciatic vein. Third stage: The stage of the femoral vein with persisting sciatic vein. In the first stage, early venous outflow from the primitive lower limb occurs through a lateral/posterior fibular (peroneal) vein. First embryological vein into the posterior cardinal vein. In the second stage, the primitive fibular vein develops two branches: anterior tibial vein and connecting branch. An anterior/medial tibial vein becomes the main deep draining vein of the calf. Anterior tibial and primitive fibular veins together now constitute the "Sciatic Vein." Second embryological vein. A part of the primitive fibular vein distal to the anterior tibial vein/branch will evolve to become the 'short/lesser saphenous vein.' In the third stage, the connecting branch grows medially from the middle of the sciatic vein connects with a new proximal medial vessel, the femoral vein, to become the definitive deep venous system, while the sciatic vein regresses. A third vein of the leg develops to become the femoral vein, which terminates into the posterior cardinal vein, anterior to the sciatic vein; it advances toward the connecting branch of the sciatic vein. Femoral vein is further evolved with the anastomoses to sciatic veins and pass down the leg as the anterior tibial vein to finish the evolution of the veins along the lower extremity. With a defect in the second stage, the lateral fibular vein will persist and become the 'marginal vein.' But, if the defect occurs in the passage to the third stage, a 'sciatic vein' will remain as the main draining vein of the limb. As an embryonal vessel, a persisting marginal vein is always valveless.

PP5.4 - UIP consensus venous malformation & lymphoedema

PP5.4.1 Consensus on guidelines for diagnosis and treatment of venous malformations


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Venous malformations (VMs) are developmental anomalies of the venous system from various stages of the embryogenesis. VMs is the most common form of congenital vascular malformation (CVM) mostly existing alone as a predominant/independent lesion. The Expert Panel unanimously recommends the use of the Hamburg classification of CVMs, and within this the classification of VMs. The panel recommends Duplex scanning as the first diagnostic test for all patients with VMs, involving the limbs, to assess the deep and superficial veins, any aberrant vein, obstruction, dilation or valvular incompetence and define the feeding or draining veins of the VM. This test is safe, non-invasive, cost-effective and reliable. Grade of recommendation: 1 (strong), level of evidence A (high quality). CT venography is recommended for evaluation of obstructed veins and other truncular anomalies of large veins in the chest, abdomen or pelvis. Computed tomography accurately depicts the underlying pathology, confirms venous obstruction or extrinsic compression, delineates anatomic variations and extent of venous thrombosis. Grade of Recommendation: 1 (strong). Level of Evidence: B (moderate quality). MR imaging and MR venography is recommended for evaluation of VMs. The test is reliable, it confirms the extent and type of the VM, delineates feeding and draining vessels, distinguishes between different soft tissues (muscle, fat) and the vascular structures and is highly accurate to diagnose deep vein thrombosis. MRI and MRV is recommended before interventions on VMs, except some small localized VMs. Grade of Recommendation: 1 (strong), Level of Evidence: A (high quality). Many asymptomatic and small lesions are best managed with observation or conservative, compression treatment. The panel suggests a conservative approach to most asymptomatic lesions and recommends any treatment other than of very small, localized VMs be performed only by vascular specialists, most frequently after multidisciplinary consultations.

PP5.4.2 Consensus on guidelines for diagnosis and treatment of primary lymphedema


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Chronic lymphedema is a progressive and usually painless swelling of the limbs as the result of decreased transport capacity of the lymphatic system either by primary or secondary origin. The majority of primary lymphedema has congenital structural abnormalities of the lymphatic system and belongs to the group of lymphatic malformations such as hypoplasia, aplasia, hyperplasia, or dilatation (lymphangiectasia) with valvar incompetence; it can also be a genetic defect causing lymphatic malfunction or the cause of obstruction can be unknown (idiopathic). Depending on the age of onset, primary lymphedemas have been divided into three groups: Congenital, Praecox, and Tarda. Evaluation must include a detailed clinical evaluation: careful history taking, including family history of limb swelling, and thorough physical examination. A detailed record should include the detailed signs and symptoms: non-pitting edema, skin changes, skin discoloration, dermatitis, eczema, ulceration, hyperkeratosis, varicosth, lymph vesicles, drainage of fluid, and Stemmer sign (squearing of the toes). The presence of venous, arteriovenous, or capillary malformations in addition to lymphatic malformation, or any discrepancy in the length of the limbs should be recorded. Any complications, such as cellulitis, lymphangitis, malnutrition, immunodeficiency or suspicion for malignancies (lymphangiosarcoma) must be documented. Diagnosis in general can be sufficiently made only with basic combination of non- and minimally invasive tests: plain x-rays of the limb, Duplex scanning of deep and superficial veins, radionuclide lymphoscintigraphy, and occasionally MR and/or CT when indicated. Invasive tests are seldom needed till required as road maps for the treatment. Radionuclide lymphoscintigraphy is the most essential part of the diagnosis of primary lymphedema in addition to clinical evaluation and extremely useful for depicting the specific lymphatic abnormality: lymphatics/vessels, lymph nodes, andermal buckflow. Contempory management is now based on manual lymphatic drainage and compression bandage-centered complex decongestive therapy as the choice. Surgical therapies, reconstructive or excisional, remain auxiliary measures.

PP5.4.3 Secondary phlebo-lymphoedema: definition, diagnosis and treatment

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Oedema due to a dysfunctional lymphatic system primarily caused by chronic venous insufficiency (CVI). At the time of submission of this abstract full consensus documentation was not available, nor were comments from all participants. However some key points are presented. When the CVI results in an excessive fluid load at
Endovenous 808 nm diode laser ablation of incompetent perforators. Clinical and instrumental results after six years

L. Corcos 2, D. De Anna 1, D. Pontello 1, V. Barucchello 1, F. Carrer 1, B. Elezi 1, F. Di Benedetto 1, G. Peruzzi 2, T. Spina 2, V. Brasadola 1, F. Bresadola 1

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Endovenous laser ablation (ELA) of incompetent greater and lesser saphenous (GSV/LSV) veins were described up to now. Since 2002 a new experience in the treatment of incompetent perforating veins (PV) was carried on.

Aim. To verify by clinical-duplex follow-up the outcome in the limbs treated by 808nm diode laser. Preliminary results.

Methods. Total interventions in 6 years 1320. Prospectively studied: 443 limbs of 254 patients. Distribution (various combination): ELA of GSV, 46 LSV, 501 PV, 430 CV, 149 GSV stripping, with surgical interruption of incompetent sapheno-femoral/popliteal junctions (280-SFJ 45-SPJ), 15 SPJ external banding. Limbs selected (C2-C6) and controlled by duplex and photographs of PV and VC cutaneous map. PV diameter (<4mm) and length (mean 44cm/patient) were calculated. Transillumination-guided ELA was performed by Diode laser, 808nm (Eufoton-Trieste-Italy), fibers 0.6 mm, continuous emission, 4-8W, 10-20J/cm were used. Clinical-duplex follow-up was performed once/year on the basis of the photographic files.

Results. Healing process: blood vaporization, thrombosis, fibrosis and atrophy in the major VCs (>4mm) and to immediate massive venous wall damage in the minor ones (<4mm). High rate of complete and stable occlusion, different rates of not occluded/recanalized VCs segments with/without residual reflux, mainly in VCs of diameter>6mm, significantly decreased were observed. A high rate of residuals became atrophic during the early follow-up. The persistent residuals were subjected to re-treatment by ELA or foam-sclerotherapy. The procedure was well tolerated. Low rate of skin burns and phlebitis. 2 cases were subjected to skin surgical repair and 1 to thrombectomy.

Conclusion. ELA of VCs is fast, effective and indicated in vessels >6 mm. Not occlusion seems to be related to incorrect technique. Early or late recanalization can be due to the physiological evolution of the thrombus and expected. Re-treatment is simple and has to be considered as a foreseeable complement.

PP5.6 - Endovenous procedures 8: Treatment sclerotherapy 6 - safety

Endovenous 808 nm diode laser ablation of varicose colaterals. Clinical and instrumental results after six years

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1 University of Udine, Department of General Surgery, Innovative Biotechnological Program, Udine, Italy
2 Prosperus and Villa Cherubini Institute - Departments of General and Vascular Surgery, Florence, Italy

Endovenous laser ablation (ELA) in the treatment of incompetent greater and lesser saphenous (GSV/LSV) veins was carried on.

Aim. To verify by clinical-duplex follow-up the outcome in the limbs treated by 808nm diode laser. Preliminary results.

Methods. Total interventions in 6 years 1320. Prospectively studied: 443 limbs of 254 patients. Distribution (various combination): ELA of 153 GSV, 46 LSV, 501 PV, 430 CV, 149 GSV stripping, with surgical interruption of incompetent sapheno-femoral/popliteal junctions (280-SFJ 45-SPJ), 15 SPJ external banding. Limbs selected (C2-C6) and controlled by duplex and photographs of PV and VC cutaneous map. Echo-guided ELA of 312/501 incompetent PV/303 patients (mean 1.65, min.1-max.6/patient) incompetent PVs was performed. Limbs with phlebitis, saphenous aneurysms, collateral malformations and deep venous insufficiency were excluded. Diode laser, 808nm (Eufoton-Trieste-Italy), fibers 0.6mm, continuous emission, 8-10W, 15-30J/cm were used. Clinical-duplex follow-up was performed once/year on the basis of the photographic files.

Results. Duplex controls demonstrated that the healing process is due to blood vaporization, thrombosis, fibrosis and atrophy. A high rate of complete and stable occlusion was obtained. Different rates of not occluded/recanalized PVs with/without residual reflux, mainly in PVs of diameter>6mm, were observed. 189 incompetent PVs were normalized by simple ELA or stripping of GSV. PVs with residual/recurrent reflux were related with limited and mild venous insufficiency. They were subjected to re-treatment by echo-guided ELA or foam-sclerotherapy. The procedure was well tolerated and completely free from complications.

Conclusion. ELA of incompetent PVs is in fast, effective and indicated in vessels <6 mm. Not occlusion seems to be related to incorrect technique. Early or late recanalization can be due to the physiological evolution of the thrombus and expected. Re-treatment is simple and has to be considered as a foreseeable complement.
PP5.6-3

Laser-assisted surgery of hemorrhoids by 808nm diode laser
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Sclerotherapy, elastic banding and endo-rectal laser for the treatment of 3-4 degree (D) hemorrhoids (H): well tolerated, not radical, high rate of pain and complications. Closed techniques more advisable than open ones. From 1979 up to now >1500 patients. Since 1987 a CO2 laser used for the surgical excision. Since 2002 endovenous laser ablation (ELA) of the H pedicles, accessory varices and venous anastomoses+minimal-closed surgery.

Aim. To retrospectively compare the results obtained by surgery, surgery+CO2, minimal surgery+ELA. To verify whether ELA improves the performance of procedure and the clinical outcome.

Methods. The cases with 3-4DH divided into 3 groups: G1: closed surgery n=287; G2: closed surgery+CO2 laser n=235; G3: ELA+minimal closed surgery n=84. G1: simple high ligation+ELA of H pedicle and varices, accessory and anastomoses, minimal excision of prolapsed mucosa and skin. ELA by Diode 808nm laser (Eufoton-Trieste-Italy), W6-10, 10-20J/cm, continues emission. Manual dilatation+lateral sphincterotomy (30%) in all cases. General or subarachnoid anesthesia. No endorectal dressing. No self-evaluated pain scale used. Parameters from medical charts and short-term clinical follow-up considered: pain 0: no analgesic drugs (AD), 1 (minor-AD), 2 (major-AD), 1-3 days; wounds healing time (HT)<15 days; physiological defecation re-establishment time (DRT)<5 days; postoperative complications (PC) as residual skin hypertrophy; outpatient interventions (OI); incontinence (I); recurrence (R). The results analyzed (x 2).

Results. No pain 0 in G1; less pain in mixed technique G1,G2; less pain after ELA+radial excision-reconstruction G3 (P=0.001). HT<15 days, DRT<5 days and the n/OI in G2, G3, (P=0.001); 5 recurrences: G1. No recurrence in G2, G3. No significant difference of complications rate (mean 5.7%, range 0.9-6.4) in the 3 groups.

Conclusion. Pain decrease and stable results by manual dilatation+sphincterotomy and H pedicle ligation-interruption. CO2 laser and ELA reduce pain, HT and DRT, increases n/OI. ELA makes possible the extension of treatment, limited excision, short operating time stable results.

PP5.6-4

DUPLEX and histogical changes of the great saphenous vein in twelve months after 808nm diode laser irradiation. Further details.
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Endovenous laser ablation (ELA) is employed in the treatment of greater saphenous vein (GSV) insufficiency with various methods, with and without surgical interruption. However, its mode of action and indications are not yet clear.

Aim. To verify the GSV changes by duplex ultrasound follow-up and histological observations of 8 cases.

Methods. 44/443 affected limbs were selected by non invasive examinations (C.E.A.P.2-6) for ELA of the GSV and surgical interruption of incompetent saphenofemoral (SFJ). A Diode 808nm laser (Eufoton-Trieste, Italy) was employed by variable pull-back velocity 1-3mm/sec; 12-15Watt, 30-40J/cm. In 8 limbs the venous fragments were studied under light microscopy at 5 mm and after 1-2 months. In 44 cases Duplex ultrasound and clinical examination were performed from 7 days to 1, 2, 6, 12 months.

Results. Variously organized thrombi containing necrotic inclusions and patent areas were observed by optical microscopy in the vein lumen. Thrombus partial detachments, multiple neo-vascularization, various thermal damages of capillaries and micro-hemorrhages in the inner media were also observed. Nor neovascularization, nor thrombus extension were detected at the groin by duplex examination. The progressive venous diameter decrease and thrombus fibrotic transformation up to the hypotrophic venous disappearance at 12 months were followed-up (P=0.00001). Not occluded (18.8%), recanalized short segments (22.7%) and 2 entirely recanalized saphenous veins (4.5%) were detected. Postoperative phlebitis (13.6%) and varicose recurrences (4.5%) were observed. Non-occlusions and phlebitis prevailed in the larger venous segments (P<0.05).

Conclusion. The healing effects of GSV ELA are based on blood vaporization, thrombosis, fibrosis and venous atrophy. The potential floating thrombus extension into the deep veins, recurrent reflux by non-occlusion or recanalization, can be prevented by SFJ surgical interruption and must be monitored by Duplex examination. The 808 nm endosaphenous laser should be mainly applied to GSVs of less than 10 mm in diameter.

PP5.6-5

Endovenous 808nm diode laser ablation of incompetent saphenous veins. Clinical and duplex results after six years
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Various devices and wavelength were used for endovenous laser ablation (ELA) in the treatment of incompetent greater (GSV) and lesser saphenous veins (LSV). Aim. To verify by clinical-duplex follow-up the outcome in the limbs treated by 808nm diode laser. Preliminary results.

Methods. Total interventions in 6 years: 1320. Prospectively studied: 443 limbs of 254 patients. ELA of 135 GSV, 66 LSV, in the majority of cases combined with surgical interruption of incompetent sapheno-femoral/popliteal (SFJ/SPJ) junctions. Limbs selected (C2-C6) and controlled by duplex and photographs of cutaneous map. Limbs with phlebitis, saphenous aneurysms, congenital malformations and deep venous insufficiency were excluded. Diode laser 808nm (Eufoton-Trieste, Italy), fibers 0.6 mm, continuous emission, 12-15W, 30-40J/cm were used. Clinical-duplex follow-up was performed once/year still in progress.

Results. High rate of complete and stable occlusion was obtained. Patent segments and postoperative phlebitis (<2 months) prevailed in GSV>10mm. Early recanalization was not dependent of GSV-LSV diameter. Late recalcanizations (6-12 months) prevailed in GSV>10mm. No neo-vascularization at the SFJ-SPJ, DVT, skin burns. 1 sciatic nerve injury.

Conclusion. ELA of incompetent GSV-LSV is by 808nm is minimally invasive and safe. Is indicated in selected cases (C10 mm). Early or late thrombus recanalization is to be interpreted as a physiological evolution and expected. SFJ/SPJ surgical interruption by minimally-
PP5.6-6

Endovenous microfoam ablation in patients with migraine headache with and without right-to-left (R-L) cardiac shunt


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It is reported that intravenous sclerosants can precipitate migraine-like symptoms in patients with history of migraine. In a clinical study of 82 patients with GSV incompetence (CEAP 3-5) treated with a proprietary polidocanol endovenous microfoam (Varisolve), a subset of 27 patients gave a history of typical migraine headaches prior to treatment.

Methods. This study preferentially enrolled patients with R-L shunt to investigate the neurological effects of microfoam treatment. Prior to treatment, patients were evaluated by a consulting neurologist for history of migraine or other neurological disease, and tested for R-L shunt. Pre-treatment brain MRI, fundoscopy, and perfusion imaging were obtained. Among the migraineur subset, 14/27 patients had migraine with aura, and 22/27 were positive for R-L shunt. Polidocanol microfoam with ultra-low nitrogen content (0.1-0.8%), was injected into the GSV under ultrasound guidance (median volume 17 ml). TCD surveillance for MCA emboli was conducted throughout the procedure. All patients reporting visual or neurological symptoms were to have a neurological evaluation within 6 hours followed by further testing.

Results. Nineteen of the migraineurs had MCA bubbles detected during or after the microfoam injection. Although most patients had 10 or fewer bubbles counted, three patients had more than 100 bubbles (116, 154, 362 respectively). None of the migraineurs reported visual or neurological symptoms during or after the microfoam injection.

Conclusion. In this series of 27 carefully evaluated migraineurs treated with a proprietary microfoam, 19 of whom had MCA bubbles during the procedure, no patients reported visual or neurological symptoms. This observation contrasts with the conventionally accepted belief that patients with a history of migraine commonly report symptoms following injection of sclerosant foam. It is not known whether the lack of symptoms in this study was due to the specific properties of the proprietary microfoam, study sample size, or some other factor.

PP5.6-7

Lack of concordance between presence of right-to-left shunt and detection of middle cerebral artery emboli during endovenous microfoam ablation


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Although foam sclerotherapy is generally well tolerated, rare serious neurological events have been reported in patients with PFO. A clinical study of the neurological effects of a proprietary polidocanol microfoam (Varisolve) provided an opportunity to compare pre-treatment presence of R-L shunt with detection of middle cerebral artery (MCA) emboli during the endovenous microfoam ablation procedure.

Methods. Patients with GSV incompetence (CEAP 3-5) were prescreened for the presence of R-L shunt using transcranial Doppler (TCD) with injection of contrast (8 ml saline agitated with 1 ml air and 1 ml blood). Unilateral middle cerebral artery (MCA) bubble counts were determined for 15 cardiac cycles at rest and after release of the Valsalva maneuver. Patients testing Spencer grade 2 or greater (6 or more MCA bubbles detected) were considered positive for R-L shunt. Patients who met protocol criteria had treatment with endovenous polidocanol microfoam (ultra-low nitrogen content of 0.1-0.8%), injected under ultrasound guidance. Patients with R-L shunt were preferentially enrolled, but each clinical center also enrolled 3-5 patients without R-L shunt.

Results. Eighty-two patients had treatment of the GSV. Of 61 patients positive for R-L shunt on pre-treatment screening, 54 (89%) had MCA bubbles detected during endovenous microfoam ablation; in 21 patients diagnostically negative for R-L shunt, 6 (29%) had bubbles detected during microfoam treatment. No patients developed MRI or neurological abnormalities.

Conclusion. During injection of sclerosant foams patients are commonly exposed to cerebrovascular gas bubbles. Most patients with R-L shunt are exposed to cerebrovascular bubbles, and surprisingly nearly 30% of patients without demonstrable R-L shunt are also exposed. In patients with MCA bubble emboli during endovenous microfoam ablation with a proprietary polidocanol microfoam, there was no evidence of cerebral or cardiac microinfarction. The results of this study cannot be applied to foams made using room air or with other bedside methodologies.

PP5.6-8

Testing of maneuvers for prevention of foam migration during ultrasound-guided foam sclerotherapy

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Aim. Test the effectiveness of various maneuvers designed to restrict migration of foam debris during ultrasound-guided foam sclerotherapy of lower extremity veins.

Methods. Recently a variety of maneuvers have been proposed to prevent or mitigate the dispersal of foam injected into peripheral or truncal veins of the lower extremities into the central circulation. These include limitations of volume, elevation of the leg before or after foam injection, maintaining immobility of the patient, and avoidance of the Valsalva maneuver. Each of these methods was studied using transfontanar echocardiography (TTE) and/or transcranial Doppler (TCD) monitoring synchronized with peripheral lower extremity injections of 1% air-based Polidocanol foam made in a 4:1 ratio by the Tessari method.

Results. Foam injected into peripheral leg veins of the lower extremity resulted in bubbles identified on TTE or emboli detected by TCD monitoring in patients: a) within 30 seconds after all injections; b) who maintain 15° Trendelenberg position; c) with leg elevation following injection; d) who maintain immobility 10 min following injection; e) who sit up (Valsalva’s maneuver) after 15 minutes of immobility following injection. In a series of 50 patients undergoing ultrasound guided foam sclerotherapy of veins in the lower extremities, synchronous TCD monitoring was performed during and following injection (mean duration: 25 minutes). Forty-two percent were found to have emboli with as little as 3ml of foam injected.

Conclusion. Maneuvers proposed to mitigate dispersal of foam from peripheral leg veins into the central circulation and into the cerebral circulation are largely ineffective.

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Correlation of cerebral emboli, symptoms, and volume injected during ultrasound guided foam sclerotherapy

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Aim. To determine the incidence of cerebral emboli and its correlation to symptoms as a function of volume injected during CO2/O2 ultrasound guided foam sclerotherapy (UGFS).

Methods. Sixty five patients were studied with transcranial doppler (TCD) monitoring of right and left middle cerebral arteries during UGFS. The foam preparation consisted of Polidocanol 1-3% mixed in a 4:1 ratio of carbon dioxide/oxygen (CO2/O2). Patients were fitted with a headset allowing bilateral TCD monitoring. Threshold for high intensity transient signals (HITS) detection was set at 90% sensitivity. Patients were monitored up to one hour post termination of UGFS. Recordings were reviewed for detection and evaluation of HITS. Comparison of symptoms reported in patients with or without HITS was analyzed by Chi square test.

Results. Incidence of emboli was 34% (22/65). All emboli occurred with injections <18 ml and 77% (17/22) of emboli occurred with injections <10 ml. Incidence of symptoms including dizziness, light headedness, migraine, headache, and blurred vision was 36% (8/22) in patients with HITS. Incidence of symptoms including cough, dizziness, headache, and light headedness was 12% (5/43) in patients without HITS. Correlation of symptoms to HITS was significant (p=0.02).

Conclusion. Most HITS were detected following injections of <10ml and symptoms were more common in patients with HITS. HITS may be an early predictor of patients who may report symptoms.

Safety of ultrasound-guided foam sclerotherapy with physiological CO2-O2 gas

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Aim. Validate the safety profile of large volume ultrasound-guided foam sclerotherapy (UGFS) using polidocanol and carbon dioxide/oxygen (CO2/O2) gas and compare with the safety profiles of foam made with room air and with pure CO2.

Methods. UGFS followed previous thermal ablation of the great saphenous vein (GSV) in 100 patients. The majority of the patients were female (91%) and over 50 years old. Great saphenous veins, small saphenous veins (SSV), and their tributaries were treated in a variety of combinations using 2-48 mL of foam. Response data were collected immediately following and up to 24 hours post-intervention. Logistic regression statistical models were tested. Comparison was made to previous safety profile trials in this institution utilizing air-based foam and CO2-based foam.

Results. No physiologically significant changes in vital signs or EKG were observed. When comparing the injection groups, no difference were found in the probabilities of not experiencing leg pain (p = 0.615) or itching (p = 0.252). The odds of not experiencing dry cough, metallic taste, or chest tightness (combined) was nearly 40 times greater for the CO2/O2-based foam group and 17 times greater for the CO2-based foam group than for the Air foam group. The odds of not experiencing nausea, dizziness, or visual disturbance (combined) was 7.5 times greater for the CO2/O2-based foam group than for the air-based foam group.

Conclusion. Ultrasound-guided injection of CO2/O2-based foam appears safer than other gas-based foam injection methods.

Cerebral emboli comparison detected by transcranial doppler during ultrasound-guided foam sclerotherapy using CO2-O2-based foam or air-based foam

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Aim. To determine the incidence of middle cerebral high intensity transient signals (HITS) in patients undergoing foam sclerotherapy for the treatment of chronic venous valvular insufficiency of the lower extremities.

Methods. One hundred thirty six patients were studied with transcranial doppler (TCD) monitoring of right and left middle cerebral arteries during ultrasound guided foam sclerotherapy (UGFS). The foam preparation consisted of Polidocanol 1-3% mixed in a 4:1 ratio of either room air (n=71) or carbon dioxide/oxygen (CO2/O2) (n=65). Patients were fitted with a headset allowing bilateral TCD monitoring. Threshold for HITS detection was set at 90% sensitivity. Patients were monitored up to one hour post termination of UGFS. Recordings were reviewed for detection and evaluation of HITS. Comparison of the incidence of HITS during room air-based or CO2/O2-based foam sclerotherapy was compared by Chi square test.

Results. The incidence of HITS associated with air-based UGFS was 58% (41/71) and 54% (22/65) for CO2/O2-based foam. The incidence in these two groups did not reach statistically significant difference (p=0.61).

Conclusion. Over one-third of the patients treated with UGFS experienced HITS detected by TCD. At present the physiologic consequences of this finding are still unknown. The incidence of HITS using either air-based or CO2/O2-based foam in this study was higher than the incidence of literature-reported side effects. This study raises awareness about potential implications of emboli in the cerebral circulation during foam sclerotherapy.

Safety and efficacy endovenous chemical ablation with polidocanol microfoam in elderly patients with chronic venous insufficiency

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Chronic venous insufficiency (CVI) is more prevalent in elderly patients. However, these patients are seldom offered definitive treatment due to their advanced age, associated comorbidities and increased risk of anesthesia.

Aim. To evaluate the efficacy and safety of ultrasound-guided injection with polidocanol microfoam in elderly patients with CVI.

Methods. We reviewed medical records during the last years from patients aged 70 years and older affected by CVI. Ultrasound was used for the pre-treatment diagnosis, monitoring/guidance during the treatment and for the evaluation of the technique’s efficacy. In addition, we used pre- and post-treatment pictures to assess the success of the therapy. The data collected included CEAP class, comorbidities, anticoagulation medication, deep venous system (DVS) patency and status, number of sessions, efficacy of the therapy and adverse events. The main criterion of success was the closure of the primary incompetent veins and/or primary com-
ple healing of the ulcer. We performed a descriptive statistical analysis.

Results. A total of 176 patients were treated, aged between 70 and 95 years (mean 76.36). Of these 133 (75%) were women, 135 (76.7%) were in CEAP class 4-6, 52 (18.2%) had incompetent DVS, 109 (60%) patients had truncal incompetent and varicose veins, and 43 (24.9%) presented more than 2 comorbidities. Among this latter subgroup there were 25% patients on anticoagulants. Closure of the incompetent veins was achieved in 100% of patients and primary complete healing of ulcers was successful in 92/102 patients (90.2%). The average number of treatments was 7.47 and the average time of ulcer primary healing was 3.9 months. No major complications were encountered.

Conclusion. This study demonstrates that endovenous chemical ablation with microfoam is an efficient and safe method for elderly patients with CVI. The procedure was even successful in most patients with associated medical conditions, postthrombotic syndrome and/or ongoing anticoagulants.

AP5.6 - Varicose veins: miscellaneous

AP5.6-2
The role of tight junctions in venous disease
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Inhibiting soluble and water flow through the paracellular space is an essential mechanism maintaining the barrier function of vessels. Junctional molecules regulate the paracellular control system and were investigated for their involvement in the pathology of chronic venous insufficiency.

Methods. Aim of the study was to analyse the expression pattern of tight junction (TJ) and gap junction (GAPJ) molecules. Occludin (OCLN), claudins (CLDNs), connexins (CXs) on mRNA and protein level in patients with edema, venous leg ulcers and healthy controls. Biopsy specimens were taken in healthy individuals and in patients before and four weeks after compression therapy. The mRNA-expression was determined by using reverse-transcriptase and polymerase chain reaction (RT-PCR) and the protein-expression by western blot from tissue specimens.

Results. Quantification performed determining the expression for TJs and GAPJs displayed diminished expression for CLDN-1 and CLDN-5 in patients with chronic venous insufficiency in comparison with healthy controls on mRNA as well as protein level. No statistical differences could be detected for OCLN, CLDN-3 between the edema group and healthy controls. There was a significantly elevated expression on mRNA and protein level between the leg ulcer group and healthy controls for OCLN, CLDN-3, CX-26, CX-36 and CX-43. Densitometric evaluation revealed a more significantly elevated expression for CLDN-1, CLDN-5, CX-26 and CX-43 on mRNA and protein level after four weeks of compression therapy in comparison with prior treatment for the edema as well as the leg ulcer group.

Conclusion. Compression therapy tightens the paracellular barrier via elevated expression of specific TJs and GAP-Junctions and prevents thereby the progression of chronic venous insufficiency due to inhibited permeability of fluid into the perivascular tissue.

AP5.6-3
Laser-doppler examination of corona phlebectatica para-planaris
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Corona phlebectatica para-planaris (CPP) is a typical sign of chronic venous insufficiency.

Aim. The aim of our study was to get information about the basic microcirculation in CPP and the reactions to different tests.

Methods. Microcirculation of skin was examined in the centre of CPPs and as a control in a nearby vessel-free skin region. The resting flow was recorded in a supine position, then different provocation tests were performed such as local heating (44 °C, 2 min), postocclusive reactive hyperaemia (PORH, 220 mmHg, 3 min), elevation of the leg and venoarterial test (VAR).

Results. There were significant differences between the circulation of CPPs and control skin: resting flow and amplitude values were higher in the CPPs than in the control skin. The flow was more influenced in CPPs than in the surrounding capillaries by the breathing of the patient. Controlling the calf with a tonometer cuff a rise in flow was detected in CPPs in spite of the circulation in the capillaries. There was also a higher flow only in CPPs if the limb was raised and then put back. According to Fourier spectral analysis there is a high endothelial, myogenic and sympathetic neurogenic activity in CPPs.

Conclusion. (1) Fast circulatory rest flow values and big amplitudes suggest the role of functioning AV shunts in the ankle region. (2) Surprising responses to different tests can be the consequence of the chronic venous insufficiency.

AP5.6-4
Socioeconomic consequences of the phlebotonic drug de-reimbursement

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After Italy, phlebotonic drugs were de-reimbursed in France in January 2008. This is the result of a political campaign from the health authorities and some ‘‘well-thinking’’ experts under influence which consider as negligible the venous disease. This paper brings some argument to demonstrate that this governmental decision is unfair from an ethical point of view and inefficient to reduce health costs. It is unfair because the risk factor of the venous disease are strongly linked with the working conditions, especially of the women: the de-reimbursement of the drugs means that these women with low salary will have to pay the drug which helps them to bear the consequences of their bad working conditions. One may fear a major increase of sick leaves which will cost more than the expected savings due to phlebotonic de-reimbursement. It also predictable that as clearly shown by the Italian Study of C Allegra, we will observed in 5 years, a significant increase of venous surgery and of venous ulcer which will cost more than the expected savings due to phlebotonic de-reimbursement. It is also damaging for the population and for the practitioners that this de-reimbursement introduce a doubt on the efficacy of such drugs which clearly provide a real symptoms relief to patients and the best evidence of that is certainly that a even de-reimbursed, a large amount of patients continue to buy them if they can afford it financially.
AP5.6-5
Pharmacogenomics: new reality of modern phlebology
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Purpose: to study the frequency of occurrence of the warfarin metabolism gene in patients with deep venous thrombosis, to determine the optimal dosage of the drug depending on the genotype.

Methods. a study of CYP2C9 and VKORC1 genes with the help of PCR/RFLP method of diagnostics was conducted on 159 patients with deep venous thrombosis in lower extremities.

Results. “Poor” metabolizers with the gene CYP2C9*2 variant N/N among patients in the research group were found in 108 (68%) of cases, whereas CYP2C9*3 variant A/A -was found in 157 (98,7%) and the heterozygous variant of polymorphism CYP2C9*3 C/T was registered in 2 (1,3%) of the patients. The polymorphous variant CYP2C9*2 C/T was detected in 50 (31,4%), whereas the gene CYP2C9*2 substitution T/T – only in 1 (0,6%) of the cases. While investigating the frequency of occurrence of different polymorphous variations of the VKORC1 gene it was discovered, that among patients the heterozygous C/T variation is found more often than the "wild type" in 76 (47,8%) of cases. Such data do not concur with the data of the European and American researchers. Thus, a greater part of the patients are poor metabolizers of warfarin, which is an indication for a lower dose of the drug as compared to standard practice. The optimal dosage of warfarin to maintain INR in the therapeutic 2.0 - 5.0 interval was determined for all patients. It varied from 1,25 mg per day up till 12,5 mg per day. Only one patient manifested hemorrhagic complications as an aftereffect of the drug.

Conclusion. the study of the genotype essentially simplifies the determination of the dose of warfarin and increases the efficacy and safety of the anticoagulant therapy. The given research is at the initial stage, the continuation of the work to get more objective results being planned.

AP5.6-6
Evaluation of balneotherapy associated with patient education in patients with advanced chronic venous insufficiency: a randomized controlled trial in the SPA resort of La Léchère
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Aim. To assess the efficacy of balneotherapy associated with patient education, in patients with advanced chronic venous insufficiency (CEAP clinical classes C4/C5) in a randomized controlled trial, spa therapy being administered on the top of the usual medical care.

Methods. Patients with primary or post-thrombotic CVD with skin changes but no active ulcer, living in Grenoble area and willing to undergo a spa treatment course in La Léchère were eligible. The treated group had the three weeks spa treatment course in La Léchère (100 km far from Grenoble), soon after randomization; the control group also had a spa treatment, but starting at day 365. The treatment consisted of four balneology sessions per day, six days a week during three weeks, and three educational workshops. An independent follow-up was performed in Grenoble hospital every three months for 15 months. The main outcome criterion was the severity of the skin changes, as evaluated by means of malleolar chromanity. Quality of life (CIVIQ scale), a visual analog scale for leg symptoms and the occurrence of leg ulcers were used as secondary criteria. The year after spa treatment in the treated group was compared to the year before spa treatment in the control group.

Results. 59 subjects were enrolled. No statistically significant difference between groups was found at baseline. After treatment, chromanity showed significantly decreased pigmentation and erythema in the treatment group compared to the controls (p<0.01). Quality of life (p<0.01) and symptoms (p<0.001) also improved significantly. These differences remained significant after one year follow-up. The control patients improved similarly after their own spa treatment (day 450).

Conclusion. This study shows that spa therapy, associating balneotherapy and patient education, is able to improve the skin changes of the CVD patients, their quality of life and symptoms. This effect is of large magnitude and long duration.

AP5.6-7
Study on the effectiveness of medical treatment based on infra on legs cellulitis
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Research and wish of the patients for treatments of the cellulitis less traumatism favoured the development of medical technologies. These last have a purpose lipolytic or adipolytic and are classified according to therapeutic technic in chemical lyse (phosphatidy choline, deoxylate), mechanisms (cavitation, depressor-massage and endermology), physical (ultrasound, laser, infrared, radio frequency), and by hyperosmosism. These different therapeutic options all have a real interest, in various degrees, on the cellulitis but suffer from a deficiency of evaluation. Scientific studies are rare and the noticed population is often reduced. The association of different lytics technics with for foundation infrared and hypo-osmolar injection seems a promising therapeutic approach. A study with a cohort of more than 1000 patients shows the interest of this therapeutic association in the taking care of the cellulitis as well on the morphological aspect as cutaneous.

AP5.6-8
Transdermal cryolaser and cryo sclerotherapy in the treatment of telangiectasies and reticular veins
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Aim. We present different classification of the telangiectasies and reticular veins. There are different colors with a predominant content of either venous or arterial mixed. This hematic content will react differently to the light impact received, therefore the laser will act differently on those target or chromophore tissues. Red telangiectasies with a large predominance of sub papillary arteriole over the venule, blue telangiectasies, when the predominance on sub dermal papillary is of venous type over the arterial one, or violet or purple color, also called mixed telangiectasies. In many of them can be seen a reticular vein that ‘feeds’ them, generating what we call "telangiectasic reflux". A major action and effect is observed on skin affected by purple telangiectasies, a slightly lower effect on blue ones and slightly lower on red ones. Depending on the reaction to the light pulse and the therapeutic effect obtained, telangiectasies can be classified in: high result for purple ones, good/moderate result for blue ones, and low to poor result for red ones. The latter are usually side effects to micro surgery or previous sclerotherapy (matting)In those cases we associate IPL.

Methods. Over a total of 5760 patients treated between 2005-2008 with cryo Nd-Yag laser 1064 nm associated with a continuous air cooled device, doing the cryosclerotherapy with hypertonc glucose solution 50% mixed with sodium tetradecyl sulfate to 0.53%. 2971 patients underwent cryo-laser only, 2789 cryo-laser and cryo-sclero-therapy. The immediate Results good 84%, regular 12% and poor 4%. These 4% were generally due to neoangiogenesis or matting, after microsurgery or post sclerotherapy. The results after a year were very difficult to evaluate because patients do not attend check-ups. Only 76% of these cases were evaluated. Complications were ecchymosis, hyper, hypopigmentation, burns and intravascular coagulation.

Conclusion. this combination of 2 different type of cryosclerother-apy, requires previous training, is very effective with good aesthetic and medical results also with a low rate of complications.
AP5.6-9
Transdermal laser therapy for the superficial venous insufficiency
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Aim. The objective is to show the clinical experience obtained in the transdermal treatment of superficial venous insufficiencies of the lower limbs (MMID) combining a 1470nm diode laser device (Ceralas® E, biolitec AG, Germany) and an external chromophore.

Methods. Transdermal treatment protocol comprised the combination of the endovenous administration of an external chromophore (NaCl 20%) and the transdermal radiation delivery performed with a 1470nm diode laser and handpieces with spot, 1 to 7 mm, in 1, 2 or 3 sessions. All patients were properly informed and their written consent was obtained. 300 lower limbs stratified by CEAP C2-6 were treated, between November 2007 to January 2009. Superficial venous insufficiencies comprised varicose veins of a diameter between 1 to 10 mm. All patients were evaluated with duplex US before, immediately after procedure and in a follow-up control. An average follow-up of twelve months was attained.

Results. The technique of the simultaneous association of the transdermal laser therapy with 1470nm wavelength and external chromophore resulted in an immediate post-procedure venous diameter reduction in the first session of 30-50%, as assessed by ultrasound. This technique provided a completely ambulatory procedure without needing anesthesia, with absence of allergic reactions and obtaining good aesthetic results.

Conclusion. By using the 1470nm diode laser in association with an external chromophore the therapeutic action on superficial venous insufficiencies of the lower limbs is enhanced. Considering the classical therapeutic treatments offered such as insufficiencies sclerotherapy, the advent of the laser technology is a valid therapeutic resource to take into account in the transdermal treatment of patients suffering from superficial venous insufficiency of the lower extremities. This technique makes possible a more effective and easy to use straightforward procedure than previous therapies.

AP5.6-11
Calcium dobesilate in patients suffering from chronic venous insufficiency. A double-blind, placebo-controlled, clinical trial
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Aim. This study was conducted in order to test the efficacy of calcium dobesilate in chronic venous insufficiency (CVI) CEAP 3–5, following current diagnostic guidelines.

Methods. Double blind, placebo controlled multicentre trial in Germany and Switzerland. For admission, the adult patients were required to have a symptomatic CVI and pitting oedema. Patients wearing compression stockings CCL 2 were also admitted. There was a wash-out period of two weeks, a treatment period of 8 weeks and a follow-up of 2 weeks. During treatment the patients received dobesilate 3 X 500 mg per day, or an identical placebo. The ankle and calf perimeters were used to estimate the lower calf volume.

Results. A total of 256 patients was randomised to treatment (doses: 124, placebo: 124), the demographic and anamnestic data at admission were comparable in the two therapeutic groups. The mean volume of the lower calf diminished in the dobesilate group at the end of the active treatment period by 64.72 ± 111.95 ml, independent of the concomitant usage of compression stockings, vs. placebo +8.76 ± 152.98 ml (p <0.002). The symptoms of pain, discomfort, heavy legs, tired legs, tingling, itching and cramps, as well as the Global assessments by investigators and patients, also fared significantly better in the dobesilate group at the end of the active treatment.

Conclusion. This trial has confirmed that dobesilate reduces the leg oedema and improves the symptoms of objectively diagnosed CVI, independent of the concomitant usage of compression stockings.

GE5.6-1
The external stretching valvuloplasty: a new technique for venous valve repair
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Restoring venous valve function by Valvuloplasty is a possibility with evidence of positive outcomes in more than 70% of cases. Various suggested techniques did not spread, mainly because of the lack of a proper device. To achieve better results, an innovative technique has been developed.

Methods. The External Stretching Valvuloplasty (ESV) aims to give a stretching action on the opposite inter-commissural walls to modify the usually circular cross section into an oval one, so that the cusps free edge extra-length is reabsorbed. A consequent new device has been developed, working as a surgical implant around the incompetent valve; this is an Oval Shaped External Support (OSES), made by a Nitinol net-like smooth and elastic framework, available in different size. Bench test and preclinical trial were done. The inter-commissural diameter's enlargement of about 30% showed valve function's recovery in most cases. Some Pts have been elected for the ESV and OSES device simulated application on superficial system. The stretching action was performed by securing the device to the apices of the valve commissures by surgical stitches. The ESV feasibility and immediate efficacy were demonstrated. Then, a routine surgical treatment was performed.

Conclusion. The ESV seems to be very effective and might be carried out - virtually - at any peripheral venous valve site. The ESV should be useful: a) in principle, in all Pts with CVI and US-visible and mobile valve leaflets of any diameter, b) in practice, in the estimated 50–70% of the present Pts with mild to moderate varicose disease, but c) all new Pts - namely, with early stage of CVI - may benefit of it. Larger clinical trial might show that ESV improves the results of valve repair operation, leading to reduce varicose recurrences and to spare the most GSV.

GE5.6-2
Surgical treatment of varices with tumescent local anesthesia heavily diluted in bicarbonate: “the gentle surgery”
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Aim. To evaluate the benefits of tumescent local anesthesia heavily diluting by isotonic bicarbonate (THDB) for the surgery of varices.

Methods. Prospective study of lower limbs (LL) operated on for varices under THDB from March to June 2006. Pain was studied during the intervention and at D8 using a visual analogue scale, ecchymosis areas were assessed at D8, and QoL was measured using an SF-12 questionnaire at D8 and at D30.

Results. A total of 160 LL in 156 patients (122 men and 34 women), aged between 21 and 85 years (mean age = 51.5) were operated

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on by stripping in 12.5% of cases and isolated phlebectomy in 87.5% of cases. During the intervention and at D8 the pain score was respectively 1.52 and 1.12 (non significant (NS)). The mean ecchymosis surface was 10.1 cm² at D8. There was no ecchymosis in 29.4% of cases. At D8 and D30 the SF-12 physical component was respectively 96.8 and 97.5 (NS) and the mental component was respectively 36.6 and 36.9 (NS).

Conclusion. Treatment of varices under THDB enabled us to reduce per- and post-operative pain to a very low level, to reduce at minimum or even eliminate the presence of ecchymosis and to preserve QoL.

GE5.6-3

Value of the preservation of the saphenous vein for the surgical treatment of varices in young nullipara patients

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To evaluate the value of the preservation of the great saphenous vein (GSV) in nullipara patients who had a pregnancy following a surgical treatment of varices.

Methods. Retrospective study of nulliparas who had a pregnancy following a first surgical treatment of varices (FSTV), leading to varicose recurrence and reoperation (REOP). -January 1998 to December 2002 (T1): the referent FSTV was ablation of the GSV. -January 2003 to December 2007 (T2): the referent FSTV was phlebectomy with preservation of the GSV. The extent of the treatment was evaluated by the number of zones treated per limb (NZT) via phlebectomy.

Results. A total of 44 LLs (T1=25 LLs; T2=19 LLs) were operated on in 35 patients. At the time of FSTV there was no significant difference concerning demographic and hemodynamic data, CEAP classification, and frequency of symptoms between T1 and T2. The GSV was preserved in 8% during T1 and in 78.9% during T2 (p<.05). The mean time between the FSTV and the pregnancy was 22.8 months, and between the pregnancy and the REOP was 15.8 months. At the time of REOP we found significant differences between the cohort of nulliparas for who FSTV was done during T1 and for who FSTV was done during T2, concerning the frequency of symptoms (FSTV T1=79.1% vs FSTV T2=31.6% p<.05), the frequency of redo surgery at the junction (FSTV T1=52% vs FSTV T2=11% p<.05), the NZT (FSTV T1=7.6 vs FSTV T2=6.1 p<.05) and the postoperative complications (FSTV T1=8% vs FSTV T2=0% p<.05).

Conclusion. The surgical treatment of varices in nullipara patients via phlebectomy, with preservation of the SV, may make it possible to reduce the complexity, signs, and symptoms in the event of varicose recurrence after pregnancy.

GE5.6-4

The effects of isolated phlebectomy on reflux and diameter of the great saphenous vein: a prospective study

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Aim. Evaluate the effect of isolated phlebectomy on the duration and velocity of reflux, as well as on the diameter of the great saphenous vein (GSV).

Methods. Prospective study including patients presenting reflux in GSV and treated with isolated phlebectomy. Reflux duration (RD), peak reflux velocity (PRV) and diameter of the GSV were measured when patients were standing up by ultrasound duplex scan preoperatively and then 1 month after surgery.

Results. We included 55 legs in 54 patients (24 women and 30 men) aged from 37 to 83 (mean age 62.6). We reviewed all of the legs 1 month after the isolated phlebectomy treatment. We found a significant decreased of the mean RD (0.81 vs 1.53 sec p<0.001), PRV (248.6 vs 119.5 msec p<0.001) and of the mean diameter of the GSV at the ostium (5.6 vs 6.7 mm p<0.01), the thigh (4.2 vs 5.0 mm p<0.01), the knee (4.0 vs 5.3 mm p<0.001) and the calf (2.7 vs 4.0 mm p<0.001).

Conclusion. We noted a change to reflux in the GSV after isolated phlebectomy with a significant reduction in RD and PRV. Isolated phlebectomy also led to a significant reduction in GSV diameter. These data suggest that the SV can be improved from a haemodynamic and anatomical point of view by using treatment focusing on the suprafascial venous network.

GE5.6-5

Saphenectomy without crossectomy, an easy and safe alternative solution to endovenous techniques

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Aim. Advertising for foam sclerotherapy or endovenous techniques commonly keep on comparing these new methods with the traditional stripping, performed under general anesthesia and linked to a high rate of complications and one month recovery. But the modern varicose surgery has been dramatically improved. The aim of this prospective study is to give new data for a right comparison.

Methods. Between January 2002 and December 2008 a total of 1237 legs underwent a saphenectomy for primary varicose veins related to a thigh great saphenous vein (GSV) incompetence. All GSV avulsions (using iragnosis exclusively) were performed without crossectomy and added with very extensive stab avulsion of tributaries. In 894 cases (72.9%), the saphenous trunk was removed up to the lower end of the arch. This procedure was performed in spite of a trans-ostial reflux on 633 legs (70.8%). All procedures were performed under local anesthesia (tumescent anesthesia ± femoral nerve block). No post-operative anticoagulation was systematically prescribed. Patients were notified of a clinical and ultrasound investigation on D7 and 1 to 3 months after surgery.

Results. No intra-operative complication was noted due to the technique. All legs but 11 (99.1%) were post-operatively checked. We have noted one small infected hematoma on a calf phlebectomy and 77 (6.2%) calf sensitive disorders linked to booking, all disappeared within 5 months. No DVT was noted. A thrombus was noted in 28.4% residual arches (without extension to the femoral vein) on D 7, which mainly disappeared within 1-3 months. The number of days off for work was less than 5 for 82.5% patients.

Conclusion. The ‘modern’ crossectomy free surgical avulsion of the GSV is an easy, safe and valuable alternative to endovenous techniques. This surgical technique has all advantages of endovenous techniques without their drawbacks, and mainly without increased cost due to specific devices.

GE5.6-6

Is still crossectomy the first obliged step in varicose vein surgery? 6 years follow-up in a randomized study in 124 legs without inguinal dissection

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The inguinal flush ligation with tributaries ligature far from the femoral vein is the standard procedure to treat varicose veins of the GSV.
Recanalization of missed little veins, or previous limbphatic reflux or others unknown factors are the origin of the so called “neoangiogenesis” in 50%. Aim of this study is to show that the inguinal dissection can be avoided in more than 98% of cases. 1200 legs were submitted to vv surgery (same surgeon with pre operative echo-guided mapping: 855 (69.4%) primary vv and 567 (50.6) were recurrence of which 658 (79%) were submitted to minimally invasive surgery without inguinal dissection and saphenectomy when necessary. 124 legs were randomized in two groups and entered the study. (A) flush ligation with inguinal dissection (62 cases) and (B) with GSV ligation 2 cm. below the SFJ (62 cases). In all cases saphenectomy of the great saphenous vein was performed (short or long) plus phlebectomies. Inclusion criteria were: varicose vein disease with SFJ incompetence, competent SSV and absence of other refluxes. All cases were echographically mapped from the same surgeon and digitally recordered. The follow-up included an echo guided study of the groin every year for five yrs. 99% of patients were detected at the end point. All legs were examined clinically and with duplex. The presence of thigh varicose veins and reflux detected echographically were the parameters to include the case as recurrence. In conclusion 119 legs were detected at the end of the study. Previous reports at 24 and 56 months showed no difference between the groups, while in the last two years the comparison showed the presence of clinical recurrence in 31% and with reflux at Duplex in 35% in Group A, while it was respectively 9.6 and 11% in group B with significance in statistical analysis (Chi square and Fisher exact test for small groups (p<0.03). The Authors discuss any correlation in order to avoid standard procedures in favour of a more satisfactory personalized surgery avoiding in 98% of cases groin dissection, with less complication rate, time wasting and costs.

High ligation in chronic venous disease of the lower limbs: an unavoidable surgical approach?

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Aim. To evaluate if a novel pre-operative duplex protocol could predict the need of high ligation (HL) in varicous veins surgery. We propose to utilize the combination of the reflux elimination test (RET) and the assessment of the terminal sapheno-femoral valve (TV) competence. RET is performed by finger-compression of the incompetent collaterals and is positive when demonstrates great saphenous veins (GSV) reflux disappearance. The analysis of the sapheno-femoral junction (SFJ) is performed investigating reflux by means of two different manoeuvres: squeezing (SQ) and Valsalva (VAL). We hypothesized that the combination of a positive RET and of a competent TV could represent the pre-operative duplex indication of varicous veins surgery without HL. Design Of The Study: Case control study. Subjects: We compared 100 consecutive patients, affected by C1 (CEAP Clinical Class C2-6), presenting a RET+ and an incompetent TV both at VAL and SQ (Group A), with 100 patients presenting a RET+ and a competent TV (Group B) both at VAL and/or SQ. The two groups were matched for age, gender, clinical class and disease duration. We operated both groups by means of flush ligation and proximal avulsion of the incompetent tributaries form the GSV trunk (Chiva2 procedure). Main outcome measure: Recurrence rates assessed by clinical and ECD evaluation at 3 years follow-up.

Results. The risk of recurrences was almost 32 times higher in the group A, confirming that TV incompetence assessed according to the experimented protocol is the main predictive factor (OR 51 5; 14.4-68.6, CI 95%). These recurrences were mainly localized at the SFJ (71% of group A vs 3% of group B) (OR 79.2; 23.2-270.2; p<.0001).

Conclusion. Our results demonstrate how patients with a competent TV at the preoperative duplex analysis can be successfully treated by a minimally invasive and cheap surgery, without the need of high tie.

A strategy of varicose syndrome management based in haemodynamic concepts

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An old concept of anatomy and physiology of veins should be considered: the veins do not have collaterals but tributaries. It is not an anatomic concept but mainly a physiologic one. The blood flows from the small veins to the higher caliber veins. These principles should be observed in all kind of varicose syndrome management. Several surgical techniques of varicose syndrome management preserving the saphenous trunk were described and considered.

Methods. Three hundred and fifty six patients with primary varicose syndrome were submitted to diagnosis with duplex ultrasound after a clinical examination. The deep, superficial and perforator system regarding dimension, obstruction and reflux including its intensity were observed. Hundred fifty five patients were submitted to the surgical approach (phlebectomies). Two hundred and one patients were submitted to the sclerotherapy management only. The surgical strategy was to perform phlebectomies only. The sclerotherapy was performed only in the tributaries. The patients were followed up clinically and with ultrasound: in the surgical cases before and three months after procedure and in the sclerotherapy, before each session. Usually, a new session of sclerotherapy is performed with seven days interval.

Results. In approximately 86% of patients (surgery, sclerotherapy and mixed) we observed that the diameter of the saphenous trunk became reduced and frequently the insufficiency (if it was present) disappeared. This reduction could be from 16% to 36%. Moreover, the patients reported a clear improvement of symptoms and their QoL.

Conclusion. Frequently, the insufficiency of saphenous veins is a consequence of the insufficiency of the tributaries or at least aggravates it. According to our observations, the management of varicose syndrome should not begin with the saphenous trunk but in the tributaries. In this way you can obtain a good or reasonable result avoiding the primarily destruction of saphenous trunks.

Aim. Treatments of varicous networks related to the great saphenous vein (GSV) incompetence tend towards preservation of the sapheno-femoral junction (ultrasound-guided foam sclerotherapy, endovenous techniques, crossectomy free saphenectomy) and even of the trunk (CHIVA, ASVAL). A statistic of saphenous haemodynamics became highly necessary to evaluate the risks of wrong evolution of these treatments and try to specify indications.

Methods. 790 legs with primary varicose veins linked to an incompetent thigh GSV were included. All legs required a first-hand surgery. They were investigated twice (consultation then pre-operative skin mapping) using duplex- and color-coded scan. Investigations have specifically studied the origins of the saphenous reflux. For each leg, all sources of reflux were noted with specification of the main source. The patients reported a clear improvement of symptoms and their QoL.

Results. 79.3% of junctions were incompetent; but the ostial valves were pathological in only 53.4%. The origin of reflux was pre-terminal (coming from junction tributaries) in 25.9%. Perineal varicose veins were present in 21.4% legs, but were the main origin of reflux in only 11.9%. The rates of reflux originating from primary dystrophic networks in the inguinal lymphatic layer, from thigh perforators and from sapheno-popliteal junction via the Giacomini vein were respectively 1.9%, 3.5% and 2.0%.
Conclusion. Two major lessons can be drawn from this large study: 1. Only 53.4% of ostial valves are incompetent. Consequently the top-to-bottom varicose pathogenic theory is highly controverted. 2. A treatment (and specifically the surgical resection) of the sapheno-femoral junction is haemodynamically unnecessary in 46.6% of thigh GSV reflux.

PP5.7 - Venous ulcer treatment II

PP5.7-1

Multi-layer bandaging system with tubulcus® in the treatment of venous leg ulcers

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Venous ulcers are a major health problem because of their high prevalence and associated high cost of care. The cost of venous leg ulcers is estimated to be $1 billion per year in the United States, and the average cost for one patient over a lifetime exceeds $40,000 because the natural history of this disorder is slow healing and high recurrence rate. It is estimated that 0.5% of the entire population in Western European countries has an active venous ulcer.

Methods. An open prospective single center study including 438 patients with venous leg ulcers (ulceration surface: 3 - 210 cm², duration: 3 months - 42 years) was performed. During the one year treatment period patients were treated with multi-layer bandaging system consisting of Tubulcus® (a heelless open-toed elastic class III compression stocking), and specifically the surgical resection) of the sapheno-femoral junction is haemodynamically unnecessary in 46.6% of thigh GSV reflux.

PP5.7-2

Elastic stockings and ulcer treatment: what about pressure and stiffness?

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Multicomponent bandages exerting a high standing pressure starting from a low and comfortable supine pressure (high stiffness) have a higher recommendation grade for venous ulcer treatment compared with elastic stockings producing lower pressure and stiffness.

Aim. Evaluating an optimal compression system for venous ulcers treatment comparing elastic properties over time of 2 compression devices by in vivo-measurements.

Results. The mean pressure (mm Hg) in the supine and standing position was 45.8±5.8 and 55.2±5.1 (ulcer kit), 69.5±8.8 and 94.8±10 (bandage system) (p<0.001). The corresponding SSI values were 9.3±0.4 and 25.3±6.1 respectively. After 48–72 hours the pressure loss in the supine and standing position was 6.1% and 5.8% with the ulcer kit, but 41.2% and 36.1% with the bandage system (p<0.001) so that the standing pressure of the bandage system came close to that of the ulcer-kit.

Conclusion. The standing and working pressure of ulcer Kit and multicomponent bandages are similar at least starting from the 3rd day, removing the outer layer over night. Pressure and stiffness were compared with those measured in 12 patients suffering from venous leg ulcers and treated by means of a multicomponent inelastic bandage system (Rosidal Sys®) with high pressure and stiffness.

Results. The mean pressure (mm Hg) in the supine and standing position was 45.8±5.8 and 55.2±5.1 (ulcer kit), 69.5±8.8 and 94.8±10 (bandage system) (p<0.001). The corresponding SSI values were 9.3±0.4 and 25.3±6.1 respectively. After 48–72 hours the pressure loss in the supine and standing position was 6.1% and 5.8% with the ulcer kit, but 41.2% and 36.1% with the bandage system (p<0.001) so that the standing pressure of the bandage system came close to that of the ulcer-kit.

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6 months of follow-up, 84.4% of the ulcers achieved complete healing. Healing rates varied depending on the incompetent vein segments. When only great saphenous vein was sclerosed, 95.1% of leg ulcers healed before 24 weeks. In contrast, when only perforator veins were treated, 78.9% of the wounds achieved healing before 24 weeks. Ulcers smaller than 10 cm² and with a history of less than 12 months had a healing rate after 24 weeks of 97.4%. On the other hand, ulcers greater than 10 cm² and with a history of more than 12 months had a healing rate after 24 weeks of 74.1%. There were no major complications, in particular no DVT or PE. Ulcer recurrence after 1.2 and 3 years was, respectively, 5.26%, 11.69% and 16.95%. Mean time for ulcer recurrence was 69.42 months.

**Conclusion.** This technique may become a first-line treatment in the management of leg venous ulcers.

**PP5.7-4**

Radiofrequency-induced thermotherapy (RFITT) and ultrasound guided foam sclerotherapy – A comparison study for the treatment of chronic venous ulcers

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In the last couple of years the usages of endovascular techniques for the treatment of higher CEAP stages (C5, C6) have been reported more frequently in the literature.

**Aim.** The study aims to compare the effectiveness of RFITT and ultrasound guided foam sclerotherapy in the treatment of chronic venous leg ulcers.

**Methods.** Between X/2007 and X/2008, RFITT was used for the treatment of 56 chronic venous ulcers in stages C5 (29 legs) and C6 (27 legs) whereas 61 ulcers in stages C5 (31 legs) and C6 (30 legs) were treated by ultrasound guided foam sclerotherapy. For RFITT of stem veins and their tributaries the CelonProCurve applicator was connected to the CelonLabPRECISION generator and RF energy of 25-30J/cm has been continuously applied on the vein walls. For RFITT of perforators and smaller epifascial veins the CelonProSurge micro applicator was used with a mean energy level of 25J/cm. Foam sclerotherapy was provided according to Tessari using Polydocanol (concentration 3%, 2% and 1%).

**Results.** There was no statistically significant difference between both methods in CEAP stage C6 (p>0,05). However, there was an important difference in Variance of times of closing the legs (using RFITT was tighter and using foam sclerotherapy was wider). During the follow-up examination (3-12 months after the procedure) 87.8% of the legs treated by the Celon method were completely healed compared to 85.5% after sclerotherapy. A recurrence was observed in 7.4% of the patients post RFITT and in 7.9% after foam sclerotherapy. There was no reopening of the leg in stage C5 at the follow-up examination in both groups.

**Conclusion.** Both methods have been proven to be fast and effective. However, no universal and one-fits-all intervention exists for the treatment of chronic venous ulcers.

**PP5.7-5**

The significance of CEAP classification for choice of surgical method intreatment of venous ulcers

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Previous biochemical (lactate, pyruvate), histological and clinical investigations show that there are two types of venous ulcerations: caused by superficial venous insufficiency (SU) and caused by deep venous insufficiency or obstruction (DU).

**Aim.** Of the study was to examine short-term and long-term follow-up using different surgical procedures in treatment of SU and DU ulcers.

**Methods.** Patients are divided into two groups: 263 patients arranged as C5-6EpAsPrPr (equivalent to SU) and 65 arranged as C5-6EpAsAdpPr (equivalent to DU) according to CEAP classification. SU group was operatively treated in superficial and perforating veins, and DU was operatively treated in deep and perforating veins.

**Results.** Patients with SU (C5-6EpAsPrPr) were operatively treated by superficial (136 partial or complete stripping of main veins), communicating (25 ligatures, 22 subfascial shearing) or combined (superficial + perforating) procedures (90). Patients with DU (C5-6EpAsAdpPr) were operatively treated by perforator’s ligature (17), subfascial perforator’s shearing (12), superficial vein operations (4), sapheno-popliteal anastomoses (18), de Palma bypass (15) and interposition of healthy saphena segment (1). Long-term follow-up was registered after 5 - 15 (average 5.7) years in 75 (58 SU and 17 DU) patients. Recidive of ulcerations are detected in 9 (15,5%) SU and 3 (17,6%) DU, i.e. (16,0%) of all operated patients with venous ulcers.

**Conclusion.** CEAP classification is equivalent to etiopathogenetic types of venous ulcerations and it is may determined a choice of surgical treatment patients suffering of SU and PU venous ulcers.

**PP5.7-6**

Autologous stem cells injection in diabetic foot ulcer: an experimental and clinical study

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The Authors describe a joint protocol between Italian and Chinese University on the issue of diabetic foot treatment with autologous bone marrow or peripheral blood stem cells. The rabbit leg chronic ischaemic ulcer has been the experimental model to evaluate the potential of mesenchymal stem cells. To regenerate a new vascular network suitable to heal the skin ulceration. The clinical study on chinese patients has been safely developed by the Authors and results confirmed the effectiveness and advantage of the procedure.

**PP5.7-7**

MRSA and infection-management of chronic wounds in dermatology

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Wound infections in dermatologic patients with chronic wounds are related with important distress for the patients and with relevant additional costs for medical care support. Worldwide, many community acquired and hospital acquired ulcus infections are complicated by CA- and HA-MRSA. The management of these pathogens requires an effective and consequent infection control surveillance system in the complex of ambulant and hospital care involving surveillance cultures of the wounds and nares before admission. The implementation of this surveillance in the department of dermatology of the university of Greifswald as part of the quality management system of the clinic has proven effective prevention of MRSA transmission (0 cases) now over >2 years despite partly high endemic MRSA-positivity in the community and sourrounding hospitals. Key point of the surveillance system is restriction of admission to MRSA negative
patients diagnosed by PCR at the day of admission. In contrast to acute wounds, in chronic wound (ulcus) infections, mixed communities of bacterial species, GRAMneg. rods (Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae) and GRAMpos. Cocci (Staphylococcus aureus, ß-hemolysing streptococci) dominate as causative agents. Before infection manifestation, postoperative like chronic wounds become colonized by typical contamination switching to invasive flora. The colonization steady state turns towards invasive infection when local and/or systemic host defense is impaired and virulence of the pathogen is appropriate. Colonization is a leading cause of infection but by itself can also disturb wound healing without manifest infection.

Conclusion. Consequent and accurate diagnostics and surveillance of chronic wounds in the frame of an implemented quality management system is recommended in order not to overlook neither the right moment for intervention by antiseptic or antibiotic and supportive therapeutic management nor the risks of epidemic spreading, e.g. of MRSA.

PP5.7-8
Clinical investigation on Panton-Valentin Leukocidin (PVL)-positive staphylococcus aureus isolates in patients with chronic wounds
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Healing of chronic wounds is influenced by multiple factors. Most often bacteria are not the primary cause for chronic wounds, but they are discussed to be responsible for a prolonged or complicated healing. In recent years increasing publication about distinct bacteria occur. Moreover in hospitaly acquired Methicillin-resistant Staphylococcus aureus (MRSA) and especially in community acquired MRSA (caMRSA) the concomitance of Panton-Valentin leuokcidin (PVL) seems to be very important. PVL is one of 3 leucocidines known in Staphylococcus aureus, which mediates additional virulence abilities amongst others by inducing pores in macrophages. In our prospective analysis of 48 consecutive investigated patients with altogether 66 chronic wounds we performed next to the common bacterial examination an additional test for PVL in Staphylococcus aureus isolates. We were able to demonstrate PVL in one patient. There exists a growing evidence that PVL could be responsible for severe clinical infectious diseases like furunculos or cellulitis with a higher rate of mortality. Up to now it is still unclear whether PVL is also responsible for a disturbed wound-healing process or infections in patients with chronic wounds. However after demonstration of PVL-positive Staphylococcus aureus in our investigation even in a patient with a chronic wound it seems to become more important for clinical treatment strategies to analyse this factors

PP5.7-9
Gram negative bacteria on the advance: results of a comparative clinical investigation in chronic leg ulcer patients about 5 years
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In our comparative retrospective clinical investigation we examined the bacterial colonisation in patients with chronic leg ulcers between January und December 2007. Altogether 100 patients with 107 leg ulcers were evaluated. 60 patients were female; 40 male. The median age was 65.01 years. We were able to find 191 bacterial and fungal isolates and 25 different bacterial species. The most common bacterium were Staphylococcus aureus (n=60), Pseudomonas aerugi-

nosa (n=36) and Proteus mirabilis (n=17). In 10 patients we verified a colonisation with MRSA. In 6 patients no bacterial colonisation could be found. A comparable examination was already done in our institution 5 years ago. At that time we found particularly more often a colonisation with MRSA (21.5% vs. 10.0%) and less often Pseudomonas aeruginosa (24.1% vs. 56.0%). The results of our investigation demonstrate the current spectrum of bacterial colonisation in patients with chronic leg ulcers in a German university wound-center compared to the results 5 years ago. We found a drift from gram-positive bacteria species to gram-negative species. After implementation of few hygiene arrangements we were able to decrease the proportion of MRSA positive patients. But now we see a dramatically increase of Pseudomonas aeruginosa colonisation. Therefore - beside the well known problem with MRSA - we would like to point at the potentially problematic meaning of Pseudomonas species in leg ulcer patients prospectively.

PP5.7-10
First results of a comparative analysis of 50 patients with chronic leg ulcers with a new technique (Essen Rotary) for bacterial smears
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Almost every chronic leg ulcer is colonised with microorganisms. Beside systemic infections especially the so called problem germs like MRSA represent a therapeutically challenge in modern wound therapy regimes. Therefore it is inevitable to specify the clinical relevant bacteria in order to initiate a specific treatment and to identify the bacterial resistances in case of a systemic antibiotic therapy. In the majority of patients in current clinical practice an exemplary bacterial swab is taken from the centre of the wound surface. This so called Levine technique is currently also propagated by the World Union of Wound Healing Societies (WUWHS). The aim of our clinical study was to compare the results of different swab techniques like Levine to the new established Essen Rotary. In this monocentric, open and prospective realised investigation 50 patients with chronic leg ulcers were examined consecutively. The most frequently identified bacteria were S. aureus in 28 (56%) patients (Levine) vs. 35 (72%) patients (Essen Rotary) and P. aeruginosa at 21 (42%) patients (Levine) vs. 23 (46%) patients (Essen Rotary). With a total of 111 germs the Essen Rotary detected significant more bacteria in compared to the Levine technique with 90 identified germs. It was of particular clinical importance that 2 of the 5 MRSA-patients could be identified with the Essen Rotary only. The results of our clinical study demonstrate that bacteria can be very heterogeneously spread on the surface of chronic leg ulcers. The Essen Rotary represents an efficient and uncomplicated modification of a conventional bacteriological swab technique, which is able to detect significant more bacteria compared to other conventional swab techniques.

PP5.7-11
Practicable patch test program for patients with leg ulcers with special reference to products of modern wound care – Results of a prospective study in correlation with literature
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Leg ulcer patients often suffer from sensitisations different from general population.
AP5.7 - Short free paper session IV

AP5.7.1

Incompetent perforator vein ablation by endovenous laser treatment with 1470 nm laser - First report in the middle east
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2 Rashid Hospital, Radiology Department, Dubai, United Arab Emirates
3 University of Heidelberg, Department of Dermatology, Heidelberg, Germany

During last decade ELT have been established successfully for the treatment of saphenous veins incompetence with advantages in comparison to classical surgical procedures. This method has been launched and successfully applied in treatment of incompetent perforator veins as well, becoming an alternative for surgical and endoscopic (SEPS) procedures. In our Phlebology Center we introduced this technique recently. Our patient was 49 years old women suffering from chronic vein insufficiency of both legs. In one session we performed complete treatment including ELT of saphenous veins and perforator vein ablation. Procedure was done as a day case under local anesthesia and ultrasound guidance. Postoperative period was uncomplicated and both saphenous and perforator veins were occluded on follow-up USS. The patient was under observation for nine month with good result. We conclude that endovenous laser treatment of incompetent perforator veins is safe and practical method with laser parameters presented in our case.

AP5.7.4

Endolaser venous system in paraguay centro de varices y estetica laser paraguay

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Aim. Paraguay a country with high tropical temperatures have a very high incidence of various problem. METHOD: Follow-up of 386 endolaser treatments in 270 patients with incompetent GSV, SSV, Perforating veins and Anterior Lateral Branch of the saphenous vein, were treated with a 810,980 diode laser energy (Synus). Vein access is achieved by percutaneous needle or stab-wound/Mueller-hook approach. Local tumescent perivenous anesthesia with Klein solution was delivered under ultrasound guidance. Energy was applied at 9-14 watts along the GSV starting at 1 cm of the SFJ laser energy was delivered using a 400µm fiber pulse duration with pullback every 2mm with pulses of 1 s with no inguinal access.

Results. Immediate collapse of the SFV or SSVwas assisted after the procedure and occlusions were observed in 98% of treated veins after 24 months of follow-up. Patients were instructed to resume daily activity and to wear stockings for one week. In 2 cases at the weekly follow-up we found partial recanalization and we repeat the cases with higher laser potency. Minimal skin burns, ecchymosis and paraesthesia were observed. There were absence of DVT and severe complications.

Conclusion. ELA is a minimally invasive ambulatory outpatient treatment for the reflux of the GSV and branches with results comparable or superior than others treatments. Safe easy to perform well tolerated, no general or regional anesthesia required and with higher rates of acception than surgery. Continued evaluation and long term follow-up are required to define the complete role of the laser en the treatment of varicos vein reflux.

AP5.7.5

The management of combined greater and small saphenous vein reflux using endovenous laser ablation

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Endovenous Laser Ablation (EVLA) for Greater Saphenous Vein (GSV) and Small Saphenous Vein (SSV) reflux is well established. Combined reflux of GSV and SSV often requires staged procedures. Additional procedures may also be required to ablate superficial varices. This will add to increased costs.

Aim. We present our early experience of single session treatment of combined GSV and SSV treatment using EVLA together with multifil phlebectomies.

Methods. Twenty three consecutive patients with primary symptomatic combined GSV and SSV reflux were assessed by a single Vascular Surgeon for interventional treatment. All had duplex scans and
were deemed suitable for EVLA (ELVeS Biolitec 980 and 1470 nm). The median age was 44 years (range 25-81) and 74% were female. All patients underwent EVLA to the GSV (70 joules/cm) and SSV (60 joules/cm) with phlebectomy in one sitting as an office based procedure. A technique of cooled local anaesthetic tumescence (40°C) was used. All patients were followed up after 14 days with clinical evaluation and duplex sonography.

**Results.** All patients had a pain free procedure which was tolerated well. The ablation of GSV (mean joules 2285) and SSV (mean joules 1426) was successful in all cases, which was confirmed by the follow-up duplex scan. The mean duration of the procedure was 70 minutes including repositioning. There were no sural nerve complications.

**Conclusion.** Combined GSV and SSV treatment using EVLA together with phlebectomy in an office based environment is feasible with good patient satisfaction. This approach may prove to be cost effective in the management of superficial venous insufficiency.

**AP5.7-6**

Single puncture technique for laser ablation and foam sclerotherapy to the great saphenous vein

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Laser ablation is an accepted method of treating an incompetent great saphenous vein (GSV) where the vein lies within the saphenous fascia. However, in some patients the GSV appears to continue distally as a large superficial branch which perforates the saphenous fascia and lies subcutaneously. This large branch is unsuitable for conventional laser ablation due to risk of skin necrosis and is therefore usually avulsed or stripped.

**Aim.** We describe a technique by which the incompetent, superficial branch of the GSV can be treated at the same time as the intrafascial GSV using a single puncture technique.

**Methods.** Using ultrasound guidance the skin is marked where the branch perforates the fascia and becomes superficial (Figure 1). The superficial vein is then cannulated with guidewire and laser sheath as distally as treatment is required. Tumescence is infiltrated around the intrafascial GSV which is laser ablated from the groin to the skin mark in the standard way (Figure 2a /2b). The laser fibre is then removed from the sheath and 5-10mls sclerosant foam is slowly injected via the side-arm, under ultrasound control, into the superficial branch of the GSV as the catheter is withdrawn (Figure 3).

**Results.** We have performed 20 cases to date. In all cases ultrasound follow-up confirmed successful ablation of the whole length of treated GSV and thigh branch. There has been one case of temporary superficial pigmentation but no thermal burns.

**Conclusion.** This simple technique allows effective endovenous treatment of an incompetent GSV and its superficial continuation using a single puncture. Since the GSV is occluded by laser ablation prior to injection of the foam the risk of foam embolisation into the deep venous system is also theoretically reduced.

**AP5.7-7**

Patient-reported outcomes following simultaneous endovascular laser ablation of the small and great saphenous veins

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Combined reflux of both great (GSV) and small saphenous vein (SSV) systems is often treated by separate procedures because of constraints in time and local anaesthetic volume or to avoid changing patient position under GA.

**Aim.** To determine whether patient satisfaction is affected when SSV and GSV laser ablation are performed simultaneously.

**Methods.** We have studied 48 patients undergoing laser ablation of the SSV for symptomatic varicose disease under local (LA) or general (GA) anaesthesia. 25 of these had simultaneous laser ablation of an incompetent ipsilateral GSV and in these cases a posterior approach to cannulating the SSV was used. Miniphlebectomies were performed as needed. Six weeks later patients completed a questionnaire including visual analogue pain score, return to activities of daily living and perceived “unpleasantness” of the procedure (Table 1). Patients were also asked whether they would recommend the mode of anaesthesia that they were given.

**Results.**

<table>
<thead>
<tr>
<th></th>
<th>SSV+GSV ablation (n=25)</th>
<th>SSV ablation only (n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA Mean pain score (1-10)</td>
<td>13.12</td>
<td>10.13</td>
</tr>
<tr>
<td>Procedure felt to be moderately unpleasant (%)</td>
<td>26.6</td>
<td>30.7</td>
</tr>
<tr>
<td>Recommend type of anaesthetic given (%)</td>
<td>73</td>
<td>72</td>
</tr>
</tbody>
</table>

There was no significant difference in the type of anaesthetic used between the 2 groups. Although pain scores were slightly higher (non-significant) in those patients having both SSV and GSV ablation this did not affect return to full activity or perceived unpleasantness of the procedure. The majority of patients were satisfied with the type of anaesthetic received.

**Conclusion.** In this study of patients undergoing laser ablation of the SSV we have found that simultaneous treatment of the GSV can be performed without affecting patient discomfort or the return to normal activities. We would therefore recommend combined SSV and GSV laser ablation in those cases with combined truncal reflux.

**AP5.7-8**

Endovenous laser ablation of the greater saphenous vein: early experience using a low energy radial fibre (ELVeS)

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**Aim.** Endovenous laser ablation (EVLA) with a bare tip fibre, using high energy and tumescent anaesthesia, commonly causes postoperative pain. This study evaluates our early experience of EVLA in treating Greater Saphenous Vein (GSV) reflux using a new radial tip fibre (Biolitec ELVeS) which reduces the amount of energy and tumescence.

**Methods.** 10 patients with symptomatic primary superficial venous disease were enrolled. Colour-flow duplex scan confirmed sapheno- femoral junction and GSV incompetence. Patients underwent local anaesthetic EVLA to the GSV using a radial tip 1470nm laser fibre. Minimal tumescent anaesthesia (0.1% lignocaine) was infiltrated around the sapheno-femoral junction. Pulsed energy was delivered at 30 joules/cm with a power of 4 watts. No phlebectomies were performed. Compression bandaging was applied for 48 hours postoperatively. A numerical rating scale (0-5) assessed pain during and immediately after the treatment at rest. Colour-flow duplex scan assessed patency of the GSV at 1 and 6 weeks after treatment.

**Results.** The median age was 61 years (39-74 years); 5 were male (50%). The median CEAP score was 4 (1-5); GSV diameter 0.8 cms (0.5-1.6 cms), treatment length was 41 cms (10-57 cms); total energy used was 1279 joules (300-2516 joules); volume of tumescent anaesthesia was 50 mls (11-140 mls); intra-operative pain score was
We have treated primary varices in 2500 legs over the past 5 years. Our preferred treatment of saphenous varices is selective stripping, where we ligate incompetent perforating veins measuring 3 mm or more. We perform subfascial endoscopic perforator vein surgery in patients with lipodermatosclerosis. Our procedure also includes foam sclerotherapy and phlebectomy (stub avulsion). In 2006, we participated in a domestic clinical study of endovenous laser treatment (EVLT) using ELVeS, a 980-nm diode laser (Biolitec, Germany), for primary varices of the legs. We found a rare case of complications in the study: a patient had a completely occluded great saphenous vein and transient thrombosis after EVLT. The patient was a 54-year-old man with the left saphenous vein varicos. The thrombus was removed after 3 weeks. On the 3rd day of treatment, the platelet count was markedly increased up to 912 x 10^9/mm3. Ultrasound color Doppler images showed an occluded superficial epigastric vein and complete occlusion of the great saphenous vein at the SFJ level. The thrombus did not extend to the femoral vein. The platelet count returned to normal after 2 months. No complications were reported after the treatments. All the patients said that they would have the treatment again and would recommend it to others. There were no complications.

**Conclusion.** Early results show that EVLA using a radial tip fibre with minimal tumescent anaesthesia is safe, effective and causes negligible post-operative pain. Late results and greater numbers are needed to assess long term outcome.

**AP5.7-9**

**Transient thrombocytosis after endovenous laser treatment for primary lower extremity varicose veins**

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We have treated primary varices in 2500 legs over the past 5 years. Our preferred treatment of saphenous varices is selective stripping, where we ligate incompetent perforating veins measuring 3 mm or more. We perform subfascial endoscopic perforator vein surgery in patients with lipodermatosclerosis. Our procedure also includes foam sclerotherapy and phlebectomy (stub avulsion). In 2006, we participated in a domestic clinical study of endovenous laser treatment (EVLT) using ELVeS, a 980-nm diode laser (Biolitec, Germany), for primary varices of the legs. We found a rare case of complications in the study: a patient had a completely occluded great saphenous vein and transient thrombosis after EVLT. The patient was a 54-year-old man with the left saphenous vein varicos. The thrombus was removed after 3 weeks. On the 3rd day of treatment, the platelet count was markedly increased up to 912 x 10^9/mm3. Ultrasound color Doppler images showed an occluded superficial epigastric vein and complete occlusion of the great saphenous vein at the SFJ level. The thrombus did not extend to the femoral vein. The platelet count returned to normal after 2 months. No complications were reported after the treatments. All the patients said that they would have the treatment again and would recommend it to others. There were no complications.

**Conclusion.** Early results show that EVLA using a radial tip fibre with minimal tumescent anaesthesia is safe, effective and causes negligible post-operative pain. Late results and greater numbers are needed to assess long term outcome.

**AP5.7-10**

**Prophylaxis of minor complications after endovenous laser treatment of primary varicose veins**

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**Aim.** The aim of this study was comparison of early results of endovenous laser vein system (ELVeS) technique with application of various solutions using for tumescent anesthesia.

**Methods.** From April 2008 to January 2009 37 great saphenous veins (GSV) in 37 patients with primary varicose veins due axial superficial reflux (C2, C3, CEAP) were treated by ELVeS technique (Ceralas D25, 980 nm, 600 µm fiber) without crossectomy under local anesthesia. Duplex scanning was used in pre-operative mapping, during intervention and for follow-up control. The patients were divided into two groups. In the I (control) group of 18 patients (18 legs) 400 ml of 0.5% novocain solution was used for perivenous infiltration of GSV trunk. In the II (researching) group were 19 patients (19 legs) with tumescent infiltration of GSV by curative mixture (fraxiparin 0.4 ml and hydrocortisone (50 units) dissolved in 400 ml of 0.5% novocain solution). Treatment options were 20W power in a pulse mode (1.0 sec pulse, 1.0 sec interval with 3 mm retraction of laser fiber after each pulse). All the patients used class II compression stocking just after treatment for 24 hours and then for 1 month daily.

**Results.** Duplex scanning was made at 24 hours, 1 week, 1 month, 3 months and 6 months. All GSV seems occluded after 24 hours. After 1 week parity of complications between I and II group was next: moderate pain – 72.2% to 68.4% (p<0,05), ecchymoses - 61.1% to 57.9% (p<0,05), swelling – 27.8% to 21.0% (p<0,05). Induration of the treated vein – 11.1% to 5.5% (p<0,05). After 1 month follow-up 35/37 GSV (94.6%) was completely obliterated, 28/29 (96.6%) at 3 months, 17/18 (94.4%) at 6 months.

**Conclusion.** Application of the mixture for tumescent anesthesia reduces frequency of some minor complications after ELVeS treatment if compared with the usage of novocain itself.

**AP5.7-11**

**Recurrent varicose veins after endovenous laser treatment**

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To refer the appearance of recurrent varicose veins after laser treatment of the refluent saphenous axis. 188 laser procedures have been carried out in the period between December 2001 and December 2007 at the Center of Phlebology of the Siena University for treatment of 185 patients with varicose veins. 145 patients are females and 42 males, ranging in age between 22 and 80 years. All patients were operated under local anesthesia and sonographic guidance. A 810 diode laser has been used in the first 75 procedures and a 980 diode laser in the following 113. The fiber laser is introduced for transcutanous way or after small cutaneous incision from the bottom to the top with the tip that arrives to cm from the saphenofemoral junction. The employed parameters have been 12 watt of power with 3 impulses of 1 second every cm of length of the vein, thus to obtain a fluence of 40 joule for cm. The immediate obliteration of the saphenous axis has been had in 182 cases (97%). The ricanulation has been documented in the instrumental follow-up in 15 patients on 108 (15.9%) at 3 years, in 12 on 75 (16%) at 4 years and in 11 on 35 (31.4%) after 5 years. The endovenous laser treatment is a simple procedure, poor invasive, that it can be performed in outpatient or Day Surgery regime without increase of the costs of stay in hospital. Its effectiveness currently is put in argument from the possibility that a recurrent varicose veins appears at distance of years from the treatment with ricanalization of the saphenous axis, even if in absence of symptomatology. In our experience this possibility has evidenced in the clinical and instrumental follow-up of patients operated after 5 years in a percentage that exceeds the 30%.

**AP5.7-12**

**The great saphenous vein crosse versus the saphenofemoral junction**

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The term crosse of great saphenous vein has been changed to safenofemoral junction in official anatomical nomenclature of the veins of the lower limbs. The term crosse, originar in latin language, means a curved stick or a hooked staff carried by a bishop, is used in Roman and Anglo-Saxon languages. In descriptive anatomy, the lasts 6-12 cm of great saphenous vein are called
crosse. In topographic anatomy there is the same term. In clinical and surgical anatomy it is described as the great saphenous vein crosse. The saphenous vein crosse has an intrascapital segment (saphenous compartment), a transscapital segment (fossa ovalis) and the sapheno-femoral confluence. In clinical physiopathology, in ultrasound physiopathology, the great saphenous vein crosse has a well known goal. There are two valves at this level of great saphenous vein. In surgical therapy the crosseotomy includes: ligation of sapheno-femoral confluence, ligation of saphenous tributaries and the removal of this segment of great saphenous vein. In time, through medical history, the great saphenous vein crosse became a common term.

Conclusion. We consider that the term of safenofemoral confluence is useful to define the anatomic-topography of the sapheno-femoral junction. The term great saphenous vein crosse has to be preserved in descriptive anatomy because it has important implications in anatomy, physiopathology, surgery and medical history.

AP5.7.13
Calculation of energy in segmental ablation of greater saphenous vein by radiofrequency
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Greater saphenous vein (GSV) radiofrequency (RF) ablation procedures are now currently performed very rapidly and the saphenous occlusion rate is very high with the ClosureFAST (CLF) catheter.

Methods. Since January 2008 to May 2008, 21 patients have been operated with the CLF catheter for varicose vein disease with significant GSV reflux. All limbs were C2 or higher CEAP clinical class. Energy delivered by the heating element during several cycles of 20 seconds along 7 centimeter saphenous segment was studied in 25 limbs during RF procedures. A total amount of 154 cycles have been collected every second, corresponding to 3080 data and a 50 minutes total heating time. There was a mean of 2 minutes for one leg (6 cycles) and the average vein length treated was 35 cm. On the proximal sapheno-femoral junction energy has been delivered twice.

Results. 100% immediate vein obliteration was observed. Third of energy is delivered very powerfully in 4 seconds and half the energy in 8 seconds, therefore temperature level is reaching quickly 120°C. Total energy delivered on the sapheno-femoral junction was near 760 joules. The average LEED on sapheno-femoral junction was 109 J/cm. Energy delivered on truncular saphenous segments was on average 410 joules (range, 286 to 531 J). The average LEED delivered was 59 J/cm. Fluence ruling a simple cycle was near 30 J/cm2 (range 20 to 49 J/cm2). During a second cycle in the same place, energy delivered by the heating element is lower i. The generator cannot deliver more than 600 J/7 cm. Therefore, RF is safe because its auto regulation gives enough energy to destroy veins from 5 to 8 mm diameter but not beyond. Larger vein of 12 mm requires a second energy cycle and a third cycle if diameter is superior.

Conclusion. Radiofrequency thermal ablation is safe and very adapted to GSV.

AP5.7.14
1470nm endovenous laser treatment of the great saphenous vein: more than 5-month follow-up
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Endovenous laser treatment (ELT) for the incompetent saphenous veins using hemoglobin specific wavelengths of laser presented high incidence of bruising and post-operative pain. The 1470nm wavelength is selective for water as the chromophore. This allows for targeted heating of the vein wall and is expected to result in decreased side effects after ELT.

Aim. To report the safety and efficacy of water specific 1470nm laser for the treatment of truncal varicose veins.

Methods. A total of 60 patients with 68 GSVs with an average diameter of 6.2 ± 1.1 mm (range, 3.0 to 9.9 mm) received ELT with 1470nm diode laser. The laser was applied at 6-12W in continuous mode distally from the sapheno-femoral junction. During a second cycle in the same place, energy delivered on the truncular segmental ablation of greater saphenous segment was on average 100J/cm. The average LEED on sapheno-femoral junction was 109 J/cm.

Total energy delivered on the sapheno-femoral junction was near 760 J/cm2. During a second cycle in the same place, energy delivered on the truncular segmental ablation of greater saphenous segments was on average 100J/cm. The average LEED on sapheno-femoral junction was 109 J/cm.

Discussion. ELT using 1470nm diode laser appears to be highly effective, fast and secure procedure.

AP5.7.15
Successful treatment of unilateral restless legs syndrome and superficial venous insufficiency with endovenous laser ablation and ultrasound-guided chemoablation
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Vein Center of North Texas, Denison, Texas, USA

Case Report: An otherwise-healthy 47-year-old woman presented to the Vein Center of North Texas complaining of an 18-year history of signs and symptoms of progressive unilateral right Lower Extremity (RLE) venous insufficiency including varicocities, edema, aching, pain, and nightly Restless Legs Syndrome (RLS) symptoms. She denied any Left Lower Extremity (LLE) abnormalities. RLS mimics (arthritis, nocturnal cramps, etc.) were excluded, and the diagnosis of unilateral RLE RLS was confirmed using the 2005 NIH-IRLSSG RLS criteria. An IRLSSG Rating-Scale questionnaire (IRLS) showed the RLS to be severe. Physical examination showed RLE varicocities and preterminal edema. Duplex examination revealed abnormal dilation and active reflux in the right GSV, SSV, and anterior accessory saphenous vein. The varicocities originated from these refluxing veins. All LLE veins were normal, as were the RLE deep/perforator systems. The patient underwent uneventful Endovenous Laser Ablation (EVELA) of the right GSV, SSV, and anterior accessory saphenous veins using the CTEV 1320nm laser and ultrasound-guided chemoablation of the varicocities with foamed 1% STS. Postoperative physical examination revealed correction of the edema and varicocities. Duplex examination at six-weeks and one-year confirmed successful ablation of all treated veins with normal venous circulation. Follow-up IRLS completed at six-weeks and one-year showed complete resolution of RLS symptoms.

Discussion. RLS affects 5-15% of Americans and Europeans. Its etiology is widely debated. RLS is generally believed to be untreatable, except by chronic drug therapy. Unilateral RLS is quite rare. The fact that the current patient’s RLS symptoms were isolated to the limb with venous insufficiency, and that these symptoms resolved with successful treatment of the venous insufficiency suggests that the RLS symptoms were due to the venous insufficiency. This is the first reported case of alleviation of unilateral RLS symptoms by EVLA / Chemoablation. Venous insufficiency should be ruled-out in all patients with RLS before initiation or continuation of drug therapy.
AP5.7-16
Is the thrombosis of the internal saphenous vein (ISV) post-endovenous laser treatment (EVLT) a predictive factor for the technique failure?
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The repermeability of great saphenous axis after EVLT is 5%, as reported in available literature. However, there are no data about the impact of saphenous thrombosis as a cause of said repermeabilization.

Aim. To determine the incidence for thrombosis of ISV post-EVLT in our clinical experience and its repercussion in the axis repermeabilization.

Methods. During last two years, we have treated a total of 590 limbs in 462 EVLT patients. Out of these, 546 were treated with a 1 506nm laser and 44 with a 1 470nm radial laser. In both cases and with ultrasound monitoring after 7 days and 1, 3, 6 and 12 months, the average yield was 36.5 J/cm².

Results. There were 18 cases (3%) of thrombosis of supragenicular ISV in the first control scan finding subsequent repermeabilization of the saphenous axis in 12 of them (9 partial and 3 total). The total number of repermeabilizations of ISV post-EVLT in our series was 20 cases, therefore, the thrombosis of saphenous axis represents 60% of repermeabilizations, according to our experience.

Conclusion. The collected data suggest that the existence of thrombosis in great saphenous axis post-EVLT is a repermeabilization predictive factor.

AP5.7-17
Laser treatment of the telangiectasias of the feet, (360 patients treated during 4 years)
J. Titon
Venous Diseases Research Institute of Paris, Paris, France

This research-work presents a treatment procedure which will have the ability to whiten the “red socks” or “blue feet”. After a thorough clinical exam and having identified the location of all the varicose veins and spider veins of the lower limbs by Color Triplex Echo-Doppler and Transillumination, a therapeutic process will be supplied; a decision should be made whether to proceed with it. It includes surgery or not and sclerotherapy in order to remove the venous stasis. Blue telangiectasias of the feet respond well to a Nd yag Laser 1064nm, with spectacular efficacy. Then the red spider veins will also be treated by Nd yag Laser (spot diameter 1 to 1.5 mm). The Pulsed dye Laser (585 to 599nm) and the KTP Laser (532nm) may also be used on “red socks”. It is compulsory to perform that laser therapy with a cooling system to avoid any risk of burning. The patients should undergo that treatment twice to obtain this effectiveness. Results should be achieved in 3 to 6 months. Since 4 years, 360 patients have been treated by this Laser treatment. We got good results (real improvement with patient satisfaction, or and, no more telangiectasia) at 6 months - with Nd yag for 78% of the patients for spider veins, and 88% of the patients for blue telangiectasia - with KTP + cooling for 82% of the patients for spider veins - with Pulsed dye Laser for 70% of the patients for spider veins. In addition, with the new Nd Yag Lasers (with cooling the procedure is easier to perform, safer, painless, with no burns, no bleeding, and no allergy. For the telangiectasia of the feet, “red socks”, “blue feet”, a thorough and accurate Sclero-Laser treatment will provide high-quality and lasting results, with a surveillance program every year (Chronic Venous Insufficiency context).

AP5.7-18
Laser treatment of venous leg ulcer in paraguay centro de varices y estetica laser en Paraguay
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Centro De Varices Y Estetica Laser Paraguay, Asuncion, Paraguay

Aim. The aim of this study is to show that laser treatment is a useful therapy for patients suffering from venous leg ulcers and to assess the effectiveness of low level laser therapy in the treatment of venous leg ulcers.

Methods. 49 cases with varicous ulcer disease were treated with the hand piece of 810nm diode laser energy (Synus R). The irradiation was between 4.6 J/square cm. This treatment is complemented with wound pads and compression bandages follow-up is achieved until complete closure of the wound, all treatment were done under local anesthesia and all receive 4 treatments with the same amount of energy every week until the wound was heal.

Results. After the treatment all symptoms significantly decreased and the symptoms were improve after one month 32 patients has the ulcer close, and the others close after two more weeks of treatments.

Conclusion. Ulcer closure rate for patients treated with laser debridement were faster than the others also the pain were improved and the patients were able to complete with very good compliance the treatment.

AP5.7-19
Report of improvement in hemodynamic dysfunction and disability secondary to CVD with multiple tributary vein ablation (MTVA) in 2 patients: correction of chronic obstruction (APG outflow fraction with superficial occlusion)
J. Hovorka
Valley Ambulatory Surgery Center, McAllen, USA

ASVAL and CHIVA not performed commonly in US and it is difficult to substratify patients. Multiple tributary vein ablation (MTVA) has been used to treat patients NOT amenable to stripping/phlebectomy or simple ligation due to lymphedema and increased skin thickness with disability (NO control) in addition to QOL symptoms. AMA GUIDE to disability stratifies peripheral venous/lymphatic disease by control of edema by elastic supports good/moderate/NO control. Patients with Stage 2-5 lymphedema and skin thickness of 5mm relative contraindication to stripping/ligation. Hypothesis: ascending evolutive complications of varicous varicosities may account for DISTAL outflow obstruction syndromes.

Methods. MTVA involves ablation with CoolTouch CTEV1320nm laser system (27nm fiber/specific FDA approval for tributaries) as some veins are quite close to the skin. Lymphedema control prior to treatment documentation Impedimed Biopimedence (Ri/Ro<10)/lymphoscintigraphy and lymphedema therapist evaluation. Duplex US venous pooling in tributary vessels/even continuous insufficiency in tributaries below knee. No proximal obstruction. Technique: Most clinically significant vein accessed and limb elevated (gravity-exsanguination)/ablated. Reverse trendelenburg allows feeding tributaries to fill/dilate and cycle is repeated to clinical control. Proximal control may also be with ligation.

Results. Patients with outflow obstruction w/ supraocc by ACI/APG Index case with ACI/APG data. 50y/o male w disability from trauma 6 years post injury (+deep venous reflux). MTVAx15on14-Jul-2008/perfororHHFXax2015-Jul-2008. ACI/APG available in clinic 20-July-2008. ACI staff reviewed all tracings.

<table>
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</table>

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Dagestan State Medical Academy, Makhachkala
G. Makhatilov, A. Kasparov, A. Mekhtikhanov, M. Varisov, O. Omarov

Methods. The comparative evaluation included 38 limbs with primary varicose veins (CEAP classes C2 to C5). Group A consisted of 20 (limbs) pts aged 30–48 years (mean, 36.8 years), and group B consisted of 18 (limbs) pts aged 29–46 years (mean, 35.9 years). All patients had junctional tributaries of GSV, or/and incompetent segment of the GSV and healthy SFJ. External stenting of the GSV ostial valve was performed at the time of varicose veins surgery at patients of A group. At B group patients the varicose veins were removed itself.

Results. During 5 years follow-up varicose veins recurrence with 33% junctional incompetence of the ostial valve was revealed at B group legs compared with 10% of A group pts.

Conclusion. This study confirm the efficiency of preventive correction of healthy SFJ during elective veins surgery at pts with junctional tributaries of GSV, or/and incompetent of the segment of the GSV in preventing the evolution of the varicose disease.

**AP5.7-22**
The use of a new endovenous laser device: results of the 1500 nm laser
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don 5
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2 University Hospital, Lille, France
3 1500 nm laser

Aim. A new endolaser wavelength in the treatment of saphenous vein reflux is evaluated in this prospective trial. A 1500 nm diode laser (Intermedica S.A., Barcelona) is used to obliterate the refluxing great saphenous vein (GSV). We study the postoperative occlusion rate at one month and six months and the natural change in the diameter of the treated veins after endovenous ablation. Secondary effects such as the occurrence of ecchymosis, postoperative pain, periphlebitis, need for analgetics, and the duration of incapacity to work are studied

Methods. In 129 patients 158 GSV were treated using the 1500nm diode laser. A clinical follow-up was scheduled at three days, one month and six months postoperatively. Several clinical scores were used: level of analgetics intake, whether or not periphlebitis occurs, incapacity to work, painscore and ecchymosis. Ultrasound scans were performed at one month and six months postoperatively. We used the GELEVscore to interpret the occlusion rate. This duplex score makes it possible to evaluate the morphological development of the treated veins.

Results. The occlusion rate at six months postoperative was 95.3%. Some of the nonoccluded veins closed spontaneously. There were limited side effects: moderate or severe ecchymosis in 19%, moderate pain in 1%, moderate periphlebitis in 8.2%, no paresthesias. The satisfaction rate was 100%.

Conclusion. Endovenous laser treatment of saphenous vein reflux using a 1500nm diode laser appears to be effective and safe. The side-effects are very limited and the treatment is well tolerated, with minimal postoperative pain. With a low energy treatment (6 Watts) we obtain acceptable occlusion rates. If we find a partial occlusion with a diameter less then 2 mm we advise re-ablation. In the treated veins after endovenous ablation. Secondary effects such as the occurrence of ecchymosis, postoperative pain, periphlebitis, need for analgetics, and the duration of incapacity to work are studied

GE5.7 - Thromboembolic disease II

**GE5.7-1**
Thrombosis prophylaxis in endovenous interventions
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Endovenous interventions (sclerotisation) are usually the well-planned elimination of intra-, subcutaneous and/or transfascial varic-
es (perforans) as well as the sclerotisation of subfascial vessels in venous malformations via the injection of a sclerosing agent. At its appropriate implementation, sclerotisation therapy is an efficient form of therapy, with very few side-effects. Nonetheless, in the context of the therapy, undesirable adverse effects may be principally observed, amongst which is thromboembolism. A higher thromboembolism risk in the anamnesis and established thrombophilia (particularly in combination with a high thromboembolism risk) is a relative contraindication of the foam sclerotisation. In rare cases, thromboembolic events (deep venous thrombosis, pulmonary embolism) arise following sclerotisation therapy. Larger quantities of a sclerosing agent, in this case particularly as foam, and patients with anamnestic subsided thromboembolism or a known thrombophilia are at a higher risk. In patients with such risk factors, a strict dosage recommendation and additional preventative measures are suggested. In such patients, the following is recommended: - Implementation of an effectual NM-Heparin prophylaxis (corresponding to the national and, in particular, international reference guidelines, e.g. 8. ACCP) - Implementation of a physical prophylaxis - Application of a lower sclerosing agent concentration in the manufacture of the foam - Application of a lower volume of foam - Decision based as each case arises (under consideration of an indication dependent risk-benefit balance) A known asymptomatic open Foramen ovale is a relative contraindication of the foam sclerotisation due to the elevated risk of arterial thromboembolism. Furthermore, a compression therapy with medical compression hosiery can favourably affect the result of the sclerotisation of spider veins. The frequency of pigmentation significantly decreases. Prior to a foam sclerotisation, it is not necessary to investigate specific laboratory parameters which indicate a thrombophilia. This is only necessary in isolated cases. Special value is emphasized on the determination of INR was requested so that the anticoagulation is between 2 and 3.

Results. The location of the clot was at the iliofemoral level in 12 patients (17.2%), femoro popliteal level in 16 patients (22.8%) at the calf level in 24 patients (34.3%) and in the gastrocnemian veins in 18 patients (25.7%). 24 patients (34.3%) had no trouble of the coagulation, 23 (32.8%) had a Factor V mutation, 8 (11.4%) a proteine S deficience, 4 (5.7%) association with Factor V mutation and proteine S deficience, 4 (5.7%) a cancer, 3 (4.3%) Factor II mutation. The patients were all reviewed in 6 months when the anticoagulant was stopped for some whose risk factors do not justify the continued long term. No recurrence or extension of thrombosis was found at 6 months and no clinical cases of symptomatic pulmonary embolism. A biological assessment is necessary to find a family thrombophilia in a large number of cases.

Conclusion. Surgical thrombectomy has an advantage over anticoagulant treatment alone for patients with iliofemoral venous thrombosis.

GE5.7-4
Etiological diagnosis of 70 patients with deep vein thrombosis of lower limbs
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Aim. of study: research an etiology of deep venous thrombosis in the blood coagulation.

Methods. from January 2003 to September 2008 70 patients with deep vein thrombosis of lower limbs documented were explored by clinical, duplex scan and blood examination.All have benefited from a combination of anticoagulant low molecular weight heparin with a single daily injection and vitamin K antagonsists since the first day according to the protocol of the American college of chest physician. Medical non elastic compression was used since the first day and was replaced by elastic medical stocking at D + 10. A new Duplex san exanimation with echodoppler was conducted at D + 10. D + 1 month and D + 6 months. Biological determination of INR was justified so that the anticoagulation is between 2 and 3.

Results. The location of the clot was at the iliofemoral level in 12 patients (17%), femoro popliteal level in 16 patients (22.8%) at the calf level in 24 patients (34.3%) and in the gastrocnemian veins in 18 patients (25.7%). 24 patients (34.3%) had no trouble of the coagulation, 23 (32.8%) had a Factor V mutation, 8 (11.4%) a proteine S deficience, 4 (5.7%) association with Factor V mutation and proteine S deficience, 4 (5.7%) a cancer, 3 (4.3%) Factor II mutation. The patients were all reviewed in 6 months when the anticoagulant was stopped for some whose risk factors do not justify the continued long term. No recurrence or extension of thrombosis was found at 6 months and no clinical cases of symptomatic pulmonary embolism. A biological assessment is necessary to find a family thrombophilia in a large number of cases.

GE5.7-5

Contribution of factor V R 506 Q - Leiden, prothrombin g 20210 a and MTHFR C 677 T mutation to the genetic susceptibility of deep vein thrombosis of lower extremities. Is screening for factor V H 1299 R and MTHFR A 1298 C justified ?

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Lebanese population harbors a very high prevalence of Factor V R 506 Q - Leiden (14.4%), Factor V H 1299 R (10.4%), MTHFR C 677 T (34.6%) and MTHFR A 1298 C (74.14%) mutation.

Aim. To assess inherited genetic abnormalities among Lebanese patients with deep vein thrombosis of lower extremities and to report their clinical outcome.

Results. From 2000 to 2008, 34 of 169 patients (20%) with vein thrombosis had thrombophilia. 25 had 1, 6 had 2 and 5 had 3 genetic mutations: Heterozygote Prothrombin G 20210 A 2, Factor V R 506 Q - Leiden: 22. Homozygote: 2, Heterozygote: 20, Heterozygote Factor V H 1299 R: 1, MTHFR C 677 T: 14, Homozygote: 3, Heterozygote: 11 and MTHFR A 1298 C: 3. Genetic testing was requested in young pa-
Hyperhomocysteinemia and venous thrombosis: our experience.
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More previous studies suggest the hyperhomocysteinemia may be a risk factor for venous thrombosis (superficial and deep). To assess the risk we studied the plasma concentration in all patients enlisted, in one year, in rehabilitative Vascular Day Hospital and 30 health subjects for control. We studied the plasma concentration of the homocysteine in 305 patients (194 females and 111 males age ranging 19-78 years), admitted to our rehabilitative Vascular Day Hospital, during one year, because of an unifying peripheral vascular disease (deep or superficial venous thrombosis, 42 cases), venous ulcers (38 cases), arthropathy of lower limbs (stages 2-4 Lérice Fontaine, 51 cases), primary or secondary lymphedema (161 cases), thoracic outlet syndrome (3 cases), and in 30 health subjects of control. We observed the following Results. 140 subjects (48.5%) presented hyperhomocysteinemia, 165 subjects (54.2%) had normal values of cysteinemia. In normal subjects we observed 6 cases (20%) of hyperhomocysteinemia. In all cases of hyperhomocysteinemia we observed a genetic mutation of the MTHFR (58 in omoxygy and 88 in eterozygy). On 1430 subjects with blood relation with hyperhomocysteinemic patients and health control positive subjects, 970 presented an MTHFR mutation (321 in omozygy and 549 in eterozygy). 149 of them (15.9%) presented hyperhomocysteinemia. In all subjects with hyperhomocysteinemia we performed a prevention by means folates, orally continuously administered, checking yearly the homocysteine values. In subjects with genetic mutation and normal values of homocysteinemia we performed a prevention by means an oral administration of Folates on alternate days. One-year follow-up demonstrated none acute event and not onset and/or progression of the thrombotic phenomena at the instrumental checks. The study confirm us the role of the hyperhomocysteinemia in the genesis of vascular diseases and the importance of the thrombotic risk primary prevention by means the study of the genetic predisposition in risk subjects.

Adherence to guidelines on the evaluation of suspicion of deep venous thrombosis in Germany
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1 Center for Vascular Diseases, Mannheim, Germany
2 Medical Department II, Friedrichstadt Hospital, Dresden, Germany
3 Department of Angiology, Northwest Hospital, Frankfurt, Germany
4 Department of Dermatology, University Hospital, Buxa, Germany
5 Department of Haematology and Oncology, Charité University Hospital, Berlin, Germany
6 Pharm Euro, GlaxoSmithKline GmbH, Hamburg, Germany
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Aim. Guidelines recommend clinical decision rules (CDR) using an implicit or explicit assessment of clinical probability (CP) followed by D-dimer testing in case of low CP. The TULIPA registry (Thrombosis and pulmonary embolism in outpatients) surveyed the adherence to such guidelines.

Methods. The diagnostic strategy followed by physicians was assessed in a registry with 326 participating vascular centers in Germany including 4976 consecutive patients suspected to have DVT. The Wells’ score could be calculated in 4658 pts and found low in 2563 (53%). In 793 of these (31%) had D-dimer tests been performed and found normal in 618 (78%) of 793. DVT was detected in 14 patients with low CP and normal D-dimers (2.5% [95%CI 1.1 - 3.4]), 4 of these were proximal (0.65% [0.1 - 1.1]), 10 isolated distal DVT (1.6% [0.6 - 2.6]). Calculating by Wells’ score 1997 was possible in 4663 pts and found low in 1911 (41%). In 612 of these (32%) had D-dimer tests been performed and found normal in 490 (80% of 612). DVT was detected in 8 patients with low CP and normal D-dimers (1.6%), 1 of these were proximal (0.17%), 7 isolated distal DVT (1.4%).

Conclusion. The guidelines’ diagnostic strategy revised an accuracy comparable to previous reports, but was implemented in one of three suspicions only. Non-adherence led to the performance of 78% unnecessary imaging procedures in patients of low CP.
Prevalence of sticky platelets in a colombian family, clinical implications, possible hereditable pattern and study of platelet receptors. Preliminary results

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The Sticky Platelet Syndrome (SPS) a cause arterial and venous thrombosis. There are controversial positions about the importance of this syndrome as a cause of inherited thrombophilia.

**Aim.** Investigate in a Colombian family of more than 70 individuals the sticky platelet phenomenon and its consequences.

**Methods.** The index case was a 70 year old lady who suffered a deep venous thrombosis without any recognized risk factor; one of her daughters have had recurrent episodes of superficial vein thrombosis, and the other one had migraines. The clinical suspicion of SPS was made and platelet aggregation was positive. Due to her family history, we determined platelet aggregation in family members. Platelet aggregation was determined using Mammen’s technique. An additional blood sample was taken for DNA extraction to genotype GPIa, GPIIb, GPIIIa and P2Y12 platelet receptors by PCR-RFLP. Preliminary.

**Results.** So far, we have results of 24 individuals: one of the generation I, 17 of the generation II and 6 of the generation III. Only one individual was negative for sticky platelets and 23 were positive: 39% type I (ADP and epinephrine) and 61% type II (epinephrine). Four of 24 individuals (16%), distributed in the three generations, have had clinical conditions associated with the SPS such venous thromboembolism, migraines and gestational losses. The genotype of platelet receptors is in process.

**Conclusion.** In this family, SPS seems to be a hereditary risk factor for thrombophilia and there is not a clear pattern of Mendelian heritage. Its genetic etiology is unknown and its genetic pattern of inheritance could correspond to a complex trait. This could be resolved with a genome wide association scan. Sticky platelets should be looked at for thrombophilia and there is not a clear pattern of Mendelian heritability.

A normal D-Dimer value, measured by a high sensitivity assay, rule out a suspected venous thromboembolism episode independently of pretest clinical probability

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All diagnostic algorithms of Venous Thromboembolism (VTE) state that when a patient has a low-moderate pretest clinical probability of VTE, evaluated by explicit rules (Wells criteria), a normal D-Dimer, rule-out these process. However, in general clinical practice, out of clinical trials, these explicit rules are rarely employed.

**Aim.** To prove that the diagnostic strategy to systematically assess D-Dimer levels to all suspicions of VTE, avoiding the image determination to patients with normal values is safe for the patients and cost-beneficial for the Institution, whatever the explicit criteria are.

**Methods.** A management survey study of all Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) suspicions, carry out between 12/2006 to 09/2008. Blood levels of D-Dimer were measured by a ELFA assay (D-Dimer Exclusion, VIDAS, BioMerieux, France). All patients with a normal (<500 ng/ml) D-Dimer value were followed by phone calls for three months. An economical cost-benefit analysis was practiced.

**Results.** A total of 3051 suspected VTE episodes were detected. D-Dimer was measured in 2240 cases. From 529 suspicions with a normal D-Dimer value, only one episode of relapsed DVT was found. No significant differences in VTE prevalence was discovered between the suspicious group with D-Dimer measured (25.3%) and non-measured group (23.1%). (Chi-square = 1.43, p=0.25). The proposed strategy is cost-benefit if the prevalence of patients with normal D-Dimer levels is more than 19.7% for DVT or 17.5% in PE suspicions. With the proposed strategy, the saving costs for each VTE episode found were from 72 6 € to 373 2 €.

**Conclusion.** D-Dimer determination by this method to all patients with suspicion of VTE, independently of the pretest clinical evaluation, could reject 23.6% of episodes with safety, providing that the patients in anticoagulant treatment or relapsing episodes are excluded, and with an important cost reduction in image explorations.

Phlebography of the lower limb: revival of a dying art

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In 1923 Berberich and Hirsch described the first in vivo human angiograms using radio-opaque contrast. For more than 50 years, phlebography has been the investigation method to diagnose venous pathology especially for the diagnosis of the deep venous thrombosis of the lower limb. With the introduction of venous ultrasound of the lower limb (US) in the late 1980 ‘s conventional phlebography is decreasingly used for this purpose. Although US has now become the imaging test of choice for venous pathology there are some instances where phlebography is still essential for the diagnosis and treatments such as venous desobstruction and stenting.

**Aim.** We present a kaleidoscope of phlebograms with the aim to visualize venous anatomy and pathology, especially for teaching purposes.

**Methods.** Through more than a hundredth carefully selected phlebograms of the lower limb we describe and clarify venous anatomy and pathology. Where instructive we combine phlebograms with Doppler US images. Each case is selected for its educational value. All venous systems are well represented.

**Discussion.** US is the gold standard for the diagnosis of venous pathology of the lower limb. Phlebograms are extremely helpful for complex venous anatomy and to explain venous pathology. There are some instances where US fails or is insufficient for the visualization of venous pathology or anatomy of the lower limb. This is the case where there are certain uncommon venous anomalies either congenital or acquired, deep venous thrombosis in certain deep veins of the lower limb and in cases where there are patient related factors impeding sufficient US visualization. In all these cases phlebography gives the breakthrough for the right diagnosis and thus for the appropriate treatment. This is the basis for good medical practice. For all these reasons we believe that phlebography should be revived and kept alive.
POSTER SESSION
DIA1

History and current status of the korean society of phlebology


The Korean Society of Phlebology was founded on 2001. The first president was Prof. Byung Boong Lee (Samsung Medical Center) from 2001 to 2003. The 2nd president was Prof. Jan-Sang Park (Catholic University) from 2004-2005. From 2006, Chairman of Board was took over the office work instead of the president. The 1st Chairman was Prof. Won- Hyun Cho (Keimyung University) from 2006 to 2007. The current 2nd Chairman is Dr. Hyunchul Kim (Hanyang University) from 2008 to 2009. For International Affairs, Korean Society of Phlebology designate Prof. Dong-Ik Kim (Samsung Medical Center) as a National Delegate from 2008. On 2009 presently, our society is composed of 1,200 regular members including vascular surgeons, thoracic surgeons, plastic surgeons, interventional radiologists and dermatologists. We have scientific congress twice annually. This year the 18th annual spring meeting was held on 29th March and 19th annual autumn meeting will be held on 25th October, 2009, at Sheraton Hotel, Seoul, Korea. Our society are concerning about the varicose vein, venous thrombosis, vascular malformation, lymphedema, vascular trauma and noninvasive vascular examinations, etc. We have plan to attract the World Congress of UIP 2013 in Seoul, Korea. Our provisional program will be presented on poster session during the Congress in Monaco.

DIA2

Effectiveness of weight loss on the evolution of chronic venous insufficiency (CVI) after bariatric surgery in obese patients

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CVI is a known complication in these patients and 2/3 of them have no venous reflux. Bariatric surgery (BS) corrects the complications of CVI in almost all patients with a Body Mass Index (BMI) $>$ 30. The objective is to study the relationship between weight loss and CVI in obese patients after BS.

Methods. From a database of 758 obese patients examined before a BS (clinical and duplex examination), patients with CVI (Gep C3-C6) and a BMI $>$ 30 were reviewed.

Results. Of the 758 patients, 57 (7.5%) met the criteria, 3 did not have a BS. 1 refused to be reviewed. 35 who had a BS, were reviewed (65%). Of the 35 reviewed patients: 30 were females. Age was 45.74 +/- 11 years. The distribution of GVAP clinical class was C6 (0), C5 (1), C4a and b (n 4 and 2), C3 (28). A venous reflux was present in 36% patients. BMI was before BS 47.72 +/- 9.05 and after 41.33 +/- 10. Weight loss was 32.13 +/- 17 kg. Period between BS and the review was 16.35 +/- 9 months. After BS, the outcome parameters were based on clinical signs: group I - no clinical improvement/aggravation, group II - clinical improvement, group III - disappearance of clinical signs. The distribution was: group I (5 patients), group II (15 patients), group III (17 patients). Weight losses (kg) were in group I: 3 +/- 7.1, group II: 34.9 +/- 3.9, group III: 36.9 +/- 3.5. There was a significant correlation between the improvement of weight loss and the improvement of CVI. The difference was very significant between the groups II and III and the group I (p<0.0006).

Conclusion. In obese patients with CVI, weight loss after BS could be a major parameter of improvement of clinical signs of CVI.

DIA3

Hungarian names in the phlebo-lymphatic clinical research

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This presentation deals with personal achievements in phlebology and lymphology by people who were born and educated in Hungary. Many Hungarians who worked abroad are mentioned, such as Albert Szentgyorgyi, who discovered flavonoids, Michel Foldi, who promoted the conservative treatment of lymphedema, Geza deTakacs, who pioneered the use of heparin prophylaxis, John Dormandy who dealt with the role of leucocytes in the development of chronic venous insufficiency, Zoltan Varady who introduced a new phlebectomy instrument and Peter Gloviczki who is one of the leader’s of the phlebo-lymphology in the USA. There are highly respected colleagues also in South America as Pedro Pablo Komlos and Roberto Varnagy, and in Australia as Peter Konrad and George Somjen. Several other colleagues can be included in this group who worked in Hungary. Endre Mester, who discovered the ulcer-healing effect of soft lasiers, Emil Monos, who dealt with the influence of gravity on the venous system, Andras Hetenyi, who made some modifications in varicose vein surgery to preserve the greater saphenous vein stem. Regarding malformation research, Emric Solajgy’s clinical and Lajos Solajty’s experiments on venous and arteriovenous diseases must be mentioned and Geza Tasnadi’s wide-ranging clinical results should be emphasized. Maybe we could include in the accepted evidence our studies which dealt with the removal of varicose veins in the absence of deep vein circulation and the evidence of AV micro-shunts behind spider veins. The activity of these people is very different from each other but what unites them is that they are all Hungarians.

DIA4

Less recurrent varicosis of the saphenofemoral junction by performing modified continuous suture of the femoral vein?

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Artemed Fachklinik, München, Germany

Aim. Neouangiogenesis originating from the endothelial tissue of the long saphenous vein and further tributary veins of the femoral vein seems to be one of the most important factors beside a genetic predisposition in the pathogenesis of recurrences and re-recurrences. In order to prevent recurrences and re-recurrences a modified continuous suture of the femoral vein is performed at the Artemed Fachklinik Munich.

Methods. A modified continuous suture of the femoral vein with non absorbable 5-0 Prolene® was performed after a complete resection of the stump of the long saphenous vein in patients with an incompetence of the long saphenous vein and in patients with recurrences of the saphenofemoral junction or with re-recurrences. Furthermore, a special closure technique of the little stumps of deep medial and lateral tributary veins of the femoral vein was performed.

Results. No postoperative complications like deep vein thrombosis were seen. Long term results concerning recurrences and re-recurrences have to be completed and will be presented.

Conclusion. Due to neovascularisation and neouangiogenesis as the reason for recurrences we assume, that recurrences are caused by endothelial hypoxia, neovascularisation, neouangiogenesis and lymphonodal-venous network originating from the endothelial tissue of the long saphenous vein as well as of deep medial and lateral tributary veins of the femoral vein. Consequently, modifications of the continuous suture of the femoral vein seem to be necessary in order to prevent contact of the endothelial tissue of the tributary veins of the femoral vein and the surrounding subcutaneous and lymphatic tissue. Compared to conventional surgical techniques the proposed experimental technique may be more successful.
The association of LBO-laser or diode-laser (with a wavelength of 532 nm) to sclerotherapy (polidocanol 0.5 - 1%) for the treatment of telangiectasias ranging in size from 0.2-1.0 mm is characterized by various degrees of effectiveness.

**Aim.** The purpose of the prospective study was to examine the results and also limits using variable spot sizes, energy fluences-powers, pulse duration and the importance of associated sclerotherapy.

**Methods.** 7 patients with variable sized telangiectasias (0.2 - small - 0.5 - large - 1.0mm) were treated using 1 spot size, 2 energy-fluences of 10 and 15 j/cm2, with 1 - 3 pulses and a repetition rate from 3 to 5 Hz. Every patient recived 1 or 2 treatments at each site by 4 - 6 - 8 weeks intervals and 42 of them needs an associate sclerotherapy (polidocanol 0.5±1%).

**Results.** 65% of patients had a greater than 50% clearance after a single treatment using the LBO-laser (532 nm) and 80% after two treatments. The association of sclerotherapy improved the results at more than 90%. The higher fluence showed comparable results with the lower fluence energies, but it marks more side effects. The best results for laser- and sclerotherapy eradication of isolated telangiectasias was seen by about 3 months to one year follow-ups.

**DIA6**

**Frequency of intima-media thickness increase and of atherosclerotic plaques in asymptomatic patients**

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2 Chaire Evaluation Ceren ESC Cembiotech, Dijon, France

**Aim.** To define the role of minimally invasive procedures in surgical treatment of varicose veins.

**Methods.** Endovenous laser treatment (EVLA) of gastrocnemius vein reflux with 1320nm - 2 case reports

F. Chapman-Smith, A. Browne
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Gastrocnemius vein (GV) reflux was treated with EVLA using tumescent anaesthesia. Foam UGS has previously been used. There are paired medial and lateral head gastrocnemius veins. EVLA is usually intrafascial.

**Aim.** To treat gastrocnemius vein reflux with 1320nm endovenous laser ablation.

**Results.** 65% of patients had a greater than 50% clearance after a single treatment using the LBO-laser (532 nm) and 80% after two treatments. The association of sclerotherapy improved the results at more than 90%. The higher fluence showed comparable results with the lower fluence energies, but it marks more side effects. The best results for laser- and sclerotherapy eradication of isolated telangiectasias was seen by about 3 months to one year follow-ups.
from 2 weeks to 1 year. The survey shows lower frequency of postoperative hematomas in group II and III patients (29 per cent and 6 per cent respectively) than in group I patients (69 per cent), while group III patients showed almost total absence of injury to the sensitive tributaries of saphenous nerves (2.2 per cent), but in 7 patients (34 per cent) various degrees of repatency were discovered within a year after the operation, which required puncture sclerotherapy.

**Conclusion.** Contemporary methods of surgical treatment of varicose disease are both highly efficient and aesthetic. Their application helps to reduce the period of patients’ treatment and recovery.

**DIA9**

**Step by step of endovascular laser procedure for treating varicose veins: our experience**

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Endovascular treatment for varicose veins offers today several advantages over surgical standard stripping. It is less invasive and it is associated with minimal discomfort and complications, with a quick recovery after treatment. The objective of this work is to report the routine care in our phlebology unit for ablation of the saphenous veins using endovenous laser. We describe patient selection, procedures of anaesthesia, duplex scanning, laser devices and optic fibers used, endovenous laser technique, postoperative management and follow-up examinations.

**DIA10**

**Laparoscopic varicocelectomy**

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**Aim.** To evaluate the effectiveness of laparoscopic ligation in the varicocele treatment. Laparoscopy has been advocated for varicocelectomy.

**Methods.** We reviewed retrospectively 101 patients who underwent laparoscopic varicocelectomy in our department from 1995 to 2008. We analyzed: age at operation, grade and side of the varicocele, intensity of the pain, response to conservative treatment and laparoscopic ligation.

**Results.** Average age was 23.7 year old (range 17-38). Mean operative time was 25 min (range 15-50 min). The varicocele was left sided in 89 patients and bilateral in 12 cases. Varicocele was grade III in 55 cases, grade II in 42 cases, and grade I in 4 cases. In 89 patients (88.3%) there was complete postoperative resolution of pain, while 12 patients (11.7%) had only partial resolution with complete resolution at 6 months follow-up with only one exception. Postoperative complications: 3 cases of pneumothorax. There was no conversion or other major complications.

**Conclusion.** Laparoscopic method was established as gold standard in the varicocele treatment because of the lower rates of recidives and postoperative complications.

**DIA11**

**Pyoderma gangrenosum-rare complication of sclerotherapy**

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Case presentation of a 42 year old female who presents with symptomatic unilateral varicose veins. Her history reveals that she suffers from rheumatoid arthritis. She has 2 children. Her second child was delivered by cesarean section and her post operative recovery was marked by multiple pyoderma gangrenosum nodules which were difficult to treat. A duplex ultrasound scan confirmed an incompetent great saphenous vein on the right leg. After discussion with her dermatologist who felt sclerotherapy was unlikely to precipitate Pyoderma Gangrenosum the patient proceeded to ultrasound guided sclerotherapy. One month later the patient presented with an ulcerating nodule on the right knee medially. Pyoderma Gangrenosum was diagnosed by her dermatologist.

**Discussion.** History and physical characteristics of pyoderma gangrenosum Recommend investigation and modern management. Brief discussion on lower extremity ulcers. Lessons to be learnt. Photographs of ulcer will be displayed.

**DIA12**

**The “Push-up”: an original technique for the surgical correction of recto-haemorrhoidal prolapse. Personal experience**

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3 University of Modena - Department of General Surgery, Modena, Italy

**Aim.** The authors suggest a bloodless and minimally-invasive treat-ment known as “Push-up”, based on the occlusion, traction and sus-pension of haemorrhoids (H).

**Methods.** With patient under local/spinal/caudal anesthesia, spiral-vertical sutures with absorbable thread are applied beginning from the site of H, by piercing the rectal wall through the mucosa and sub-mucosa. A knot is tied at the level of the H pedicle, ½ cm above the suture, in order to lead to thrombosis; the overhanging rectal wall is pierced with the same needle and 2-3 stitches are inserted leading to a “pushing up” effect towards the first knot. The end of the thread is blocked with final knot. All the H which are present ion the anal circumference can be treated at the same way. The stitching completely stops venous, arterial and lymphatic blood flow in the whole H pedicle.

**Results.** 60 patients with 1st or 2nd degree recto-haemorrhoidal pro- lapse were treated from April 2004 to March 2008: 35 male (58.3%) and twenty-five female (41.7%), age ranging from 20 to 60 y. Clinical follow-up was carried out on 54 patients (90%) at 1, 3, 6, 12 months. Only one patient (1.6%) needed secondary surgery for prolapse recurrence. In the immediate post-operative period, moderate pain, oedema, and anal sphincter spasm were present in 50 patients (83%) for 2-3 days and solved by drug administration. No major complications were observed. 20 patients (35%) were controlled at 6 months and showed no clinical signs of H prolapse with complete disappearance of the stitches.

**Conclusion.** The authors recommend the “push-up” technique as a propasable alternative to open/closed surgery in 1st and 2nd degree pro- lapse H. The described technique can be defined as minimally, bloodless surgery, with minimum post-operative complications. Further advantages are represented by low costs, brief surgery and short recovery time.

**DIA13**

**Leg ulcers in the patient with Klippel-Trenaunay syndrome - A case report**

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Klippel-Trenaunay syndrome (KTS) is a complex congenital anom-aly featuring two or more of the following: (1) capillary malforma-
tions (port-wine stains), (2) soft tissue or bone hypertrophy (or both) and (3) varicose veins or venous malformations.

Methods. We report a case of a 53 year-old male, presented with unilateral port-wine stains on his left upper and lower extremities and the trunk, soft tissue and bony hypertrophy of upper and lower extremities and varicose veins (without evidence of functional arteriovenous fistulas) on the lower extremity with two ulcers, in the medial aspect of the leg around and above the ankle. G6EApPr according to CEAP classification. After treatment with wound dressing and elastic bandage the ulcers have resolved.

Conclusion. In this case the management of this rare syndrome is generally conservative, consisting of psychological encouragement, reassurance, and the continued use of graduated compressive stockings for varicosities.

DIA14
Ambulatory treatment of varicose veins – Possibilities and limits
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This work presents our clinic activity on 3800 patients between February 2005 – January 2009 concerning varicose veins treatment in ambulatory. There were several procedures we used: endovenous laser treatment, flebectomies, sclerotherapy both normal and foam and transcutaneous laser treatment. The patients were included in CEAP classification from the beginning. The most cases were CEAP 2 (58%) followed by CEAP 1 (27%). We also had CEAP 6 cases in a small number. All patients included in CEAP 2 – until CEAP 6 class went Doppler ultrasound and the CEAP 6 class patients went flebography. The methods used for ambulatory treatment were made alone or combined.

Results. we had a mean period of follow-up of 20.7 months and in 83.2% of cases we had very good Results. absence of pain and edema, absence of varicous veins, healing of varicous ulcer. Complications – 15.8% cases consisting in: hyperpigmentation, postinjectional skin necrosis, trombosis, superficial flebitis, recurrence of the disease.

Conclusion. Ambulatory treatment of varicose veins has good results both functional and esthetic.

DIA15
Late complications the sequel of deep venous thromboses
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The aim of the present research is to determine the degree of rechannelization, the frequency of the reflux and the PTS in the case of patients with proximal DVT adequately treated or not adequately treated.

Methods. Clinically and by means of Color Doppler 65 patients with DVT were examined. The patients were divided into two groups: group A – 34 patients treated from DVT with heparin (UFH) or LMWH for 5-7 days during the acute phase and with Acenocumarol, Daflon (Diosmin) and by means of leg compression stocking for a period of 6 months; group B – 31 patients with DVT who had not undergone systematic therapy because of there being contra-indications preventable. In group A there was not a single case of recrudescence of DVT, while in group B in one patient (3.2%) such a recrudescence did occur.

Conclusion. The systematic six-month treatment rechannelization and increases the frequency of venous reflux, PTS and the recrudescence of DVT.

DIA16
The true cause of varicose veins is chair-sitting
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Human being is a part of nature and free of varicose veins from the start. In the course of life changes from veins to varicose veins occur. There is a cause for this, which has not been revealed yet.

Aim. Looking for a natural way of prevention by detecting the cause.

Methods. Well known risk factors and suspected causes are tested, if they can cause the disease. Precondition is, that this factor must be present in the patients life. Obesity, had connective tissue; heredity, pregnancy, long standing in profession and sitting are tested.

Results. No risk factor is the cause for varicose veins. The tested factors might contribute and correlate in extension or time of first appearance only. Sitting on chairs turns out to be the only epidemiological difference between populations free of varicose veins and regions, where the disease is wide spread.

Conclusion. Chair-Sitting is the one and only cause of variocose veins. A plausible model of the change in anatomy is presented and the reasons, why the cause has not been detected so far are discussed.

Natural prevention is: staying off the chair and living on the floor.

DIA17
The a of CEAP: imaging of vein walls
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Anatomical section of NÄAD including 18 named venous segments should be examined for venous pathology in each patient with chronic venous disease (CVD). High resolution ultrasound scanning allows assessing the structure of vein wall and surrounding tissue of every vein segment independent from symptom-complex.

Aim. To define vein pathology with the help of ultrasound scanning including “intelligent” echo-color Doppler systems.

Methods. Symptomatic CVD patients were examined with ultrasonography with high-frequency probes (17,0 Hz) SonocG imaging and XRES-technology adapter for ultrasound. CEAP clinical class varied from C0 to C5 and etiological class was detected as A0 in all examined patients. Each patient was examined to check and obtain images of all 18 venous segments in line with NÄAD standards.

Results. 1. Pathomorphological changes of vein wall can be registered in each segment of deep venous system at any clinical class. The most typical deformation is thick vein wall frequently met at the left common and external iliac vein segment. 2. At C0-C1 segmentary deformation of deep, superficial and perforant vein wall is registered usually combined with visible endothelium defects. However, reflux as such was not registered. 3. Pathological changes of paravenous tissues of superficial veins can be detected as liquid escalation and accumulation (early stages of lymphostasis) without clinical manifestation. 4. Pathological changes of deep veins paravenous tissues are registered at intramuscle vein as muscle tissue deformation and intramuscle vein as fascial tissue dysplasia.
**DIA18**

**Evaluation of a novel two layer compression stocking system in the treatment of venous leg ulcers**

J. Benigni, F.A. Allart

**Aim.** Evaluation of the efficacy of a novel two layer compression stocking system in healing rates of venous leg ulcers for a treatment period of 6 weeks.

**Methods.** Multicenter, open clinical trial including outpatients with venous leg ulcers characterized by size >4cm² (planimetry), ABI >0.8, <1.3, and duration of at least 1 month but less than 1 year. The compression system call Saphenamed UCV consisted of two compression stockings: an understocking with no compression on the foot and 18-23 mmHg at ankle (measure point B) worn day and night and an overstocking with open toes and a pressure range between 23-32 mmHg worn during the day only. In combination (understocking and overstocking) a pressure of 40 mmHg was achieved as recommended. Due to the compression level of each stocking component, application is particularly easy for the patients.

**Results.** 28 patients, 74.7 ± 17.6 years old were included (67.9% women). Ulcer average area was 14.6 ± 20.7 cm² and duration was 5.4 ± 6.6 months. The rate of complete healing reached 4.4% at week 2, 17.4% at week 4, and 59.1% at week 6. A healing rate over 75% was reported for 13.0% of patients at week 2, 43.5% at week 4 and 52.2% at week 6. Moreover, compared with the initial ulcer size, there was a significant (p<0.0001) reduction of 41.7% ± 34.2% at week 2, 61.8% ± 57.7% at week 4, and 68.0% ± 54.2% at week 6. Significance was reached inITT as well as per protocol analysis.

**Conclusion.** Treatment of venous leg ulcers with the novel stocking system for 6 weeks resulted in complete healing in more than one third of the patients and healing rates of over 75% surface area in more than half of them.

**DIA19**

**Recurrences of the saphenofemoral junction due to an incompetent persisting superficial epigastric vein**

M. Broermann, S. Schattenkirchner, K. Vogt

**Aim.** Beside neovascularization, neovascularisation, genetic predisposition or incorrect operative techniques recurrences and re-recurrences of the saphenofemoral junction can be caused by a superficial epigastric vein with an insertion into the femoral vein proximal of the Hiatus saphenous. In order to prevent recurrences and re-recurrences this special rare variation of the superficial epigastric vein should be thought of in every patient.

**Methods.** Within a retrospective longitudinal study in ≈ 200 patients with recurrences of the saphenofemoral junction a continuous suture of the femoral vein with non absorbable 5-0 Prolene® was performed after a complete resection of the stump of the long saphenous vein. Furthermore, it was intraoperatively evaluated, if there exists an insertion of the superficial epigastric vein into the femoral vein proximal of the Hiatus saphenous and in case, the superficial epigastric vein was transected and ligated.

**Results.** No postoperative complications like deep vein thrombosis were seen. Intraoperative results and long term results concerning re-recurrences will be presented.

**DIA20**

**Two cases of the venous aneurysmal disease, true and pseudoaneurysm of extremity superficial veins**

J. Benigni, J.K. Chung, M. Kang, S.J. Kim

**Aim.** The aim of this study was to report the safety and efficacy of the 980-nm diode laser for the Endovenous Laser Ablation (EVLA) of SSV reflux caused by saphenopopliteal junction (SPJ) incompetence.

**Methods.** A randomized comparative prospective study was performed. From January 2007 to January 2008, in 100 patients with small saphenous veins were treated with EVLA, using a 980-nm diode laser at 10 watts in continuous mode. Patients were randomised to undergo EVLA with 40J/cm (Group A, 50 patients) or 80J (Group B, 50 patients) respectively. They were evaluated at 1 week and at 1, 3, 6, and 1 year to determine efficacy and complications.

**Results.** There was no significant difference concerning gender, age, C of CEAP, body mass index or diameter of the treated vein. Successful occlusion rates of the SSV, defined as the absence of flow on color Doppler imaging, were 98% (49/50) in group A and 100%
Histomorfology of calf muscles at patients with primary chronic venous insufficiency before and after surgery

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Aim. Lower limbs mild tissue histomorphological alterations before and after vein surgery were studied at patients with various clinical classes of CVD.

Methods. and methods. Long-term results of surgical treatment for 38 legs (classes C3, C4, C5 according to CEAP) from 6 to 48 month were studied. All patients had deep and superficial axial reflux before treatment. Surgical treatment consisted of the correction of incompetent femoral vein valves, removing superficial veins and perforating veins interruption. Derma, muscles fiber and muscles fascia of the legs were research from all patients pre- and postoperatively by histomorphological and histochemical methods.

Results. Postoperatively patients in stages C3, C4 have got regress of histomorphological alterations compared with patients in stages C5 that have got structure and degenerate alterations.

Conclusion. Surgical correction of venous blood circulation in affected limbs were more effective in limbs in classes C3, C4 if compared with class C5 where they have got non reversible structural alterations.

Relationship between thermal effect and carbon cap formed at the end of laser fiber for 810nm @EVLT procedure

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Aim. Endovenous laser treatment for varicose vein is less-invasive procedure as patients can walk as soon as taking EVLT surgery. However, individual technical factors are more important for the success of saphenous vein EVLT. The most important factor for complete vein wall closure is the thermal effect at the end of laser fiber. There are two major heat phases such as low heat stage on early phase and high heat stage on late phase of EVLT. We study about the relationship between laser power and produced carbonization cap at the end of laser fiber from early phase to late phase.

Methods. 1. Formation of Carbon cap 810nm laser irradiation was performed by 5w, 10w and 15w for 10,20,30,40,50 and 60 sec into blood. The length of the carbon cap was measured at the end of laser fiber after each 10 second irradiation. 2. Thermal changes at the end of fiber tip. Data regarding time of 810nm laser energy delivery from 5w to 15w and thermal changing were collected from closed silicon tube circuit on 2ml/s blood substitute flow.

Results. Thermal changing of pseudo-blood with early laser energy delivery were up to 20 °C. None of thermal changing was observed after 10 seconds of laser energy delivery. Due to carbonization on the fiber tip, vast thermal increasing change was observed after 200J laser energy delivered. The first 10second temperature around the fiber tip was between 10 °C and 20 °C. The lengths of carbon cap formed were 2.66 ± 0.31mm on 5W, 5.53 ± 0.68mm on 10W and 4.86 ± 0.69mm on 15W.

Conclusion. EVLT surgeon should change the laser power in order to increase the amount of the carbon cap formed at the end of laser fiber, and the rate of the complete vein closure will be raised after EVLT procedure.

Histomorfology of calf muscles at patients with primary chronic venous insufficiency before and after surgery

DIA22

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5 Dagestan State Medical Academy, Makhachkala, Russia

Aim. Lower limbs mild tissue histomorphological alterations before and after vein surgery were studied at patients with various clinical classes of CVD.

Methods. and methods. Long-term results of surgical treatment for 38 legs (classes C3, C4, C5 according to CEAP) from 6 to 48 month were studied. All patients had deep and superficial axial reflux before treatment. Surgical treatment consisted of the correction of incompetent femoral vein valves, removing superficial veins and perforating veins interruption. Derma, muscles fiber and muscles fascia of the legs were research from all patients pre- and postoperatively by histomorphological and histochemical methods.

Results. Postoperatively patients in stages C3, C4 have got regress of histomorphological alterations compared with patients in stages C5 that have got structure and degenerate alterations.

Conclusion. Surgical correction of venous blood circulation in affected limbs were more effective in limbs in classes C3, C4 if compared with class C5 where they have got non reversible structural alterations.

External banding valvuloplasty for incompetence of the great saphenous vein: a 10-year results

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Aim. External banding valvuloplasty (EBV) of the great saphenous vein (GSV) in patients with varicose veins is still controversial. This study evaluated the effectiveness of external banding valvuloplasty in selected patients with an insufficiency of the GSV after a mean follow-up of 92 months.

Methods. 101 limbs underwent EBV for the treatment of a GSV insufficiency. Thirty-one limbs from 2 patients (3 men, 24 women,
mean age, 44.2 years; range, 19 to 58 years) were re-examined and followed up for a mean of 92.6 months. The venous volume (VV), venous filling index (VFI), ejection fraction (EF) and residual venous fraction (RVF) were analyzed preoperatively and at the follow-up using air plethysmography (APG). The diameter and reflux of the GSV was evaluated using duplex ultrasound.

**Results.** Overall, the mean follow-up time was 92.6±22.3 months (range, 46 to 138 months). At the follow-up, the preoperative venous hemodynamic states had improved significantly: VV 96.0±32.3mL to 83.4±32.4mL, VFI 3.6±2.9mL/min to 2.4±2.2mL/min, RVF 39.7±18.6% to 26.1±16.8% (P<0.05). The diameter of the GSV was 6.4±1.4mm preoperatively, and 4.8±1.7mm postoperatively (P<0.01). Reflux in the proximal GSV was demonstrated preoperatively in 19 (61.3%) out of 31 limbs. During the follow-up period, 4 limbs (12.9%) had high ligation and stripping of the GSV performed due to the recurrence of varicosity.

**Conclusion.** External banding valvuloplasty of GSV provides good results in terms of the venous hemodynamics and decreasing the diameter of the GSV EBV might be an alternative procedure to stripping or endovenous ablation therapy in selected patients.

**DIA26**

**Endovenous laser treatment (EVLT) of varicose veins**

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**Aim.** Today we need to use new effective techniques for treating varicose veins, which can be at the same time less invasive and highly cosmetic. Aim: to study results of using high-energy laser in varicose vein treatment.

**Methods.** 71 patients with C2-C5 (by CEAP classification) varicose veins were treated with 980-nm laser (Dornier Medtech, Germany). Pathologic reflux of great saphenous vein (GSV) was confirmed by duplex ultrasound (US). GSV’s diameter was from 8 to 19 mm. Anesthesia was tumescent (65.1%), intravenous (4.9%) or combined (30%). In all cases operation began with crossectomy. Then laser fiber was inserted into the GSV until distal (84%), middle (6%) or proximal (10%) one-third of crus. Tumescence by J.Klein was injected perivenously under US guidance. Laser emission delivered in continuous mode with energy density of 20-25 J/cm². GSV in area of medial malleolus, lateral saphenous branches and insufficient perforating veins were resected through incisions of 2-3 mm by Varady’s method. Clinical follow-up period were from 1 month to 1.5 years.

**Results.** Duplex US made on the next day, 1 week, 1.5 months and 3 months after the operation showed successful occlusion of GSV. After 1-1.5 years GSV remained closed and had no bloodflow. In one case there was segmental recanalization after 6 months, which had no clinical manifestation. 65.7% of patients had paravasal ecchymosis during first week. 35% of patients needed sedation and/or intravenous anesthesia.

**Conclusion.** Efficacy of EVLT is as good as traditional surgery but less traumatic and more cosmetic. Crossectomy as a mandatory stage of operation prevents such complications as ascending thrombosis, recanalization of GSV and recurrence of disease as ‘long stump’ syndrome. EVLT combined with minisurgery is more effective.

**DIA27**

**Preoperative color duplex ultrasound in varicose vein surgery**

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The aim of this study is to evaluate the advantage of color duplex vein ultrasound before lower extremity varicose vein surgery.

**Methods.** We examined 45 legs in 44 patients (m-19, f-25, 28-56 years), treated in our hospital during one year, with primary varicose vein. This procedure included deep femoral and popliteal vein scan, sapheno-femoral and sapheno-popliteal junction reflux, and perforate vein insufficiency.

**Results.** In 38 patients we find safphenofemoral insufficiency, in 4 patients we find both safphenofemoral and saphenopopliteal insufficiency. In 3 patients we did not find any significant insufficiency in that specific location. In 30 patients we made ankle to groin long saphenous vein (LSV) stripping, in 8 below the knee to groin LSV stripping, in 4 patients we made both LSV and short saphenous vein (SSV) stripping. In 3 patients we made ambulatory phlebectomy.

**Conclusion.** Preoperative color duplex scanning helps surgeon to make proper decision and chose operative protocol. Type of operation is determined by presence of pathological reflux, not for avoiding the possible complication.

**DIA28**

**Endovenous laser ablation for cosmetic treatment of superficial veins of the face**

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Prominent tortuous veins of the face constitute a source of distress for many patients. To determine the safety and efficacy of endovenous laser ablation for cosmetic treatment of superficial veins of the face, we relate a case of a female, 26 years old, presenting a prominent tortuous vein in her face, localized at forehead. The patient did not suffer from collagen vascular diseases, had no chronic illnesses, and were thoroughly informed of the strictly cosmetic nature of the procedure. Endovenous ablation with laser 980nm was performed using a 200µm axial fiber. No significant hematoma or edema was seen in this patient. No ulceration or hyperpigmentation occurred long term. The follow-up period was 9 months and showed that treatment of superficial veins of the face using endovenous laser can be safe and effective.
DIA30

VENS surgery. First experience of 30 procedures
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During 2008 we performed 50 VENS procedures in 30 patients. The age of patients was about 28-57 years old. The CEAP classification of operated persons C2EpAsR. Surgical intervention was performed under local and tumescent anesthesia, in 12 cases we started the operation with crossectomia. The other 18 were performed under ultrasound control. The average time of being in hospital was 1 or 2 days. We did not get any complications during treatment and the period of recovery. During the period of observation up to 4 months we did not observed sapheno-femoral reflux.

DIA31

Miniinvasive treatment of chronic venous insufficiency
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Aim. To investigate efficacy of miniinvasive procedures in treatment chronic venous insufficiency (CVI) of the inferior extremities.

Methods. There were examined 1410 patients with CVI the inferior extremities (1355 patients had varicos disease of inferior extremities, 75 patients-posttrombotic illness in a stage of a canalization). Among patients with varicos disease of inferior extremities women were 85,1% (1110 patients), men-14,9% (225 patients). There were 66,7% (50 patients) women and 33,3% (25 patients) men with posttrombotic illness. Tropic distresses were observed at 10,6% (150 patients). Participants underwent miniinvasive procedures in treatment CVI of the inferior extremities with endoscopic subfascial dissection perforating veins carried out on operational endoscopic, radiofrequency endoluminal ablation, phlebosclerosing, compression therapy, local positive pressure in V.A.Kravchenko's vacuum chamber (Patent ¹860766, Salimzhanov N.N.) in a combination to medicamental therapy.

Results. Effectuality a stage surgical rehabilitation of patients with CVI the inferior extremities at application miniinvasive procedures has increased on 28,6%.

Conclusion. Application of miniinvasive procedures of treatment CVI of the inferior extremities frames congenital conditions for development out-patient phlebsurgery. Not reducing radicalism of intervention, they allow to achieve excellent cosmetic results. Use of these procedures conducts to downstroke of terms of treatment and disability of patients, that finally essentially reduces economic expenses for carrying out of a wide sanitation of the population.

DIA32

Small saphenous vein treated by ultrasound guided foam sclerotherapy
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Aim. To report the outcome of a series of patients with small saphenous vein due to incompetent saphenous trunks and varices of small saphenous vein treated by ultrasound guided foam sclerotherapy (UFS).

Methods. Between November 2006 and November 2008, 201 outpatients (141 women, 60 men) with varicose veins of small saphenous vein in 287 limbs were treated. 3% sodium tetradecyl was foamed 1:3 with air. The Tessari method was used to produce foam using 3% sodium tetradecyl sulphate; up to 8 mL of foam was injected per session under ultrasound control. Most of their CEAP clinical classes for the limbs was C2 (97.2%) including C3 (0.7%), C4 (2.1%). In patients with unilateral varices, only treatment was required in 42% of patients and 2 treatments in 49% of patients to obliterate incompetent saphenous trunks and varices of small saphenous veins. For bilateral varices 2 treatments were required in 41% of patients and 3 treatments in 45% of cases. The clinical outcome and potency of treated veins on duplex ultrasonography was assessed at a mean follow-up interval of 11 months.

Results. A total of 287 limbs were available for assessment at a follow-up interval of 6 months or greater. The SV had remained obliterated in 82% of limbs. Incompetent saphenous trunks and varices of small saphenous veins was effectively treated by UFS again.

Conclusion. UFS technique is useful in the management of incompetent small saphenous vein alternative to surgery.

DIA33

Chronic venous disease: pharmacotherapy with red vine leaf extract
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Chronic venous disease (CVD) is a relevant contemporary medical issue involving over 80% of population. This disease of “civilization” deserves attention and proactive measures from doctors of various specialties. To provide a prompt and professional treatment program all involved doctors should have a clear classification and diagnostic algorithm and therapy principles. Pharmacotherapy is the leading, scientifically proven and approachable way to reduce vein symptoms and improve patient life quality. A wider arsenal of phleboactive preparations – the more effective medical support will be and less severe stages of CVD in patients will be met.

Aim. To define clinical aspects of pharmacotherapy with Red vine leaf extract.

Methods. Red vine leaf extract, an active component of Antistax, was used in CVD patients of ambulatory center in Moscow. Patients of various CVD classes had a full-scale 8-12 week therapy course.

Results. 1. Antistax provides a powerful anti-swelling and pain relieving effect (taken 300 and 720 mg a day) indicated by patients at 2-3 week of treatment. 2. Red vine leaf extract was used within pre- and postoperative treatment scheme that resulted in better surgery outcome and reduced rehabilitation period. 3. Using Antistax at early stages of CVD helps to prevent clinical manifestation of disease and respectively reduces treatment costs in general. 4. Antistax is a prescription-free preparation that is approachable for patients.

Conclusion. Having a wide arsenal of phleboactive agents allows to promote CVD treatment to medical and patient public and raise awareness about CVD and treatment options. Availability of effective and safe treatment options, like natural Red vine leaf extract of Antistax, dramatically improves the quality of medical care and CVD treatment effectiveness.

DIA34

Podoconiosis: a special form of lymphoedema
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Recently, two Dutch general practitioners, asked for our opinion in the treatment of patients with podoconiosis. We were fascinated by the photos they showed us of this special form of lymphoedema. Doctors are unfamiliar with this disease. To increase attention and knowledge we did a literature search. Podoconiosis (endemic non-filarial elephantiasis) is a geochemical disease that is endemic in countries in tropical Africa, Central America and northwest India. In Ethiopia between 500,000 and 1 million people suffer from podoconiosis. Prevalence of podoconiosis is related to the geographical distribution of volcanic soil. The affected populations work barefoot on this irritating soil which is rich in elements such as aluminium, silicon, iron, beryllium, and zirconium. These elements are absorbed through the skin of the feet, causing lymphangitis of the lower legs and eventually fibrosis of these vessels. As not all members in a family seem to develop podoconiosis a genetic susceptibility was suspected. Recently, evidence has
been found for an autosomal co-dominant major gene. Podoconiosis is a bilateral but asymmetrical disease of the lower extremities that doesn’t occur above the knee. In most patients symptoms develop between the first and third decade. Men and women are equally affected. Patients develop progressive lymphoedema of the lower limbs and hyperkeratosis with the formation of moss-like papillomatosis, and ‘block’ toes. The swelling progresses in one of two types: soft and fluid or hard and fibrotic with multiple skin nodules. Eventually, fusion of the interdigital spaces and ankylosis of the foot joints develop. Like in other forms of lymphoedema, patients are very susceptible for serious infections caused by bacteria and fungi. Patients with podoconiosis are stigmatized and socially rejected. However, the development of the disease, as well as the progression in already affected patients, can easily be prevented by wearing shoes and good foot hygiene.

**DIA35**

**Narrowing of superficial and deep veins by a ready-to-wear compression device demonstrated by magnetic resonance imaging**

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The question as to whether compression causes venous narrowing is still a subject of controversial discussion and depends on the relationship between intravenous pressure and compression pressure.

**Aim.** To show the influence of a ready-to-wear compression device on the diameter of leg veins by MRI (magnetic resonance imaging).

**Methods.** Cross-sections were measured in the area of the largest calf diameter in a patient in the supine position, without compression and with a ready-to-wear compression device*. This device is recommended for small and recent leg ulcers and exerts an interface pressure of 23 mmHg at the mid calf level.

**Results.** Venous narrowing can clearly be shown in the superficial and deep veins, and in particular in the muscular sinus. Under compression, the cross-section of the leg appears nearly circular.

**Conclusion.** The ready-to-wear compression device*, which exerts a pressure of 23 mmHg at the centre of the calf in the supine position, causes considerable narrowing of superficial and deep veins, as well as closure of the muscular sinus.

*Rosidal® mobil, Lohmann & Rauscher

**DIA36**

**Elastic compression stocking after endovenous laser ablation of the great saphenous vein**

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The aim of this relate is describe a new type of elastic compression stocking. Endovenous laser ablation (EVLA) is a minimally technique for treating varicose veins due to truncal vein incompetence. Postoperative sick leave, time of normal physical activity, pain, edema and thromboembolic complications can be reduced by elastic compression stocking. We presents a new type of elastic compression stocking 20-30mmHg for one leg use (‘sac’) after endovenous laser ablation of the great saphenous vein.

**DIA37**

**Nervous relationships of the short saphenous vein**

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**Aim.** The aim of this study was to describe the anatomical relations of the short saphenous vein in the lower limb as an aid in locating important anatomical landmarks in surgical treatment of chronic venous disease.

**Results.** The short saphenous vein (SSV) runs in a compartment demarcated by muscular fascia and a membranous layer of subcutaneous tissue. In light of the close proximity to associated nerves, the clinician should be well-aware of the anatomical pitfalls in order to avoid injury of the adjacent nervous structures: at the ankle level, the sural nerve is located very close to the vein. - In the apex of the calf, area of very high risk with possible existence of a ‘short saphenous artery’ - In the popliteal fossa, close to the tibial nerve.

Complete anatomical information facilitates surgical intervention involving SSV procedures for treatment of venous disease and avoids complications.

**Conclusion.** These findings emphasize the usefulness of US venous and nerve mapping prior to an invasive procedure for treatment of chronic venous disease.

**DIA38**

**Association of crossectomy and foam sclerotherapy in the treatment of venous ulcerations at elderly patients**

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The various of surgical methods in the treatment of a chronic venous disease induces to the search of optimum solution. By one of them is the combine of crossectomy and foam sclerotherapy. The aim of this study was to estimate of efficiency combine of crossectomy and foam sclerotherapy in the treatment of venous ulcerations at elderly patients.

**Methods.** and method. Patients with an active (open) venous leg ulcer (CEAP C6) qualified for the study. From 2006 to 2008, 10 patients, 2 men and 8 women in age of 70-95 years, (mean age 78.4), 6 people with chronic venous insufficiency (CVI) VSM and 4 patients with CVI VSP. Venous USG mapping was made before operation. During the operation, in both of CVI VSM and VSP was made classical crossectomy. After the ligation of outlet of the VSM and VSP to their circumferential section introduced the thin latex catheter, through which given 3% Aethoxysclerol, then applied compression therapy and recommended walk. Control USG was performed after 1-3-6-12 months.

**Results.** In all cases has come to an efficient occlusion VSM and VSP. At all patients in 3 months reached cure the ulceration. Additionally in 2 cases was situated epidemic transplant. In 2 patients appeared pain along an anatomical course of the VSM or VSP and 3 patients had the overcolouring of skin principally on the course of lateral varicoses.

**Conclusion.** 1. Combine crossectomy and foam sclerotherapy is worthy method of recommendation in the treatment of venous ulcerations at the elderly people. 2. This method has the small number of complication, therefore can be applied at older patients with the large cardiovascular diseases.

**DIA39**

**Treatment of venous ulcers with cronocol implants – Analysis of 10 cases**

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Chronic venous insufficiency (CVI) is a health problem with a clear negative impact on society in Portugal and worldwide. Although the physiopathology is not fully known, the theory of chronic inflammation caused by chronic venous hypertension, which plays a key role in cutaneous alterations, associated to the theory of microvascular retention of leucocytes has gained relevance. The Cronocol® implant
(collagen matrix impregnated with gentamicin sulphate) contributes to the formation of good granulation tissue, better microcirculation and, through topical gentamicin, reduces the bacterial count, thereby decreasing proteolysis and exsudate. Therefore, and combined with elastic compression, it creates an ideal environment for wound healing. The goal was to clinically evaluate 10 patients, aged from 57 to 82, with chronic venous ulcer, painful on the inclusion date and resistant to other treatments, with no other associated pathologies, who were treated with Cronocol® implants. Three parameters were evaluated: pain, treatment continuity and cicatrization. As outpatients, they had the implants applied on a weekly basis, with dry compresses applied over them and, lastly, elastic bandage. The result was a painless condition after 1 to 3 dressings, a clear weekly improvement, which the patients themselves pointed out, and finally complete healing at the end of 2 to 27 weeks. We must not forget, in all these patients, the previous lengthy evolution of up to 240 weeks without evidence of improvement. Although no direct comparison with other treatments was possible in each case, Cronocol® treatment in this series was always used after failure of several others. We found it evident that Cronocol® implants significantly improve the quality of life of patients with venous ulcers and are a most effective means to heal venous ulcers resistant to other treatments. Simultaneously, they seem to help reduce the number of patients at health care centres and decrease expenses at these centres.

DIA40
Understanding of DVT is superior to knowledge about it
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Based on Vichow’s observation the knowledge about thrombosis and its treatment has grown constantly. Confusion and fear of medical misbehavior seems to grow accordingly and frightens patients and doctors alike. Using the observations of deliberate iatrogenic thrombosis during endovascular treatments of varicose veins the process of thrombosis will be presented from a new point of view. The result is understanding of the thrombotic disease. This is superior to knowing about it and offers new ways of prevention.

DIA41
Management of isolated calf deep vein thrombosis
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Aim. The aim of this study is to reveal the suitable management of isolated calf deep vein thrombosis (DVT).

Methods. The patients diagnosed isolated calf DVT by venous ultrasonography and performed follow-up venous ultrasonography were enrolled. We examined the incidence of following symptomatic pulmonary thromboembolism (PTE) or the progression of thrombus.

Results. Venous ultrasonography was performed for 662 patients and 108 patients diagnosed DVT. In these patients, 82 patients diagnosed isolated calf DVT and 56 patients performed follow-up venous ultrasonography. Elastic stocking was used for all DVT patients and anticoagulation therapy was performed in 16 patients (28.6%), depending on their attending doctor (average INR: 1.79 [1.02]. The thrombus decreased or disappeared in 26 patients (46.4%) and had no change in 27 patients (48.2%) at follow-up venous ultrasonography (20.0 [3.1 days after diagnosis). The progression of thrombus was demonstrated in only 3 patients (5.4%). These patients were all in the perioperativer period of orthopedics and performed an inadequate anticoagulation (average INR: 1.08 [0.05]. There were no patients with following symptomatic PTE.

Conclusion. Progression of thrombus or following PTE seldom occurred in isolated calf DVT patients with the use of elastic stocking. However, isolated calf DVT is able to be worsening after orthopedic surgery under the inadequate anticoagulation.

DIA42
Biomedical engineer and phlebologist: a midship frame
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Aim. At the Université libre de Bruxelles (U.L.B), training students in engineering, using computer software and mathematical models, learn to design, develop and test new materials and equipment with health professionals’ supply. The aim of this presentation is to explain some results of the medical-engineering collaboration, in the special field of venous disease.

Methods. Three different current preoccupations and their possible relevant solutions are considered and developed: • The design of an efficient retractor for inguinal surgical approach, allowing a surgeon to work all by himself. • The replacement of expensive disposable strippers by suitable metallic ones, presenting the same flexibility and supporting iterative and effective sterilization. • The design of an ambulatory mechanical device for saphenofemoral junction obliteration, in an office setting and without general sedation. These topics are studied using classical engineering approaches, by identifying the needful functions of the device to be developed. Design tools, such as CAD software for 3D modeling or numerical calculation software, are used to find their best implementation. It is concurrently discussed with the phlebologist to validate the concept.

Conclusion. The reported conducting researches reveal the strong interest in the integration of engineering and medicine. Meeting with the medical staff can help the student to better assess prototypes, troubleshooting problems, rethink the device until it works correctly, and develop their ability to design practical as well as cost effective products. Meeting with the biomedical engineer leads the vascular surgeon and the phlebologist to enhance creativity and to combine their high degree of medical knowledge with spatial awareness, three-dimensional conceptual ability and computer literacy. This collaboration can give issues to current pragmatic problems such as the chronic lack of available assistance in the operating room, the need for less expensive devices and more ambulatory procedures.

DIA43
Sugar and honey: cheap medications for the venous ulcer
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Conversely, European honey in Australia. Bactericide/acid, giving burning collateral-effect. Recently investigated. Poor-countries could benefit from these cheap-drugs. However, honey-alginate is not a cheap dressing. The Vasculab-Survey. Answers, limited-in-number, give an instantaneous-picture of the phlebological habits. In the mean, participants were mainly well-trained European Vascular-Surgeons. Sugar. Obsolete (28%), partially active (28%), comparable/better than other medications (44%). Not a first choice. Quite commonly used. Equally used alone/mixed with other substances (Vaseline/Polyvidone), constantly in any phase of therapy. Almost all add elastic compression. New trial considered useless (52%), worth-doing-it (44%), light prevalence of the first group. Honey. Obsolete (29%), partially active (18%), comparable/better than other medications (53%). Not a first choice. Less commonly used than sugar. Mainly used alone/less-frequently mixed (Zyncum Oxyde/Vaseline/Alginate), constantly in any phase of therapy. Almost all add elastic compression. New trial considered useless (53%), worth-doing-it (47%), light prevalence of the first group.

Conclusion. Sugar/honey maintain a consistent/limited role in daily-practice. Honey was recently investigated, while nowadays sugar lacks a serious scientific evaluation. Honey is better considered, but practically more rarely used than sugar. Though the survey prevalent opinion is that it isn’t worth organising a new trial, we finally propose a little experimental work (not a large trial) on these partially-abandoned materials.

DIA44

The incidence of malignant diseases among patients with deep vein thrombosis of lower extremity

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It is well known that patients with malignant diseases have increased hypercoagulability (Troussaud syndrome). However, the true incidence of deep vein thrombosis (DVT) in patients with malignant disease is unknown because most DVT episodes remain clinically silent.

Methods. The aim of our study was to establish the incidence of malignant diseases among patients with DVT. Also, in the follow-up period of 24 months after initial treatment, patients with DVT and without established malignancy were regularly checked up in order to determine the appearance of malignant disease.

Results. A total of 382 patients with DVT verified by ultrasonography were included in the study. Fifty-five patients were lost during the 24 months follow-up period and 327 patients completed the study. During the initial treatment of DVT eighteen patients (5.5%) already had verified malignant disease. The diagnosis of lymphoma and retroperitoneal tumor was established in two more patients (0.61%) after performing additional diagnostic procedures, making overall incidence of malignant diseases in patients with newly diagnosed DVT of 6.11%. In the follow-up period of 24 months the malignancy was diagnosed in 17 patients (5.20%). Six patients (1.83%) were diagnosed with cancer in the first year and 11 patients (3.36%) were diagnosed with cancer in the second year of the follow-up period. Overall, 37 patients (11.51%) included in the study developed DVT as a result of increased hypercoagulability due to presence of malignant disease. Colorectal cancer and prostate cancer were the most often seen malignancies in patients during the initial treatment of DVT (7 patients-2.14%, and 4 patients-1.22%, respectively) while in the follow-up period lung cancer had a highest incidence of 1.22% (4 patients).

Conclusion. The results obtained in our study show that the presence of DVT may be an early sign of malignant disease and that the patients with idiopathic DVT should be carefully monitored for malignancy.

DIA45

Severe drug-induced skin reaction after sclerotherapy

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We describe a case of an usual side effect after polidocanol sclerotherapy session to treat varicose veins. A 44 year female presented with superficial varicose veins. There was no history of allergic reactions and she was not taking any medications. Varicose veins were treated with one session of polidocanol microfoam. After a few days she returned to office itching all over the body. Papules on treated leg and in others areas of the body were found. She was treated with prednisone, 20mg daily, for two weeks and recovered from allergic reaction. Despite the good evolution of drug allergy, a large hyperpigmented skin lesion remained around the injection site.

DIA46

Laser therapy in treatment of angiolipathy of low extremities of chronic venous insufficient

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Aim. Rate of cases of diabetes and its dangerous complications as diabetic angiopathy of low extremities of chronic venous insufficient determine a urgency of a choice of medical influences, including phisiotherapeutic.

Methods. The 126 patients were treated aged 28 to 76 years. Diabetes of type I was diagnosed at 16 patients, the others – Diabetes of type II. 56 patients had chronic venous insufficient. The way is carried out as follows. On a background of complex treatment in the top third of hip will spend a catheterization at an aorta on Seldinger’s method with the subsequent introduction in a catheter through a rubber bung of the target end of a wavebeam guide of the laser device of an intravenous irradiation of blood ALOK-1, with a wavelength 0.65 microns, capacity on the end of a light guide 1.6 mW with optical correction on a monofiber wavebeam guide. Thus the target end of a wavebeam guide should act from a catheter in a lumen of a vessel not less than, on 20 mm. An irradiation of a blood spend daily within 60 minutes.

Results. As a result of use of the given way parameters of microcirculation were improved at 1 degrees of an ischemia on 12.5%, 2 degrees - 7.5 of%, 3 degrees - 5,1 of%, 4 degrees - 4,0 of%.

Conclusion. For improvement of efficiency of treatment the original way intrasecral a laser irradiation of a blood by capacity 1,6 mW (the patent 1 10410 Salimzhanov N.N.) was applied.

DIA47

Phlebosclerosing treatment of varicose disease using the «foam-form» technique

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Aim. To investigate efficacy of phlebosclerosing treatment of varicose disease using the «foam-form» technique.

Methods. There were examined 75 patients at the mean age 56±6.6 years. 33 patients complained of cosmetic defects, 16 patients - on the heaviness sensation in the gastrocnemius muscle in the end of day. 14 patients complained of foot edema, 12 patients suffered from pain of inferior extremities. 7 patients complained of night seizures. Participants underwent ultrasound – guided sclerotherapy by method of Tessari. After introduction of sclerosant imposed a
compression bandage and elastic stocking class II on latex small pillows.

Results. Complete obliteration of the saphenous vein and its collateral branches were obtained in 40 cases. The recanalization was discovered in 4 patients with valvular insufficiency of greater saphenous vein during year after treatment and 2 patients with valvular insufficiency of lesser saphenous vein. In 7 cases after 10 days were discovered symptoms of a local thromboflebitis. In 8 patients were discovered teleangiectasias in area of complete obliteration of vein. After treatment in 2 patients complained of cosmetic defects, 6 patients complained of the heaviness sensation in the gastrocnemius muscle in the end of day, 1 patient complained of edema, 2 patients complained of pain of inferior extremities.

Conclusion. Phlebosclerosing treatment of varicose disease using the ‘foam-form’ technique is the safe procedure, allowing to provide a safety and long-term obliteration of varicose veins of large calibre, even with high veno–venous runoff.

DIA48

The graph classification for the venous system of the lower limbs

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The Hemodynamic Venous Map (MEV) is a conceptual representation of the venous system. Paths/Cycles are easily detected by simple inspection. The Graph Classification (GC) allows a rigorous definition of Paths/Cycles. Cycles are classified too, adopting the same conceptual frame. Teupitz classification (which includes Parana) is almost a subset of GC.

Methods. Starting from the EccoColorDoppler (ECD) of the venous system and from the MEV, it is possible to derive a computerised representation (MEV-c) using the VNet Model (1991-2009/Aquarius-s.r.l.). Almost 1000 MEV-c were automatically analysed, counting the% rate of each internal net structure. Theory An essential tool is the Compartment-Level-Graph (CLG), the sequence of segmental levels in a Path, the height (1-4 bottom-up) being the type of venous net. Perforators are inserted as vertical segments which link N1 to other nets. Arches link N1-to-N2 and are not drawn in the CLG, which shows Path structure in immediate graphic format.

Graph Classification (GC):

- I-min I/O-minimal-to-minimal paths
- I/O-O-maximal-to-maximal paths
- I/O-O-open p2p
- I/O-O-point-to-point paths
- I/O-O-minimal-to-maximal paths
- I/O-O-minimal-to-output paths
- I/O-O-input-to-output paths
- I/O-O-input-to-minimal net paths
- I/O-O-input to output paths
- I/O-O-open I/O
- I/O-O
- I/O-O

GC for Paths:

Six classes of min-min Paths are recognised. Cycles are classified according to the classification of mixed non elementary min-min is built on known elementary structures. Validatoin of GC. It's accomplished: - comparing GC to previous Teupitz classification, evaluating analogies/differences. GC /Teupitz differ mainly in sub-types of type-II-closed-Shunts. - checking the completeness. In GC there are no unclassifiable objects. - checking the determination of the procedure (unique item), i.e. partitioning the set of all possible structures.

Conclusion. GC has mainly these features: - It links diagnostics to modern Graph Theory knowledge. - It classifies mainly Paths, the structures really used to transport blood and to bypass obstacles to flow as thromboses, compressions, surgical sutures. - It underlines that Cycles are classifiable as Paths.

DIA50

Surgical interventions of recurrences of the saphenofemoral junction in tumescent local anaesthesia

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Aim. Under the special aspect of intra- and postoperative anodynia and a convenient intraoperative situation for the patient and the surgeon of types local of and general anaesthesia were developed.

Methods. In a period of ten years (1998-2008) phlebosurgical interventions of recurrences, pseudorecurrences or re-recurrences of the saphenofemoral junction were performed in tumescent local anxiesthesia in the Artemed Fachklinik Munich in 5000 patients. The used tumescent solution consisted of mepsicaine or prilocaine, NaCl, epinephrine and NaHCO3 and was applied using mechanical pumps in a dosage of 500 to 1000 ml/patient.

Results. From our experience surgical interventions of recurrences and pseudorecurrences with minimal scary tissue can be easily performed in tumescent local anaesthesia; in case of recurrences or re-recurrences with extreme scary tissue and adherences of subcutaneous and lymphatic tissue in the groin an absolute anodynia can not be guaranteed and an additional total intravenous anaesthesia (TIVA) seems to be useful.

Conclusion. The tumescent technique represents a safe, comfortable and elegant method in the field of phlebosurgery. Especially in the field of phlebosurgical reoperations the advantages of this technique (reduced bleeding, hydrodissection and intra- and postoperative anodynia) are of a significant importance.

DIA51

Bilateral iliofemoral thrombosis in 19-year-old female with absence of suprarenal segment of inferior vena cava and hereditary thrombophilia – Case report

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Absence of a segment of inferior vena cava is not a frequent disorder. Moreover, patients are commonly asymptomatic, so the diagnosis is often set accidentally. It typically stays undetected by routine ultrasound examination of lower limb veins. The situation might be changed in the presence of additional risk factors, when it could contribute to thrombosis development at surprisingly early age. The case report of 19-year-old female patient without remarkable medical and family history is described. Six weeks after being put on contraceptive pills, she started to suffer back pain, propagating to right leg. After two weeks of an unsuccessful treatment by a neurologist, an ultrasound examination of lower limb veins was performed. It revealed bilateral iliofemoral thrombosis, proximally reaching the inferior vena cava (IVC), which seemed to be dilated. This finding was confirmed by subsequent CT flebography - IVC was blindly terminated at renal vessels level by a spherical sac, 44 millimeters in diameter. Suprarenal segment was absent and IVC was dedicate again at the hepatic veins junction. Numerous pelvic and paravertebral collaterals were present. Haemato logical examination revealed combined thrombophilic disorder – heterozygous Factor V Leiden, homozygous MTHFR, lupus anticoagulants positivity as well as increased levels of homocystein and factor VIII. Despite the borderline indication (more than two weeks of symptoms), the local thrombolytic therapy was administered via both popliteal veins. Check-up phlebography showed total patency of left femoral and popliteal veins, and partial recanalisation of popliteal and superficial femoral veins. After two days, the treatment was stopped because of fever and platelet count decrease. Afterwards, treatment with vitamin K antagonist was initiated, and patient was discharged, free of symptoms. The diagnosis of IVC atresia is not established frequently, however, it has to be considered in cases of idiopathic, typically bilateral thrombosis, developed at an early age.

August 2009
Hypothetical cellular and molecular mechanisms of the development of a venous leg ulcer

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It still remains unclear which factors are actually responsible for events leading from venous stasis and hypertension to the venous ulceration. Furthermore, the primary problem in studying the pathogenesis of venous ulcers is the lack of animal models for this disease.

**Aim.** The aim of this work was to establish a hypothetical model that shows how venous ulcers might develop, according to current knowledge.

**Methods.** There was performed text-mining of papers, mainly in the fields of oncology, immunology, and cell biology, with special regard to possible roles for cytokines and other signaling proteins, and focused on mechanisms leading to apoptosis of keratinocytes.

**Results.** Although it should be suspected that not all of the pieces of this puzzle are in place, it is assumed that venous hypertension resulting in the increased capillary permeability and extravasation of erythrocytes is the primary event in the pathophysiologic chain. Consequently, macrophage-derived cytokines enhance the expression of adhesion molecules in the endothelium and increase the recruitment of leukocytes to the pericapillary space. Extravasated T cells stimulated by cytokines differentiate toward the Th1 phenotype. Due to excessive extravascular passage of erythrocytes iron accumulates in the dermis. In tissues with a high concentration of iron, T cells proliferate instead of undergoing apoptosis. Stimulated by interferon-gamma and Fas ligand, matrix metalloproteinases shed Fas ligand from T cells. The combined effect of Fas ligand and interferon-gamma result in the overexpression of Fas by keratinocytes. Matrix metalloproteinases shed Fas ligand from T cells. The combined effect of Fas ligand and interferon-gamma on Fas-overexpressing keratinocytes and keratinocytes in the dermis. In tissues with a high concentration of iron, T cells proliferate instead of undergoing apoptosis. Stimulated by interferon-gamma and Fas ligand, matrix metalloproteinases shed Fas ligand from T cells. The combined effect of Fas ligand and interferon-gamma on Fas-overexpressing keratinocytes and keratinocytes in the dermis. In tissues with a high concentration of iron, T cells proliferate instead of undergoing apoptosis. Stimulated by interferon-gamma and Fas ligand, matrix metalloproteinases shed Fas ligand from T cells. The combined effect of Fas ligand and interferon-gamma on Fas-overexpressing keratinocytes.

**Conclusion.** It is hoped that future investigations may benefit from the presented hypothesis.

Assessment of the quality of life in women with venous disease

C. Taieb
Public Health and Quality of Life, Boulogne, France

Currently, venous disease constitutes a real medical problem as well as a real socio-professional disability because of its physical symptoms. The quality of life of the patients is affected by this problem.

**Aim.** Assess, in real-life conditions, the impact of a Vitamin C, hesperidin methyl-chalcone based treatment, on the quality of life of patients with venous disease.

**Methods.** Pragmatic assessment in real-life conditions over a 7-day period with the pharmacist handing out the questionnaire when the treatment is delivered. The SQOR-V, a validated questionnaire available in several languages, was used.

**Results.** 76 women were included, average age 48.95 (ET15.9), average weight 63.5 kg (ET 12), of which 51% are required to stand for more than 6 hrs, and 20% say they must stand without any rest. For 34% of them, the treatment was prescribed by a doctor, for 7% the pharmacist suggested the treatment, and 4% requested the treatment.

**Conclusion.** that all cases of cutaneous sarcoidosis, even with minimal involvement, should undergo a systemic workup.

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**Conclusion.** The treatment shows its effectiveness in 7 days through a statistically significant improvement of quality of life. This subjective data is confirmed by the patients' satisfaction expressed through the renewal of the treatment and recommending it to people they know.

Noble method for great saphenous vein trunk sclerotherapy under balloon occlusion at sapheno-femoral junction - Its safety and early results

Seirei Sakura Citizen Hospital, Sakura, Japan

**Aim.** Foam sclerotherapy of the great saphenous vein (GSV) is promising method under ultrasound-guidance to deliver foamed sclerosing agents. However, venous blood reflux or flowing out of formed sclerosants through sapheno-femoral junction (SFJ) could not be blocked. We developed a noble technique for catheter-directed foam sclerotherapy of GSV trunk under balloon occlusion at SFJ and early results of this treatment were evaluated.

**Methods.** Between April and October 2008, a consecutive series of 30 patients of varicose vein with GSV truncal incompetence in 37 limbs were treated. Up to 5.0 mL of 2.0 -2.4% polidocanol foam including contrastmedia was injected through an introducer sheath (5Fr. 30cm long), which was inserted percutaneously over a guidewire in the GSV, following balloon occlusion at SFJ using 4 Fr. Fogarty catheter under venography. All treated patients were examined by colour duplex ultrasonography between one and three months after the sclerotherapy.

**Results.** Primary occlusion rate of GSV was achieved in 33 of 37 limbs @ (89%). Ultrasonography revealed that the diameter of GSV near SFJ was decreased in 72% of all treated cases and the echogenicity of occluded GSV was increased to isoechogenic. On the other hand, the inner lumen of non-occluded GSV of 4 limbs was hyper-echogenic and the reflux flow was extremely reduced in all cases. There were no instance of deep vein thrombosis, superficial thrombophlebitis or systemic complications.

**Conclusion.** The catheter-directed foam sclerosing therapy of GSV trunk under balloon occlusion at SFJ is a safe treatment and has resulted in excellent primary occlusion rates.

Sarcoidosis mimicking the leg ulcers in the patient with chronic venous insufficiency – A case report

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**Aim.** Sarcoidosis is a multi-systemic granulomatous disease of unknown origin. Cutaneous features occur in approximately 25% of patients. The clinical presentation of cutaneous sarcoidosis is highly variable. Rare presentations include ulcerated plaques, morpheaform lesions, and unilateral lower extremity edema. It has been suggested that all cases of cutaneous sarcoidosis, even with minimal involvement, should undergo a systemic workup.

**Methods.** A 37-year-old female with a history of chronic venous insufficiency.-CESepsAsPr according to CEAP classification/developed multiple ulcers on the most common site of stasis ul-
importance of adequate management of leg ulcers in this specific context. It has been previously reported in the literature. This case stresses the importance of adequate management of leg ulcers in this specific context.

**DIA56**

**Early result of rheolytic thrombectomy in patients with proximal vein disease**

**A. Tsuji, N. Yamada, S. Ota, K. Ishikura, M. Nakamura, M. Ito**  
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**Aim.** To evaluate the acute effect of rheolytic thrombectomy for proximal deep vein thrombosis (DVT).

**Methods.** The patients diagnosed proximal DVT and treated with rheolytic thrombectomy in Mie University Hospital were enrolled. All patients performed venography before and after rheolytic thrombectomy and evaluated the effectiveness and complications associated with use. The effect was evaluated using venographic severity (VS) score, which was a scoring method to assess the amount and form of thrombi by venography.

**Results.** There were 13 patients diagnosed proximal DVT and treated with rheolytic thrombectomy. The VS score was significantly decreased after treatment (pre: 28.8 ± 7.9, post: 10.4 ± 7.1, p<0.0001). There was no major treat Erelated adverse complications.

**Conclusion.** Rheolytic thrombectomy was effective and safety for treating proximal DVT.

**DIA57**

**Endovenous ablation of the great saphenous vein with laser 980nm and 1470nm comparing with conventional surgery in patients with varicose veins: short term results**

**L. Narvaes, J. Ferreira, A. Reichelt, K. Silvestri, M. Goldani**  
PUCRS University- CV Surg DPT - Phlebology Unit, Porto Alegre, Brazil

**Aim.** Endovenous laser ablation (EVLA) is a minimally invasive technique for treating varicose veins due to truncal vein incompetence. This study compared EVLA with conventional surgery (CS) in patients with primary saphenofemoral and great saphenous vein (GSV) reflux.

**Methods.** Consecutive consenting 30 patients with symptomatic varicose veins due to GSV insufficiency were randomized to either EVL 980 nm, EVL 1470 nm or CS. Patients were submitted according to CEAP classification. No concomitant procedures was realized. Routine postoperative duplex scanning was obtained in all patients at 7 days, and 1, 3, and 6 months. Sick leave, time of normal physical activity, pain score, use of analgesics, Venous Clinical Severity Score (VCSS), QOL, patients satisfaction and complications rates were investigated.

**Results.** A follow-up of 4 months was achieved in all patients. The results were well matched for patient GSV characteristics. Occlusion of the GSV was confirmed in 100% of limbs in the EVLA groups. The surgical treatment were efficient in eliminating GSV reflux. The 3 groups experienced similar improvement in VCSS score. Postoperative pain, bruising and use of analgesics were higher in CS group. Also, this patients left more time to resume normal physical activity and work. No cases of major complications occurred. No cases of venous thromboembolism occurred.

**Conclusion.** This study suggests that the short-term efficacy and safety of EVLA and CS are similar. Increased postoperative pain, bruising and use of analgesics in the CS group and earlier return to normal activity following EVLA may confer important socioeconomic advantages.

**DIA58**

**The foot venous pump: anatomy and physiology**

**J. Uhl, C. Gillot**  
Laboratory of Anatomy - University Paris Descartes, Paris, France

**Aim.** To describe the venous anatomy of the foot in order to enlighten the mechanism of the plantar foot pump.

**Methods.** and methods: 150 human feet of fresh cadavers injected with latex then a complete dissection, drawings and photographs make the basis of this anatomical study. Veno-CT with 3D reconstruction of the foot were also performed in 50 varicose patients.

**Results.** This study demonstrates that the concept of the "plantar sole of Lejars" is not correct: the true plantar pump is located deeply at the level of the plantar veins. In fact, the normal sole described by Bourcevet is made with a thin network an its dilatation (Lejars) is a very pathological state, resulting of a severe distal venous stasis.

**Conclusion.** The reservoir of blood moved up by the manual pressure of the sole and the pressure of the foot at each step during walk is truly located in the lateral plantar veins (20 to 35 cc). This emphasize the importance of foot static disorder in all IVC patients. The foot pump is really the first step of the venous return of the lower limb during walk. The second step being the calf pump activated by the contraction of the soleus, then gastrocnemius muscles.

**DIA59**

**Advance phlebology treatment - 5 years own experience**

**K. Wasilewska 1, Y. A. Kazim 1, G. Wasilewska 2**  
1 Rashid Hospital, Vascular Surgery Department, Dubai, United Arab Emirates  
2 Rashid Hospital, Radiology Department, Dubai, United Arab Emirates

In February 2004 we had established the first Phlebology Center in the Middle East with a fully equipped, up to date operation theater for vein surgery in Rashid Hospital, Dubai. Combinations of different surgical procedures were applied in almost two thousands cases to the patients suffering from venous diseases. During our 5 years experience we had performed successfully more then 500 ELT with no major complications. We would like to share our own experiences, results and rare complications.

**DIA60**

**Cost-effective-training device for micro foam ultrasound-guided sclerotherapy [UGS] for varicose vein treatment**

**J. Wulf 1, M. Sica**  
1 3B Scientific GmbH, Hamburg, Germany  
2 Deputy General Secretary of French Society of Phlebology, Paris, France

UGS with foam is effective in the treatment of complicated and uncomplicated varicose veins [1,2]. In order to achieve an optimal out-
come and to minimize complications an appropriate amount of skill and training is required. Effective application of ultrasound guided techniques requires knowledge and experience of ultrasonography and good hand-eye coordination. The aim of this project was to develop a cost-effective training device to improve the acquisition of pre-clinical skills of vascular specialty students and trainees for micro foam ultrasound guided sclerotherapy for varicose vein treatments.

Methods. To meet the requirements of appropriate material that mimics the ultrasound specific echogenic characteristics of soft tissues, laboratory investigation was performed. Furthermore mechanic properties were taken into account. The development process of training device was supervised by a clinically experienced phlebologist (20 years of experience, about 40000 UGS procedures performed in his career).

Results. UGS simulation was performed on the developed training device. Ultrasound appearance of the target vein was represented well and realistically. The needle insertion into the lumen of target vein was performed successfully and micro bubbles of foam represented a good contrast in the ultrasound scans.

Conclusion. In the training of UGS an affordable and appropriate training device may help to improve basic skills before procedure is performed on patients. Further validation how simulator based training of UGS will improve skills of trainees will be in focus of future investigation.

References

Ambulatory phlebectomy in the treatment of varicose veins
S. Zivic, D. Milic, N. Ilc, I. Smiljkovic, N. Djordjevic, V. Zivkovic
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Ambulatory phlebectomy is a relatively new method in the treatment of varicose veins. Using this protocol, an atraumatic small headed stripper is turning the vein inside out and is basically peeled out from soft tissues of the leg. No trauma is afflicted to the surrounding soft tissues.

Aim. The aim of our work was to show the results in the treatment of varicose veins using ambulatory surgical protocol in patients operated at our institution during the two years period (1.1.2007 - 31.12.2008)

Methods. Prospectively we have analyzed a group of 42 patients who underwent this surgical procedure. Male: female ratio was 1:2 with median patient’s age of 48.1 years (23 to 61 years). All patients (100%) were operated in loco-regional anesthesia. We have analyzed: operating time, postoperative complications, recovery time and return to work, the need for postoperative analgesia and the cosmetic effect.

Results. The average operating time was 49 minutes per leg (27 to 101 minutes). We have registered no postoperative complications. The average hospitalization was 1.2 day (6 hours to 2 days) and most patients went back to work after 5 days (2-11 days). Twenty-eight patients (66.6%) did not need any postoperative analgesia and the cosmetic effect was much improved compared to standard procedures.

Conclusion. The advantages of ambulatory phlebectomy are: simplicity, practically no postoperative complications, short hospitalization period and early return to work. In conclusion, ambulatory phlebectomy is a minimally invasive procedure and by avoiding general anesthesia, hospital setting and convalescence. It is also a very cost efficient procedure.
VIDEO SESSION
Dia. Video-1

Correlations between interface pressure measurements and a CT scan with 3D reconstruction under specific eccentric compression at the thigh level

J. Benigni1, J.F. Uhl, A. Cornu-Thenard
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2 French University Group for Medical Compression Study, Paris, France

After treating the great saphenous vein [GSV] trunk (surgery endovenous procedures) some adverse effects could potentially be serious (thrombosis) and can hinder a return to work (pain). They could be prevented by applying a compression on the thigh. To compress the saphenous trunk or canal, it is advisable to place a pad between the compression and the skin. No physical proofs of the effects have validated this theoretical notion. To measure the interface pressures at point F (middle of the thigh) between the skin and 2 compression stockings (CS) before and after adding a specific pad on the thigh. To evaluate the effects on the mean pressures of the reconstructed pad under 2 thigh CS without and with interposition of the foam pad, the diameter and morphology of the GSV trunk was assessed.

Results. In supine and standing position, the mean pressures in F under 2 thigh CS without and with interposition of the foam pad are 19, 22, and 57.5, 66 mmHg. On the 3D scan reconstruction, without pad, no compression of the trunk of the GSV is observed in spite of the 2 CS. At the oppo site, with the pad, a reduction of the section of the GSV is obtained:75% at the lower and upper parts, 40% in F.

Conclusion. This study shows that the interposition of a specific pad between a compression device and the skin at thigh level can be used to increase the interface pressure. The CT scan with 3D reconstruction shows that this system provides an effective compression of the GSV trunk at the thigh level.

Dia. Video-2

SEPS – The way we treat incompetent perforators
C. Costa Almeida, L. Carvalho, L. Reis, C.E. Costa Almeida
Centro Hospitalar De Coimbra, Coimbra, Portugal

Valvular incompetence of perforator veins is a possible and frequent major pathogenic factor in chronic venous disease of lower limbs. We deal with this situation surgically, by subfascial endoscopic perforators surgery (SEPS). This video, with didactic purposes, shows this technique in detail. Through a small skin incision in the proximal medial third of the leg (over the usual route of the short saphenous vein, which can be assessed at the same time, whenever necessary), we get into the subfascial space with a videocamera disposing of one 5mm working channel. After creating a working space by insufflation of CO2, we easily reach the incompetent perforators, dissect them free and clip and cut them. With just one incision in sound skin we treat incompetent veins under skin in very bad condition, even with an open ulcer. It is possible to assess the subfascial space and the perforators pale red and vital, as it is made evident in the film. Sometimes these veins are so dilated that it is not possible to embrace them with a 5mm clip and a larger clip becomes necessary, applied by an appropriate 9mm clipper. It is important to have previous ecodoppler information about the presence of incompetent perforators, but it is not necessary to have them exactly located in the leg. This operation, technically easy and quick to perform by surgeons with video surgery experience, is done as the only procedure or as part of a larger and more complex surgical treatment of venous insufficiency, as planned to each patient. Functional and cosmetic results are very good.

Dia. Video-3

Reticular veins on the face: experience of seven years on laser treatment.
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2 Universidade De Sao Paulo, Sao Paulo, Brazil

Aim. Reticular veins are seen as a cosmetic problem when visible in the face. Many patients and physicians are not aware that nowadays transdermal lasers are capable of a selective photothermolysis. New lasers have 1064nm wave length, long pulse, large spot size and when properly set does not damage the skin. Large veins on face have thin walls, low pressure and facial skin has lower laser absorption. On the other hand, injecting sclerosants may cause severe complications for reticular facial veins require high volumes; those veins have no valves and are connected to deep cranial veins. The objective is to describe our laser experience on treating facial veins (2 to 3 mm).

Methods. All patients were photographed or filmed prior to treatment. All laser devices used were Nd: YAG 1064nm (Vasculight until 2002, Quantum until 2005 and Harmony from then on). Most of the times is performed a sequence of 6mm, 108/cm2 with pre, parallel and post skin cooling. Interval between sessions is generally 2 weeks. No medication is used and sometimes gel is applied.

Results. In our clinic patients generally come in for leg vein treatment. At least 10% of them have veins to be treated on face. The patient with longest follow-up period was 5 years. In this patient, 100% clearing was obtained in 2 sessions and the vein did not recur. Ecchymosis occurred in less than 2% of the patients. Dermal crusting was observed in less than 1%

Conclusion. Transdermal lasers are a good and safe option to treat reticular veins in the face.

Dia. Video-4

3D virtual trip in the venous system
J. Uhl
Digital Anatomy Unit University Paris 5 Descartes, Paris, France

The aim of this video is to demonstrate the major role played by the new computerized imaging tools available today in the fields of morphology and vascular anatomy. For anatomical studies or educational purposes, they enhance classic techniques. Three-dimensional reconstruction, which is already used in daily clinical practice, will be the basis for computation of validated volumetric protocols enhancing our diagnostic, prognostic, and therapeutic methods. It is also a fantastic educational tool: interactivity and virtual dissection makes it simple, efficient, attractive, and easily understandable, particularly in the field of venous anatomy. 2-3 case reports of CVD are shown to demonstrate the power of this new tool.

Dia. Video-5

Video comparison of in vivo and in vitro patterns of foam sclerosant distribution
J. Ragg
Angiologic, Berlin, Germany

Aim. To optimize strategies of foam sclerosant treatment by understanding and steering of foam distribution.

Methods. First, a glass-pip model is used to study the distribution patterns resulting from varying injection velocity, pipe diameter and slope. Second, in-vivo studies were performed using video registration of contrast-controlled foam propagation in diseased veins.

Results. The in vitro foam injections demonstrate that slow injections may result in only partial wall contact, while rapid injections will cover the whole circumference of the vein. However, rapid injections
may lead to foam propagation in other than the target vessels. In-vivo injections are far more complex, as more side branches and perforators are involved. The in-vitro findings were confirmed.

Conclusion. Pipe models and in-vivo contrast-controlled foam injections may help to understand foam distribution patterns and the influence of injection velocity, vessel diameter and particular anatomic situations.

DIA.VIDEO-6
Improving varicose vein surgery with transillumination
A. Reichelt, L. Narvaes, J. Ferreira, M.A. Goldani
PUCRS University CVSurgery Depto, Porto Alegre, Brazil

Varicose vein surgery, probably one of the most common surgical procedure perfomed, is very dependent of prior correct marking. This video will show the value of transillumination, first we do the varicose vein map in standing position and after in horizontal position, with help of a transilluminator, we perfome again, using diferente color pen, varicose vein map. Transillumination mapping enhances the location of veins and in consequence improves the quality of treatment.

DIA.VIDEO-7
Great safenous vein ablation with laser 1470 using radial emission optical fiber
A. Reichelt, J. Ferreira, L. Narvaes, M.A. Goldani
PUCRS University CVSurgery Depto, Porto Alegre, Brazil

Varicose vein disease, probably one of the most frequent human disorder, were submitted along the centuries to many forms of treatments from cauterization to new era of endovascular LASER ablation. This was standarized by International Endovenous Working Group (IEWG) with axial fiber and tumescent anethesia. Recently a new model of fiber with radial emission and new LASER wavelength 1470 nm were introduced. LASER 1470 is mainly absorbed by water and radial emission fiber, which has more homogeneous distribution of energy, can be used without tumescent anesthesia, allowing to see with ultrasound control in real time vein closure process.

DIA.VIDEO-8
Endovenous laser: 9 years experience - lessons learned
A. Reichelt, J. Ferreira, L. Narvaes, M.A. Goldani
PUCRS University CVSurgery Depto, Porto Alegre, Brazil

Endovascular treatment of vein reflux, mainly great and short safenous veins, had an important improvement with use of endovascular laser technique. This treatment was developed by Dr Carlos Bone Salat in 1997. Since then many modifications were developed to improve the quality of results. Here we listed some modifications adopted by our group: 1-Ecocolorduplex always for diagnosis and during procedure. 2-Check all equipament before procedure. 3-Check if the fiber isn’t inside of the sheat. 4-Check when pull back the sheat, if the fiber come together. 5-Patient position during procedure. 6-Cover ultrasound keyboard with sterilized transparent plastic sheet. 7-Transducer prepare. 8-Povidine as gel a gel transmission. 9-Tourniquet to increase vein dilatation. 10-Corkscrew manover. 11-Doubgle vision helps vein puncture. 12-Fixed fiber to skin. 13-Fixed needle soft to increase vein dilatacion. 10-Corkscrew manover. 11-Double vision.
NATIONAL SOCIETIES
SESSIONS & SPECIAL
CHAPTERS
SC1.9 - Session of the Latin American Chapter.
The varicose syndrome: the Latin America overview of the diagnosis and management

SC1.9-1
Foam in Argentina - State of the art - Latin American Symposium
N. Rosli
Centro de Flebología Never Rosli, Córdoba, Argentina

In our Phlebology Center we have a very long experience about Sclerotherapy. This position is very well known for the most important Argentinian Phlebologists. So in this lecture I will present diagnosis and treatment with Foam will present some cases specially about techniques, conception and procedures. At the end of this presentation I will show examples with results.

SC1.9-2
Management of the superficial venous insufficiency in 2009. An overview
A. Shapira
Abstract not available

SC1.9-3
Poor stability of polidocanol foam as compared with lapidium chloridrate
J. Ulloa 1, J. Ulloa-Dominguez
1 Clínica De Venas, Bogota, Colombia
2 Fundacion Vascular, Bogota, Colombia

Polidocanol has been used widely for the last three decades in the treatment of telangiectasias. With the arrival of foam in the venous armamentarium, new sclerosing agents seems to have a major advantage over polidocanol in terms of stability. Lapidium chloridrate is a widely used sclerosing agent with more than 15 years of history in South America.

Methods. We compared polidocanol foam and lapidum chloridrate foam in vitro and recorded in film the time they took to become liquid again after a standard Tessari procedure.

Results. Lapidium chloridrate showed a dramatically high stability as foam as compared with polidocanol (32.5 sec. vs. 1.34 sec) this could represent a major advantage in the treatment of telangiectasias as well as bigger trunks.

SC1.9-4
The prevalence of lymphoedema in primary varicose disease and the efficacy of calcium dobesilate on the resolution of lymphatic oedema
F. Flota Cervera
Abstract not available

SC1.9-5
Varicose veins disease overview of treatment in Paraguay
V. Canata
Centro De Varices Y Estetica Laser, Asuncion, Paraguay

Paraguay a country with tropical temperatures has a very high incidence of veins problems. More than 40% of the population have veins problems the principal objective of this study is to demonstrate the effectiveness and security of the treatment as well as the personal experience in our surgical practice. We develop a practice devoted to all veins problems in particular attention to the cosmetic area with special attention to outcome and patient satisfaction, patient generated quality of life with disease specific instruments and complete overall after the treatment. Maintaining the dynamic nature of the disease in a center with all the resources of the first world in Asuncion Paraguay the heart of south America.

SC1.9-6
Inclusion and exclusion criteria of the endo laser management of the varicose syndrome
V. Ibañez Esquembre
Abstract not available

SC1.9-7
Surgery of varicose veins. The history of the “pop star”
R. Varnagy
Abstract not available

SC1.9-8
Profilaxis of DVT in surgery
M. Bravo
Abstract not available

BO1.11 - Session of the Asian and Australasian chapter

BO1.11-1
High peak reflux velocity in the proximal deep veins is a strong predictor of advanced postthrombotic sequelae
Department of Plastic and Reconstructive Surgery, Tokyo Women’s Medical University, Tokyo, Japan

The purpose of study was to determine the indicative duplex-derived hemodynamic parameters reflecting the progression of PTS.

Methods. Venous abnormalities were evaluated in 131 limbs out of 130 patients who completed 6-year follow-up after an acute DVT. Clinical manifestations were categorized according to the CEAP classification, and the patients were divided into two groups: early CVI (CI-3Es, As, d,p, Pr, o) and advanced CVI (C4-6Es, As, d,p, Pr, o) at 6-year follow-up point. Venous segments were examined whether they were occluded or recanalized. The reflux parameters assessed were the diameter (cm), the reflux time (RT: s), the peak reflux velocity (PRV: cm/s), and total refluxed volume, and these parameters were assessed in FV and POPV at the 2-year and subsequent 6-year follow-up point.

Results. There were 98 limbs in early and 33 in advanced CVI. The frequency of venous reflux was significantly higher in advanced CVI (p<0.001). In contrast, the proportion of occlusion did not differ between the groups (p= 0.138). The proportions of FV and POPV incom-
petence were significantly higher in advanced CVI (p<0.0001, <0.0001, respectively). In these veins, RT did not improve the discrimination power between the two groups. On the contrary, PRV had significant discrimination power in these veins both the two- and six-year follow-up point. After calculating suitable cutoff point using receiver operating characteristic curves analysis at 2-year follow-up point, multivariable analysis showed that PRV of ≥25 cm/s in POPV was the strongest independent predictor of advanced CVI (OR 60.5, 95% CI 43.1 E239, p<0.0001). Similarly, in FV, PRV of >25.4 cm/s was found to be a strong predictor of advanced CVI (OR 25.8, 95% CI 10.6 E31.1, p<0.0001).

Conclusion. These findings suggest that the presence of high PRV in the proximal deep veins is an independent predictor of advanced symptoms of PTS.

BO1.11-2
Relation between radiofrequency and laser ablated venous diameter and recanalization
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Aim. The purpose of this study is to determine whether the degree of shrinkage of ablated vein at postoperative follow-up can predict recanalization at mid- and long-term follow-up.

Methods. 53 patients (62 limbs) of 89 patients (102 limbs) underwent endovenous ablation for great saphenous vein reflux from 2004 to 2006 were evaluated for venous reflux and GSV diameter at saphenofemoral junction (SFJ), middle thigh and knee at pre, post 1, 6, 12, 24 to 36 months by duplex ultrasound at standing position. Endovenous ablation of GSV from SFJ to knee with stab avulsion phlebectomy using radiofrequency (VNUS Closure) for 28 limbs, 980 nm diode laser (ELVeS) for 34 limbs was performed.

Results. 12 recanalized GSV (RF 6, laser 6) in 62 GSV were found for post operative 36 months. 2 GSV recanalized within post operative 1 month. The GSV at thigh and knee shrank over time until post operative 24-36 months. There was no significant GSV diameter difference between two procedures through post operative 24 months except post 6 months. The GSV diameter at postoperative 12 months later in recanalized cases was larger than occlusion cases. The diameters of all 12 recanalized GSV at thigh and knee were more than 3 mm at recal- nalized periods, and the venous diameter at thigh and knee in 11 of 12 recanalized GSV were more than 3 mm at all post operative periods.

Conclusion. The ablated GSV shrank through the post operative 24 to 36 months. The diameter of ablated GSV larger than 5 mm at postoperative 12 months later has a risk of recanalization.

BO1.11-3
The current management of varicose vein surgery for leg vein in Korea
K.T. Kim
Abstract not available

BO1.11-4
Surgical treatment of severe acute deep venous thrombosis in lower extremity
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2 Vascular Surgery Department of Xuan Wu Hospital, Capital Medical University, China

To explore the method and effectiveness of treatment for severe acute deep venous thrombosis (DVT) in lower extremity.

Methods. Eighteen patients with severe acute DVT treated in our hospital from January 1, 2002 to December 31, 2008 were retrospectively analysed. All the patients had limb edema and pain, sixteen had limb cyanochroia, two had limb pallor. Ten had weakened dorsalis pedis artery pulsation, eight had silent dorsalis pedis artery pulsation. One had calf skin ulcer and foot gangrene. Colour Doppler ultrasonography revealed DVT and superficial venous thrombosis in all diseased limbs. One patient underwent above knee amputation for limb gangrene. Seventeen underwent surgical thrombectomy, of which three were simple thrombectomy, five were supplemented with suprapubic saphenous vein bypass, six with suprapubic PTFE graft bypass, three with iliac vein lysis angioplasty.

Results. One patient died (5.6%) on the third day after surgery. Limb edema relieved in seven patients (41.2%), reduced in ten patients (58.5%). All diseased limbs regained normal artery pulsation and skin appearance except for one limb amputated. Sixteen patients (94.1%) were followed up by a mean of 54 months. Limb edema disappeared in five patients (31.5%), reduced in eight patients (50%), relapsed in three patients (18.7%). Among three disease-relapsed patients, one died of malignant tumor 9 months after operation, two had their graft occluded resulting from intimal hyperplasia.

Conclusion. Surgical thrombectomy is an effective method for treating severe acute DVT in lower limb.

BO1.11-5
Helps and hindrances to the diagnosis & treatment of venous disease in India
M. Patel
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Indian physicians have long been aware that many Indians suffer from chronic and acute venous disease. But it wasn’t until recently that three multi-national, multi-center studies revealed that chronic venous insufficiency (CVI) and venous thromboembolism (VTE) are just as common in India as in the rest of the world. India has been so preoccupied with diagnosing, treating, and managing communicable disease, and the new epidemic of cardiovascular disease and Type 2 diabetes, that venous disease has been left in the dust. In this talk, I will describe the medical, technological, economic, religious, and attitudinal influences that have helped and hindered the diagnosis and treatment of venous disease in India. And I will discuss what I feel needs to be done to help India -- with its 2.6 billion legs -- catch up to the West’s greater awareness, understanding, and respect for venous disease.
CB1.11 - ICC symposium
New methods to evaluate compression therapy

CB1.11-1
Measurement of interface pressure
H. Partsch
Private Practice, Vienna, Austria

The effects of compression therapy on a diseased extremity depend mainly on the exerted pressure.

Aim. To review different methods of measuring the interface pressure of a compression device in vivo.

Methods. Some newly developed pressure transducers were compared: Kikuhime (Meditrade, Soro, Denmark), SIGaT (Ganzoni-Sigvaris, St. Gallen, Switzerland), MST tester (Salzmann medico, Switzerland) and Picopress (Microlab, Padua, Italy). By measuring pressure changes during exercise or due to changes of the body position the elastic property (stiffness) of different compression products can be assessed in vivo.

Results. The Kikuhime transducer can only be used to measure instant pressure after application of the compression device. Also the MST tester is unable to register continuous pressure changes during movement but offers the possibility to measure simultaneously at different segments of the extremity. By using the Sigat-tester and the Picopress continuous pressure readings are possible. Measuring the pressure under a gradually inflated sphygmomanometer the Picopress instrument revealed the highest degree of accuracy.

Conclusion. The pressure under a compression stocking or a bandage has an important influence on the efficacy of the compression device and should be measured in future studies in which compression products are compared.

References

CB1.11-3
Compression pressure in lymphoedema of the upper and lower extremities
R. Damstra
Abstract not available

CB1.11-4
3D-CT for demonstrating compression effects
J.F. Uhl
Abstract not available

CB1.11-5
MRI for detecting hemodynamic effects of intermittent pneumatic compression
F. Lurie
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Intermittent Pneumatic Compression (IPC) is one of the mechanical modalities of DVT prevention. The target of action is to change blood flow in deep veins. It is achieved by application of dynamic mechanical force to extremity tissues. When the mechanism of action of IPC devices is studied, at least three separate aspects should be considered: spatial and temporal distribution of applied mechanical forces, tissue deformation, and changes in blood flow. MRI can be effectively used in studying tissue deformation. We can demonstrate that deformation of tissues in extremity depends on the construction of the IPC garment, and also has significant individual variations. When MRI is used in combination with other imaging and physiologic techniques, new information on mechanisms of IPC action can be obtained.

CB1.11-6
Haemodynamic effects of compression depending on elasticity of the material and interface pressure
G. Mosti 1, H. Partsch 2

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2 Private Practice, Wien, Austria

Reduced ejection fraction (EF) characterizes venous pumping insufficiency and can be measured by strain gauge plethysmography
Aim. To show A) the increase of EF depending on bandage pressure and elasticity of the material, B) the minimal pressure to increase the EF, C) the maintenance of the haemodynamic effects over time.

Methods. EF was measured by SGP in 15 healthy volunteers and in a total of 70 patients with severe venous reflux (CEAP C2-C5) before and after: A) elastic and inelastic bandages applied with the same high resting pressure (30 patients), B) compression stockings and inelastic bandages applied with a resting pressure of 20, 40 and 60 mm Hg (20 patients), C) inelastic bandages applied with a supine pressure of 60 mm Hg on one leg, and elastic stockings on the other leg, for 1 week (20 patients with bilateral disease).

Results. EF is significantly lower in venous insufficiency compared to healthy volunteers. Compression improves the venous pumping function by increasing EF. A) Inelastic bandages show a highly significant increase of EF (P<.001). B) The increase of EF with stockings was 17%, with inelastic compression (20, 40, and 60 mm Hg) it was 61.5%, 90% and 98% respectively (P<.001). C) Inelastic bandages maintain a positive effect on EF which after one week is still higher than the initial improvement under the stocking.

Conclusion. Inelastic bandages with a standing pressure of 62 mm Hg lead to a normalisation of EF. Inelastic bandages are already effective with a pressure of 20 mm Hg. After 1 week of application inelastic material is still more effective than compression stockings despite its more pronounced pressure loss.

References

CB1.11-7
Dermal microcirculation in Chronic Venous Insufficiency (CVI) and peripheral arterial occlusive disease: change of dermal fluxmotion by compression bandages
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Department of Dermatology, Ernst-Moritz-Arndt University, Greifswald, Germany

The nutritive capillaries of the skin microcirculation were assessed by capillaroscopy, variation of flow in the nutritive and the deeper thermoregulatory plexus was examined by laser Doppler fluxmetry. In severe CVI nutritive capillaries were dilated, microthrombosed and rarefied. Comparing the laser Doppler flux, which was processed by Wavelet packet transformation, in patients suffering from CVI with healthy controls typical changes were obvious: The main peak energy height of the myogenic, respiratory and heart interval increased with the severity of venous disease. Particularly the respiratory activity of the flux signal was increased in CVI Effect of compression: The influence of compression bandages (mean interface pressure 26 mmHg in supine) to flux-motion in patients with peripheral arterial occlusive disease combined with CVI can be described as follows: the increased respiratory activity, which is caused by venous and capillary reflux due to valve incompetence, was reduced. The heart related activity of the flux signal was also reduced, however not abolished. In summary: compression bandages in patients with combined peripheral arterial occlusive disease and CVI abolish venous and capillary reflux, thereby venous and capillary hypervolemia and hypertension is most likely to be reduced and tissue perfusion improved.

CB1.11-8
Does compression influence progression of venous diseases?
E. Rabe
Abstract not available

AP2.5 - Session of the German Society of Phlebology
Board Meeting
Abstracts not available

BO2.6 - Session of the German Society of Phlebology
Varicose Veins And Venous Ulcer

BO2.6-1
Prevalence of chronic venous insufficiency in the population of north-east Germany (Study of Health in Pomerania)
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2 Institute for Community Medicine, Ernst-Moritz-Arndt University, Greifswald, Germany

Aim. To analyse the prevalence, clinical symptoms of and risk factors for chronic venous insufficiency (CVI) in general population of North-East Germany. Design: Cross sectional survey as a Follow-up-study of SHIP 0. Setting: City of Greifswald, Germany. Participants: 1792 people (842 men and 950 women) aged 25-86 years from the participant pool of SHIP 0, which were selected randomly from residence registries, stratified by gender and age.

Methods. This Venous population survey follows 5-year after SHIP 0, as a follow-up from 2002 till 2006. The study consists of a standardised health- and riskfactor-related questionnaire and a physical examination, which include the classification to CEAP and necessary duplex scanning.

Results. 1792 participants (842 male, 950 female) attended the trial. The mean age was 52 years. 39.1% showed no venous changes according to the CEAP Classification (C0). 25% suffered from isolated telangiectatic or reticular veins. Varicose veins occurred in 21%. Every fifth participant suffered from Oedema associated with varicose vein background. Severe skin changes according to advanced chronic venous insufficiency were documented more often in the group of the male (7%) than in the female group (5%). A history of ulcers showed up in1% and florid crural ulcers were seen in 0.3%.

Conclusion. In comparison to the Bonn Vein Study more advanced stages of chronic venous insufficiency were recognized in the north eastern part of Germany.

BO2.6-2
Incidence of varicose veins and CVI in the Bonn vein study II
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2 Dermatologie Kastanienhof, Köln, Köln, Germany
3 Institut für Med. Informatik, Biometrie und Epidemiologie, University of Essen, Essen, Germany

Aim. Chronic venous disorders are among the most common diseases in Germany. In the Bonn Vein Study I (BVS I), conducted in 2000, 3072 participants of the general population of the city of
Bonn and two rural townships, aged 18-79 years were took part in this study (3550 men, 1722 women). Participants were selected via simple random sampling from the registries of residents. In this follow-up study 6.6 years later, the same population was investigated again to. The aim was to identify the incidence of newly developed chronic venous disorders and of progression of pre-existing CVD.

Methods. From May 2007 to September 2008, we contacted all participants of BVS I and invited them for a reinvestigation. The participants answered a standardized questionnaire and were examined by clinical means and by duplex ultrasound.

Results. In the BVS I results show a distribution in the CEAP classification with C0: 9.6%, C1: 59.0%, C2: 14.3%, C3: 13.4%, C4: 2.9%, C5: 0.6% and C6: 0.1%, when considering the highest class of each individual. In the Bonn Vein Study II the response rate of the principally applicable population was 84%. The first results show an incidence of CVI of 14% in women and 13% in men within these 6.6 years.

Conclusion. The results of this study show the 6.6-year incidence and the incidence of progression of chronic venous disorders in Germany.

BO2.6-3

German guidelines for diagnosis and treatment of varicose vein disease

Cutaris Center for Skin, Veins and Laser Medicine, Munich, Germany

The German Societies of Phlebology and Vascular Surgery, together with the Professional Associations of Phlebology and Practicing Vascular Surgeons, are about to publish a 3rd. actualisation of their joint guidelines for diagnosis and treatment of varicose vein disease. Besides some formal modifications progresses in treatment modalities required adequate adjustments. Criteria of Evidence-based Medicine were considered mainly, using the Grading recommendations of the American College of Chest Physicians (ACCP) in addition and comparing to those previously and solely used of the German Society of General Practitioners and Family Medicine (DEGAM). The altered topics especially refer to foam sclerotherapy, endovenous radiofrequency and laser therapy. For all of these techniques recent publications revealed short and medium results somewhat comparable to classical surgery (i.e. crossectomy/stripping). The last-mentioned, on the other hand, lack valid studies as they are increasingly available for the oblitative methods. Themes as neovascularization and the cloacal dogma of flush ligation had to be considered in the chapter ‘reurrence of varicose veins’. To enable practitioners reasonable decisions, contraindications, risks and unwanted sequelae of all methods are stressed. Once more color coded duplex ultrasound is emphasised as a standard procedure in the diagnosis of varicose veins and performing imaging before any invasive treatment modalities assessed as mandatory. This actualisation of joint guidelines may lead to a rational basis for best practice in diagnosis and treatment of varicose vein disease.

BO2.6-5

Venous surgery in very old patients (>70 years)

N. Frings, P. Glowacki, N. Prinz, R. Schubert, P. Tran
Capio Mosel-Eifel-Klinik, Bad Bertrich, Germany

We report our experience in this specific group of patients. Patients: 478 patients were included over a one year period (2005/2006). Average age: 74 years (70-91 y). CEAP classification: C3: 4.87%, C5: 9.5%, C6: 3%. Female/ male 73/ 29%. We performed 648 major operations (609 limbs). Primary operation: Saphenofemoral- popliteal junction (SEJ/SPJ) (78%); recurrence operations SEJ / SPJ (22%). We opted for a very early but less radical surgical intervention than in younger people. Primary goal was to avoid further complications caused by the varicose veins and to eliminate the main complaints of the patients. Extensive ligation of the SEJ / SPJ or extensive removal of the varicose veins was performed only if these procedures could be achieved without any risk. All operations were done under local anaesthesia.

Results. No major complications occurred during the operation or during the hospital stay (5-7 days). After 3 months the first follow-up examination could be done in 493 limbs (522 operations/ 385 patients) and after one year in 277 limbs (296 operations/ 210 patients). Persistant (SEJ/ SPJ) was found in 3% (three months) and in 10% (one year) indicating that not all tributaries had been ligated. Phlebectomies had to be done only one year after the operation in 26 limbs (9%). In all other cases the patients were content with the results.

Conclusion. Even in very old patients major varicose vein operations can be done without any serious complication. Though the ligat-}

BO2.6-4

German guidelines for diagnosis and treatment of varicose vein disease

M. H. Nüllen, F. Pannier, G. Salzmann, L. Schimmelpenning, C. Schmidt, B. Steckmeier, D. Stenger
Cutaris Center for Skin, Veins and Laser Medicine, Munich, Germany

The results of this study show the 6.6-year incidence and of progression of chronic venous disorders in Germany.

BO2.6-3

German guidelines for diagnosis and treatment of varicose vein disease

Cutaris Center for Skin, Veins and Laser Medicine, Munich, Germany

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BO2.6-5

Venous surgery in very old patients (>70 years)

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Conclusion. Even in very old patients major varicose vein operations can be done without any serious complication. Though the ligat-
BO2.6-8
Venous reflux surgery promotes venous leg ulcer healing despite reduced ABPI
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2 Private Practice, Vienna, Austria
3 Medical University of Vienna, Section of Medical Statistics, Vienna, Austria

Aim. The aim of this study was to demonstrate that venous surgery promotes ulcer healing, even in the presence of peripheral arterial disease.

Methods. In this retrospective study, 53 patients (49 legs) with venous leg ulcers and reduced arterial ankle brachial pressure index (cor ≥ 0.8) were followed up 3 months to 7 years (median: 3.1 years) after venous surgery (group I). Venous reflux was considered to be the main cause of ulceration, and no attempt was made to restore the arterial circulation. The results were compared with those of patients with ulcers without arterial occlusive disease (n=190) who were treated following the same principles (group II). The surgical procedure consisted of interruption of reflux in the superficial and/or perforating veins. Additionally, shaving, fasciectomy, and mesh grafting was performed in 36 cases.

Results. In group I, 21 legs were lost to follow-up, 16 due to death. The mortality rate was three times higher in group I than in group II. From 28 legs of group I seen after 0.4-6.7 years (median: 2.9 years), 19/28 legs (68%) were healed compared with 123/145 (85%) in group II after 0-2.7 years (median: 3.2 years) (not significant [NS]). Recurrence was observed in 3/28 (11%) from group I and in 6/145 (4%) from group II (NS). The time course of recurrence showed no statistically significant difference between the groups.

Conclusion: Venous surgery produces beneficial results not only in pure venous ulcerations, but also in patients with accompanying arterial disease. Int Angiol. 2008 Jun; 27 (3):239-46.

BO2.6-9
Ulcer surgery and very old patients (80 -100 YEARS) - A practical procedure?
H. Hermanns, P. Waldhausen, A. Hermanns
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Aim. In Germany there is a continuous increase of life expectancy for more than 130 years. Reasons are progress in medicine, hygiene and feeding. The number of people older than 80 years will increase to treble until 2050. At the same time chronic venous insufficiency in all stages will increase and also the number of very old patients with venous leg ulcers (≥6) will increase. This represent a responsible therapeutic challenge. On the basis of this prognosis we analyzed our patients older than 80 years to 100 years after shave therapy combined with simultaneous mesh graft plastic.

Results. In the period from 1998 to 2008 76 patients (96 affected legs) with nonhealing venous leg ulcers were older than 80 years at the point of sugery. The oldest patient was 100 years. At the last examination (April 2008) 49 patients (65%) were alive, 18 (24%) deceased and 8 patients (11%) were not available. In the group of the living patients the ulcer healing rate was 80%. In the group of deceased patients 84,6% Ulcers were healed at point of death. In this group the follow-up was 37,4 months. After in-patient treatment 45% of the deceased patients went back to her own flat, 40% live with her family and only 15% need the help of a nursing home.

Conclusion. Every fifth patient with ulcer surgery was older than 80 years. The results of the living group were comparable with younger populations. Unexpected was the good social care and the low rate of patient who need help in nursing homes. Especially the deceased people had good results until their death. Pain and time of home care were clearly reduced. Ulcer surgery is a safe and practical procedure for very old patient suffering of recalcitrant leg ulcers.

BO2.6-10
Healing of venous ulcers is determined in part by genetic polymorphisms of factor XIII and iron metabolism
W. Blätterl, D. Lüscher, E. Brizzio, F. Amsler, T. Willenberg

Abstract not available

BO2.8 - Session of the German Society of Phlebology
Endovenous Treatment: Obesity and CVI

BO2.8-1
Accidental subcutaneous injection of large amount of polidocanol results in panniculitis with favorable outcome. A case report
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Inselspital, Bern, Switzerland

Polidocanol has been developed in 1936 first as a local anaesthetic, later as a sclerosant agent. It is an effective drug, painless to inject, with a good safety profile. Complications are rare and paravascular injection is considered to be harmless. We here report the case of a 19-year-old patient presenting with a dysplastic naevus on the forearm requiring excision. Local anaesthesia was performed by injecting 7-ml of presumed local anaesthetic, both intradermally and hypodermically. Instead of lidocaine-epinephrine, polidocanol 0.5% was accidentally injected. The mistake was realized since no anesthesia of the skin occurred after 15 minutes. The days after, a moderate tumefaction with local heat, erythema and tenderness was noticed, which slowly regressed during the next weeks. Subcutaneous inflammation with oedema were echographically demonstrated. The dysplastic nevus including a well circumscribed fibrotic hypodermal tissue were excised. Light microscopy studies of the excised skin specimen revealed a subacute panniculitis, under a dysplastic nevus. Healing occurred without further complications. In extension with previous reports, our observation indicates that polidocanol is a safe sclerosing agent with low local toxicity, even in case of paravascular injections. In our case, subcutaneous injection of polidocanol 0.5%, even in large amount, induced a moderate inflammation with panniculitis.

BO2.8-2
Tissue effects after subcutaneous injection with foam or liquid polidocanol
S. Schuller Petrovic

Abstract not available

BO2.8-3
The swiss registry of thermic endovenous catheter interventions in varicose veins, a multicenter case control study
C. Jeanmeret

Abstract not available
BO2.8-4

RCT for differentiated open and endoluminal therapies for degenerative disease of the great saphenous vein
I. Flessenkaemper 1, M. Hartmann 2, D. Sternger 1
1 DRK-Klinikum Berlin Mitte, Berlin, Germany
2 Phlebologiezentrum, Freiburg, Germany

Three different methods to treat degenerated great saphenous veins were evaluated. The operative methods to be evaluated were: a) invaginated venestripping (a modified Babcock procedure); b) endoluminal lasertherapy; c) endoluminal lasertherapy combined with crossectomy. All the three methods are introduced in clinical practice. Up to now there was no critical comparing evaluation of these options of treatment. All the patients got a full information about the study and after informed consense they were randomized. The main item to analyze was the evaluation of the frequency of recurrence in those three groups. A further point of interest was the technical primary success rate. We looked for the reopening rate after pure laser application compared to the group with laser application combined with crossectomy. Persistent varicose saphenous veins were also documented. Further point of interest were side effects. A special interest is to get long term results. For this a long term follow-up with ultrasound controls was installed. Quantity of inclusion To prove the thesis that there will be a difference of >10% for the rate of recurrence of insufficiency at the saphenous juncture at least 112 patients per group had to be included. The inclusion had to be organized by randomisation. Hypothetically we expected a rate of drop outs on the 10% level after 2 years. According to the chi2 test for 2 samples with equal parts (0.05) on a level of significance of p = 0.05 469 participants had to be included. In this case a logistic regression model could be used. So it could be adjusted to the single surgeons.

Results. At the moment of sending this abstract the results are not yet analysed. This will be done by the Institute for Epidemiology of the Humboldt-University of Berlin (Charité). For the presentation in Monaco the results for all perioperative parameters will be available as will be short and partly midterm results.

References

BO2.8-6

Relationship between body mass index and the severity of chronic primary venous disease
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The role of overweight and obesity in chronic venous disease is still controversial. The aim with the present study was to evaluate the impact of body weight on chronic primary venous disease and its relation to disease severity in the affected limb/s.

Methods. Between October 2005 and November 2008, 1140 patients (3619 limbs) presenting with duplex-ultrasound scanning confirmed chronic primary venous disease were evaluated. The patients were classified according to CEAP, the venous clinical severity score (VCSS) and body mass index (kg/m2). Mean age was 50 years (range 14-91) and 746 (65%) were women.

Results. There were 489 normal weight patients (696 limbs), BMI <25, 422 overweight patients (597 limbs), BMI between 25 and 29.9, and 229 obese patients (326 limbs), BMI 30 kg/m2 or more. Overweight patients had more incompetent perforating veins (p<0.001), hypertension and diabetes (p<0.001) than normal weight patients and higher C-class and VCSS (p=0.001). Obese patients had more incompetent perforating veins (p<0.001), and hypertension (p<0.001) than overweight patients as well as higher C-class and VCSS (p=0.001). Correlation between the C-class and the severity score (VCSS) was found excellent (r=0.87). There were significantly more women with normal weight and obesity compared to men (70% vs 30%, p<0.001), while in overweight patients difference was less pronounced (58% vs 42%, p<0.003) Other gender differences were not observed. There was no relationship between disease duration, bodyweight, and severity within each group.

Conclusion. The correlation of body mass index with clinical severity confirms earlier findings that body weight may independently involve a mechanism separate from local effects on venous flow. Both overweight and obesity appears therefore to be a separate risk factor for increased clinical severity in patients with chronic primary venous disease. There is a good correlation between the C-class in the CEAP classification and the venous clinical severity score (VCSS).

BO2.8-7

Obesity and varicose vein surgery
H. Hermanns, P. Waldhausen
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Every second German suffers from overweight. Germany is one of the european nations with the highest Body-mass-index results (BMI). The combination of obesity, varicose vein diseases and chronic venous insufficiency (CVI) is often found in everyday clinical practice. With increasing BMI the clinical signs of CVI increase too. A retrospective analysis of patient had have varicose vein surgery will show, wether obesity has influence on the intra- and postoperative results.

Methods. 2.077 cases of varicose vein surgery during the period from 01.01.2004 to 31.12.2005 were analysed by following criterias:
BO2.8-8
Varicose vein surgery and obesity: experience with a new boazul cuff in leg circumference up to 90 cm
H. Hermanns, P. Waldhausen
Clinic for Vascular Medicine & Wound Care Center, Krefeld, Germany

Aim. The combination of varicose vein disease and obesity is common in clinical practice. Long operations, blood lost and extensive bruises are the results. Since 2005 a new roll-on cuff for varicose vein surgery with a thigh circumference of 90 cm is available (big cuff).

Methods. Between 01.04.1995 and 31.3.2006 the Clinic for Vascular Medicine, Venous and Wound Care Centre Krefeld, carried out varicose vein surgery in 10,054 cases. 92% (n=9,249) of the operations were done with a roll-on cuff tourniquet. The cuff was inflated to 120 mmHg and rolled up to the thigh of the leg. We present the results of the big cuff pilot-study and our general experience with varicose vein surgery in bloodless technique.

Results. 1. Big Cuff: A transducer was located between cuff and skin. A cuff pressure of 120 mmHg and a median thigh circumference of 79.5cm lead to a median pressure of 228.5mmHg. The tourniquet time was 35 minutes and the systolic blood pressure during the operation not more than 120 mmHg. Under these conditions we did not find any problems. 2. Bloodless limb technique: 9.249 own operations using the boazul cuff were analysed. We found no major complications as acute arterial occlusion or a deep vein thrombosis (DVT) during the procedure. At the moment DVT-rate amounts to 0.05%.

Conclusion. The use of bloodless limb technique for varicose vein surgery is very comfortable, especially in case of severe varicose veins and obesity. Maintaining of operation standards and utmost care of the cuffs lead to successful use of this procedure.

BO2.8-9
Leg comparison of region, gender and age in Germany by digital 3D-measurements to venous diagnosis
J. Herouy
Abstract not available

BO3.7 - Session of the French Society of Phlebology
1st Part: Cooperative studies of the French Society of Phlebology

BO3.7-1
Prospective multicenter study for the evaluation of the ASVAL method to treat varicose veins: objectives and preliminary protocol
O. Pichot, F.A. Allaert, A. Caggiati, S. Chatanet, A. Colignon, D. Creton, Garces, O. Hartung, P. Pittaluga, B. Rea, J.F. Uhl
Centre de Médecine Vascular, Grenoble, France

Aim. to evaluate The effectiveness of the ASVAL method, a surgical treatment of varicose veins by phlebectomies with conservation of a refluxing great saphenous vein (GSV). ASVAL® Selective Ablation of Varix under Local Anesthesia.

Methods. And methods. We plan to include 135 patients by 9 surgeons from april to August 2009. Inclusion criteria: varicose veins with a reflux of the GSV at the thigh level, excluding pregnancy, history of DVT of SVT and any previous treatment of GSV. The patients will be assessed before and after 1 & 6 month after operation. Primary evaluation criteria: assessment of the GVS reflux 3 and 10 cm below the saphenous femoral junction after a compression-decompression maneuver of the calf (duration, max speed, speed at 1 sec) Secondary evaluation criteria: assessment of the trunk diameter, venous desability score, number of zones treated. Clinical results such as pain, ecchymosis, complications and return to normal activity will be evaluate, as well. The statistical analysis will be performed by Cenbiotec (FA Allaert).

Results. The first results will be available in july 2009.

Conclusion. The aim of this preliminary study is to identify the clinical and hemodynamical factors playing a significant role on the quality of the postoperative result after 6 month. This could make possible to isolate the most important prognosis criteria, and better define the good indications of the ASVAL method.

BO3.7-2
The SOV concept. A new approach for preserving saphenous vein trunk
G. Gachet
Club Mousse, Voiron, France

Echo-guided foam sclerotherapy is becoming the standard treatment for varicose veins. Foam is usually injected in the terminal part of the great saphenous vein (GSV) in order to obliterate the length of the GSV. The SOV (Save Our Veins) CONCEPT treats anatomical varicose (distended with major reflux) while saving functional varicose that potentially can return to normal function (normal aspect, reflux due to saphen effect under or excess of pressure above). The SOV CONCEPT is not a pre-defined strategy but adjusted to every configuration of varicose veins. The aim of this study is to evaluate the SOV concept (siphon effect part), a new strategy of treatment for varicose veins secondary to great saphenous incompetence using echo-guided foam sclerotherapy. In the SOV procedure the GSV is injected at the knee level which is easier and safer, which results in obliteration of the trunk, but leaving the terminal part of the GSV which becomes competent by the suppression the saphen effect. Fifty patients were included. All patients had axial great saphenous reflux. All patients had echo-guided injected in the knee area with 1% foam and 6 weeks later clinical and duplex examination. The obliteration of the GSV...
trunk, the length and the return to competence of the upper part of the GSV indicated success of the treatment. all GSV trunks were closed. Most of the sapheno-femoral junctions remained open but became competent. Echo-guided foam sclerotherapy is an effective and safe treatment. This study demonstrates that there is no need to inject the GSV in the upper thigh because usually the terminal part of the GSV will become competence when the siphon effect is abolished by occlusion of the distal trunk vein. The SOV concept strategy preserves competent tributary veins, reduces required foam volume while making the injection easier and safer.

BO3.7-3
Celon: a new radio frequency technique for therma-bivalve ablation of the great saphenous vein: multicenter prospective study about 65 cases: preliminary results
Centre de Chirurgie des Varices, Neuilly sur Seine, France

Aim. To evaluate The effectiveness of the bipolar Radiofrequency-induced Thermotherapy (RFITT) for the treatment of varicose veins of the great saphenous vein (GSV) by assessing the occlusion rate and the clinical results.

Methods. and methods: 3 surgeons and 3 angiologists included 65 limbs of 63 patients from october to April 2009. Inclusion criteria were varicose veins with a reflux of the GSV at the thigh level, excluding the tributaries of the thigh, history of deep or superficial venous thrombosis and any previous treatment of the GSV. Only local or loco-regional anesthesia was used, in ambulatory setting. Distal phlebectomies were associated in the majority of the patients. Equipment used was a power control unit CelonLab PREFERENCE, and a flexible bipolar applicator CelonProCurve 1200-S1 under echoguidance. Clinical results (pain, ecchymosis, complications and return to normal activity) were assessed as well as the occlusion rate of the GSV trunk at 1 week, 1 and 3 month.

Results. Post-interventionnal complications: 3 patients had light pain of the thigh during the first week (4.6%). 4 had pigmentation and/or induration (6%) along the GSV route, which spontaneously disappeared after 4 to 6 weeks. After 3 month 61/65 GVS were completely closed (94%), while 4 GSV were partially open at the upper part, without any significant reflux.

Conclusion. This first experience and preliminary results show that the Celon RF technique is simple and effective for GVS ablation and has a low rate of complications.

BO3.7-4
Prospective case-control study on the effect of sclerotherapy on the healing speed of venous ulcers and their recurrence within 1 and 2 years
J. Gobin, J.P. Benigni, F.A. Allaert
Gabinet de Medecine Vascuinaire, Lyon, France

Rational of the study. The sclerotherapy of the veins linked to the high pressure mechanisms and the venous stasis involved in venous ulcer could increase their healing rate and healing speed and reduce their recurrence rates within 1 or 2 years. Nature of the study: Prospective case-control study on. Case will be defined by patients whose ulcer has been treated using sclerotherapy of the sustaining veins and control patients by the following patients for which the sclerotherapy is not done. Main criteria: to compare within one year and two years the recurrence rate of venous ulcer being previously treated by sclerotherapy or not. Secondary criteria: To compare the healing speed and he healing rate (according Gelfand: 40% at 8 weeks) between ulcers previously treated or not by sclerotherapy. Sample size: 77 patients will be followed in each group based on the Eschar study results. Selection criteria: men or women older than 18 years old presenting venous ulcer older than 1 month with a size between 2 and 20 square cm and presenting venous insufficiency in relation with the venous saphenous. Statistical analysis: the recurrence rates between the two groups will be compared by Chi Tests and their occurrence by Kaplan Meier survival analysis and/or Cox Model. The influence of the product used for sclerotherapy, the injected volume, its nature (liquid or foam) on the healing rate, healing speed and recurrence will be compared with the same statistical tools.

BO3.7-5
Correlation between CVD and the static foot disorders
M. Chahim, J.F. Uhl, F.A. Allaert
Hopital Corentin Celton, Issyles Moulineaux, France

Aim. To study the relationship between chronic venous disease (CVD) and the static disorders of the foot (SDF).

Methods. and methods: A retrospective study including 800 lower limbs of 400 patients with CVD were assessed by measurement of the Djan-Annorier angle of the foot, in order to quantify the SDF. A complete evaluation of the CEAP items (basic CEAP) and the symptoms induced by a scoring system of imputability. Results. A significant correlation has been found between static disorders of the foot and: The body mass index (p<.01), the presence of symptoms (p<.001), their global score, their score of imputability (p<.001), the CEAP clinical classes (p<.001) and the long standing position during the day. Age and sex were not found significant.

Conclusion. The SDF can be considered as an important factor of worsening of the CVD. This emphasizes the crucial importance of the correction of the foot static disorders in CVD patients: it will improve the symptoms as well as all items related to the venous stasis. This could be easily explained by the improvement of the foot pump efficiency during walk.

BO3.7-6
Methods for the evaluation of ‘effectiveness’ ‘efficacy’ ‘efficiency’ of venoactive drugs
F. Allaert
Head of the Chair • Evaluation of medical claims • Ceren Esc et DIM CHRU, Dijon, France

Although some venoactive drug may claim for a grade A evidence level concerning their efficacy, all were de-reimbursed and that, non only in France but in some others countries as Italy. Curiously, it is noticeable that all these de-reimbursements happened in the countries where they were the most prescribed and had a sensible impact on the health costs. The reason for their de-reimbursement was not the lack of efficacy which would have been in contradiction with the previously published grade A results but the fact that the usefulness appeared insufficient to the Health authorities. The registration of a drug relies on the tryptic ‘effectiveness’ ‘efficacy’ ‘efficiency’ but also on ‘usefulness’ which is more or less mixed with other concepts of social utility, health economics and safety. After a review of the different available evaluation tools for venoactive, we will show that all criteria which may contribute to the demonstration of the usefulness of the drug requires an unavoidable prerequisite: to consider venous disease as a real pathology which is far from being the case except in the late stage of the disease where it is call under other specific terms as varicose, ulcers. If we do not succeed to change the point of view of the public health authorities the venous disease will continue to be considered as a kind of painful heaviness, which may be alleviate by venotonic but whose social importance is far from being as important of those of arthritic pain or headache pain. If not, we should perhaps turn one’s coat and considering that due to the fact that now the patient is the one who pays, beside efficacy studies we should add studies focused on patients satisfaction...
Results of an observational prospective study of a new venoactive food supplementation: Axoven®

J. Benign 1, J.P. Gobin 2, P. Faturaz 3, F.A. Allaeet 4

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2 Lyon, cabinet libéral, Lyon, France
3 Saint Etienne, cabinet libéral, Saint Etienne, France
4 Centre d’Evaluation Médicale Genes ESC & Genbiotech/IMCH Dijon, Dijon, France

Aim. To describe the evolution of the venous symptoms and quality of life of a cohort of women taking daily a new venoactive food supplementation.

Methods. Prospective observational study conducted in daily phlebology and general practice in women older than 18 years old presenting a CEAP C0s to C3s classified venous disease and taking no other physical or chemical venous treatment except lifestyle recommendations. Evaluation criteria: Symptoms self evaluated by the women on visual analogic scale (VAS) from “0” to “100” and the SF12 quality of life questionnaire.

Results. 95 women 50 ± 12 years old were included in the study. After 2 months, the leg pain measured on VAS decreased from 65 ± 25 to 25 ± 17 (average improvement percentage D: 58%; p<0.0001), leg heaviness from 67 ± 20 to 21 ± 17 (D: 62%; p<0.0001), paresthesia from 24 ± 25 to 9 ± 15 (D: 65%; p<0.0001), pruritus from 15 ± 21 to 4 ± 11 (D: 60%; p<0.0001) and cramps from 35 ± 29 to 12 ± 16 (D: 64%; p<0.0001). The psychic and physical quality of life of the women statistically improved respectively from 40 ± 13 to 51 ± 7 (p<0.001) and from 47 ± 14 to 52 ± 10 (p<0.001), just as all the SF12 dimensions without any significant side effects were described.

Conclusion. This observational study shows a significant improvement of the venous symptoms and of the quality of life in women taking daily Axoven® food supplementation.

New ultrasound technology without doppler for venous disease exploration: the B-Flow

V. Crebassa
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Aim. to evaluate The effectiveness of the ASVAL method, a surgical treatment of varicose veins by phlebectomy with conservation of a refluxing great saphenous vein (GSV). ASVAL= Selective Ablation of Varix under Local Anesthesia. New technologies such as mode B-Flow allow to show differently the venous streams as well physiological as pathological. This new technology allows a simultaneous study of blood flows, of walls and venous valvules. They allow a new approach of parietal structures and endoluminales (thrombus, sclerus...) and the control of therapeutics as echoguided sclerosis with foam which we couldn’t imagine hitherto. This new technology use not doppler effect or computer post -treatments wich we knew hitherto. This protocol gives a good efficiency and a low rate of side effects.

Prevention of infection in outpatient clinic

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Hygiene is the main subject of anxiety for the patients, media. Litigation claims about infection are very rare in our private room. But in France the incidence and severity of the infections related to this setting are probably underestimated in the absence of an adapted epidemiologist surveillance system. So far no guidelines are lay down by law but the vascular physician must know and apply the rules to avoid any infection. Objective: list of our diagnosis and therapeutic acts in vascular medicine and for each to define the rules of hygiene. Guidelines: General guidelines. Surgical hand antisepsis. Gown. Bed table: Guidelines specific for angiologists. Sclerotherapy liquid or by foam. Ambulatory phlebectomy and endovascular technics. Dressing for wounds. Pressotherapy.

Conclusion. Complience to these feasible measures should reach 100% if one wants to achieve prevention of avoidable infections. Increase vascular physician awareness of guidelines should be taught.

BO3.8 - Session of the French Society of Phlebology

2nd Part: Treatment of chronic venous disorders:

French and Russian convergences

BO3.8.1

Duplex guided sclerotherapy: respective indications of liquid and foam

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Liquid and foam are different forms of the same sclerosing agent. Their properties are quiet different because of their viscosity. The foam appears as a stronger sclerosing agent than the liquid with a high rate of success but with strong inflammatory reactions.

Aim. To propose a simple protocol using both liquid and foam under duplex for the treatment of saphenous trunks, tributaries or recurrences.

Methods. The amount of sclerosing product depending on the volume of the vein, we can diminish its volume using an alternative compression (AC) of the vein with the probe for one minute. This AC after liquid injection induces in 100% of the cases a spasm with a reduction of vein section of 75%. A second injection just below this spasm is carried out with a small amount of foam (2ml). So, we use three different forms of sclerosing agent: 3% liquid, 0% and 3% foam.

Results. AC is only utilised for large axis. Large axis under the fascia: AC + high concentration (3%-1 ml liquid) and below the spasm, foam 3% 1 to 2 ml. Small axis under the fascia: No AC. We use foam 3% or 0, 5% and 3% foam.

Methods. The amount of sclerosing product depending on the volume of the vein, we can diminish its volume using an alternative compression (AC) of the vein with the probe for one minute. This AC after liquid injection induces in 100% of the cases a spasm with a reduction of vein section of 75%. A second injection just below this spasm is carried out with a small amount of foam (2ml). So, we use three different forms of sclerosing agent: 3% liquid, 0% and 3% foam.

Results. AC is only utilised for large axis. Large axis under the fascia: AC + high concentration (3%-1 ml liquid) and below the spasm, foam 3% 1 to 2 ml. Small axis under the fascia: No AC. We use foam 3% or 0, 5% and 2 ml. Small axis at the surface: foam 0, 5% 1 to 2 ml. If the channel after the spasm is <2mm, it is not necessary to inject a large volume of foam. The injection of small volumes of foam induces lesser visual disturbances. In a prospective study on 2482 great saphenous veins, the rate of failures is less than 1%.

Conclusion. This protocol gives a good efficiency and a low rate of side effects.

BO3.8.2

Is varicose vein pattern implicated with efficacy of foam sclerotherapy of saphenous trunk?

S. Krylov, AA Laronov
Phlebology Center, Saint-Petersburg, Russia

Methods. Retrospective study of 283 cases (546 limbs) of GSV treated with foam sclerotherapy. The efficiency of a single session of treatment of incompetent GSV trunk with foam sclerotherapy (Fibro-Vein 2%-3%) was assessed at 1 week and 3-6 months of fol-
low-up. The influence of incompetent perforator and incompetent tributaries in thigh and calf areas, number of incompetent tributaries, sites of varicose veins and pelvic vein reflux was assessed.

**Results.** Apart from expected relationships between trunk diameter and sclerotherapy, the following correlations efficiency were found: 1) The presence of upper third thigh incompetent tributaries and perforators more than 3 mm affect the efficiency of a single foam sclerotherapy session; 2) The combination of incompetent perforators and/or incompetent tributaries into upper part of GSV trunk and incompetent tributaries of leg raise the probability of recurrence of GSV trunk reflux.

**Conclusion.** The difference of foam sclerotherapy efficiency was found in cases with GSV caliber more then 6 mm only. The numbers of calf tributaries as well as caliber of tributaries and perforators were found significant.

**BO3.8-3**

**Foam sclerotherapy of GSV with polidocanol 3% VS 1%: a randomized controlled study. 36 months follow-up**

J. Diamant

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Evaluate the safety, efficacy and patient acceptability of using Polidocanol microfoam with concentrations of 1% versus 3%, in the management of Great Saphenous Vein incompetence: CEAP: C2-C5 Ep As 2-3 Pr - diameter ≤10 mm. Endpoint: Suppression of retrograde blood flow in the incompetent trunk of GSV assessed by ultrasound at 3-6-12-24-36 months follow-up. and evaluation of the clinical symptoms of venous incompetence with the Rutherford score and patient acceptability using the quality of life questionnaire. Foam was produced mechanically using a standardised procedure with a blinded randomized concentration of Lautromacrol 400. The injection was performed by means of an ultrasound-guided short catheter at the internal aspect of the knee. An additional injection of 4 ml of foam could be performed if there was residual reflux in the trunk at 3 and/or 6 months. 147 patients were enrolled (04 -2003 to 04-2005), 151 patients followed up. The volume of foam injected was between 4 and 15 ml adapted to the spasm. The principal criterion was no reflux in the GSV at 6 months: 60% in the 1% group and 85% in the 3% group. Partial re-canalisation of the trunk: 20% in 1% group, 7% in 3% group; these patients were allowed an adjunctive foam injection limited to 4 ml. The evaluation of no reflux in the GSV at 1 year confirmed at 3 years was 75% in the 1% group, 78% in the 3% group. The clinical effect at 6 months was not significantly different (pain, induration, pigmentation). Rutherford score and CIVIC test were improved respectively in 90% and 60% cases (change in score of at least 20%) with no significant difference. 3 deep venous thromboses (2%) at day 10. No clinically relevant pulmonary embolism occurred.

**BO3.8-4**

**Minimally invasive technologies in the treatment of the varicose disease**


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Complex treatment of VD included surgical methods (invaginational phlebectomy or PIN - stripping, processing of insufficient perforating veins, miniphlebectomy by Muller) and modern miniminvasive technologies (endovascular laser treatment, laser transcutaneous photoocclusion of telangiectasias, different kinds of sclerotherapy and echosclerotherapy of insufficient perforating veins. EVLT of vena saphena magna was performed in 80 patients using a diode laser Dornier Medilas D. It is necessary to point out that before EVLT we usually perform crosssection with precise processing of VSM branches and perform perforating veins if necessary. As usual, the gauge of VSM was around 10 mm. EVLT was performed using a constant regimen of power supply with the power 16-22 W with the speed of traction 0.5-0.8 cm per sec. After precise and correct performance of EVLT the full obliteration of vein lummen is performed and after 12 months there is no visualization of vein during the ultrasonography duplex angioscanning. LTP was performed using FOD - N YAG laser (tradia - 532 mm) More than 600 procedures of laser photoocclusion were performed. We consider that the laser is effective in treatment of capillary telangiectasias, predominantly linear and point especially when the vessel gauge was not more than 0.7-0.8 mm. The maximal effect was obtained in patients with type 1 or 2 of fotosensivity by Fitzpatrick. Our experience in phlebosclerosis showed that foam-form sclerotherapy yields positive results in cases of big telangiectasias or reticular and nonmagistral veins. In moderate and small telangiectasias we prefer traditional sclerotherapy in combination with LTP. ESPV in patients with VD was performed in 45 cases. If perforating vein is hole-shaped not less than 4 mm and not more than 8 mm in diameter, this procedure is usually successful. Only a reasonable combination of traditional and modern mini invasive surgery helps to obtain good results in the treatment of VD.

**BO3.8-5**

**Endovenous laser treatment of Short Saphenous Vein (SSV)**

F. Vin

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**Aim.** To evaluate the efficiency of Endovenous Laser Procedure for treatment of incompetent short saphenous vein (SSV) on hemodynamic criteria.

**Methods.** Between January 2004 and June 2009 we have treated by endovenous laser procedure 48 incompetent SSV in 44 patients. After introduction of catheter, tumescent local anesthesia was performed. The fluence utilized was 11 watts 3s and 10 watts 2s until the place of introduction. Endovenous laser procedure was performed in an open surgery under tumescent anethesia without any ligation division of the saphenous popliteal junction which can give recurrence at the popliteal fossa. Duplex Ultrasound was performed at 1 month, 6 months, 1 year and 2 years. Incomplete or segmental occlusion were analyzed.

**Results.** We obtain a complete occlusion in 87,5% of cases with significant decrease of saphenous vein diameter. Only 6 patients had a recurrence with recanalisation at 1 year due to a too low fluence. Like stripping procedure, endovenous laser treatment of SSV give paresthesia at the lateral aspect of the leg (22,9%) of cases.

**BO3.8-6**

**The incompetent perforating veins: some aspects of hemodynamic and surgical treatment**

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3 Hospital N° 40, Ekaterinburg, Russia
4 Hospital N° 41, Ekaterinburg, Russia

The first aim of the study was duplex ultrasound investigation of venous hemodynamic changes of the lower limbs in different classes of chronic venous insufficiency (CVI). Forty-nine patients with CVI (C2-C6 classes) were divided into three groups and compared with 10 volunteers without the signs of CVI during ultrasound examination. Five variants of venous hemodynamic changes in great saphenous vein (GSV) system were found. The data of investigation showed that the total perforating veins diameter was indirectly associated with horizontal veno-venous volume that increased proportionally to the CVI clinical class. Direct dependence between the diameter of GSV trunk at the thigh level and total perforating veins diameter were also identified. The second aim was retrospective comparison of three methods for the treatment of lower venovenous reflux in patients with severe CVI (C4-C6 classes): endoscopic subfascial dissection of perforating veins
Combined therapy in patients with varicose veins and lower extremities lymphedema

R. Dremov, A. Larionov, E. Silchuk
Phlebology Center, Saint-Petersburg, Russia

Aim. To reduce an incidence of postoperative complications after phlebectomy in patients with lower extremities lymphedema. The basic treatment mode for magistral form of varicose veins (VV) is still an operation, however, it is proved, that 20-25% patients after phlebectomy, performed with oedema, will have lymphorrhoea and postoperative lymphostasis.

Methods. The disease was diagnosed on the basis of anamnesis, physical examination, duplex scanning of veins, ultrasonic Doppler examination and lymphoscintigraphy of the lower extremities. The treatment was carried out in several stages: 1 stage - complex conservative therapy of lymphedema, 2 stage - short stripping, 3 stage - postoperative sclerotherapy.

Results. In During the period 2002 - 2008 102 patients with lower extremities lymphedema and VV have been treated, among them there were 84 women and 18 men. The age of the patients was 25-69 years, on the average 45, 3 years. The duration of the disease was from 2 up to 30 years. During the first stage, the complex physical lymphedema therapy was performed, including manual lymph drainage, pneumatic compression, bandaging and compression knitted garments. On the average the oedema reduction has made 25-30%, the quality of life has improved. At the second stage low - invasive phlebectomy was carried out, including inversion stripping and miniplhbeectomy. At the third stage - postoperative sclerotherapy.

Conclusion. Thus, carrying out complex conservative therapy in patients with lower extremities lymphedema and subsequent combined treatment of VV in most cases results in recource of the disease and considerable improvement of “quality of life” of these patients. The clinical course of the basic disease (lymphedema) did not worsen in any cases. It is expedient for patients with VV and lower extremities lymphedema to make a first stage - complex physical therapy of lymphatic oedema and then - short stripping together with sclerotherapy.

Efficiency of Medical Compression Stockings (MCS) in venous disorders: is pressure the only useful criteria?

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Société Française de Phlébologie, Paris, France

The use of MCS is based largely on experience. If randomized controlled trials (RCT) demonstrating clinical effects exist for some indications, in other indications (C2AS, C3), the odds are rare. Health Authorities claim evaluations of MCS according to criteria of “evidence based medicine”. They consider that the clinical effectiveness is in relationship to the level of pressure. Is this criterion not too reductive?

Clinical indications according to the levels of pressure The International Compression Club has published recommendations in Chronic Venous Disorders and Venous Thrombosis according to the levels of pressure and published RCT (Grade of recommendations and quality of evidence IA and IB). French standardization of MCS French standardization (IFPTH) relies on several technical points: - existence of 4 classes of pressure (10 to 36 mmHg) . weight of the yarn . quality of the yarn utilized, - double covering of yarn of wool - knitting of the heel . pressure gradient from the ankle to the thigh . persistence of pressure after washing tests This standardization ensures: - durability of pressure throughout time, - constancy of pressure (in the same class of pressure) from one MCS to another and according to the morphology of different patients, Textile properties of MCS and future RCT These different textile characteristics have a role on the interface pressures and the stiffness of MCS. They are specific to the standardization utilized and must be specified in a RCT.

Conclusion. If pressure is an important technical property to be aware of, the existence of textile standardization defines and gives particular technical qualities. The standardization has an influence on interface pressures and the stiffness of MCS. We must be aware of them to appreciate the differences of clinical results between 2 RCT evaluating MCS with the same level of pressure.
CB4.6 - Joint symposium with European Society of Lymphology - International Union of Phlebolymphology on phlebolymphoedema

CB4.6.1

Physiopathology of phlebolymphehema
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San Giovanni Battista Hospital, Rome, Italy

The mixt oedema, caused by a venous and lymphatic systems failure, is observed more frequently in the clinical practice. The common origin of venous and lymphatic vessels at mycrovasculotissutal level, permits to two systems to interact to maintain the constant centripetel capacity of tissular fluid transport. In case of deficit of one system the other can help its function, as far as possible. When the deficit go too far the anathyomo-functional failure increases and it desappears the oedema. A lymph-stasis can as worsen in case of arose phlebothrombosis as the clinical consequences of a phlebothrombosis can increase in case of lymphangitis or acquired lymphatic local system failure. For the diagnosis it’s very important to compare the venous instrumental study (above all by means the echocolordoppler) and a lymphoscintigraphy for the exact definition of the lymphatic compartecipation to the oedema genesis. Very basilar it’s the study of the suprafascial and subfascial compartment by means the high resolution echography. A correct clinical and instrumental diagnosis can address the proper therapeutical approach as for the pharmacological aspects and for the surgical (venous and lymphatic) and the physical rehabilitative role. Among the physical treatment (ever combined, tailored and complex) it’s important underline the physical exercices under elastocompression that permit to obtein the best results. Very important it’s also the differential diagnosis among the cardiac, hepatic, renal oedema and with the oedema induced by the pharmacological effect.

CB4.6.2

Diagnostic and therapeutical implications in truncular and extratruncular lympho-venal malformations
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Joint Symposium on Phlebolymphedema by International Union of Phlebolymphology and European Society of LymphologyVenous and lymphatic systems are mutually dependent dual outflow system of the circulation, and failure of one system gives additional burdening/loading to other system. Long term one system failure results in total failure of this 'inseparable' dual system altogether. Phlebolymphedema (PLE) is a combined condition of the chronic venous insufficiency (CVI) and chronic lymphatic insufficiency (CLI). Lymphovenous malformation, classified to Hemolymphatic Malformation (HLM) by Hamburg Classification, is one of the causes ‘primary’ PLE. HLM is a combined condition of venous malformation (VM) and lymphatic malformation (LM); VM causes CVI while LM causes CLI. Truncular VM lesions, originated from the ‘later’ stage of embryogenesis, have direct hemodynamic impact to the venous system (e.g. marginal/sciatic/lateral embryonic veins or aplasia/hypoplasia of iliac/femoral/polpetal veins) resulting in more severe CVI in comparison to the extratruncular lesions. Extratruncular VM lesions, originated from the ‘earlier’ stage, exert its hemodynamic impact indirectly, which is augmented by its progressive nature of mesenschnymal cell characteristics; when it makes a steady growth, CVI would get worse proportionally. Same rule applies to the LM of two different embryologilal subtypes: extratruncular LM known as lymphagena and truncular LM known as primary lymphedema. Truncular LM makes direct impact to the lymph transporting system resulting in CLI represented clinically as a chronic lymphedema. Extratruncular LM,
which seldom has a direct communication with lymphatic system, remains embryonic tissue remnant and has a limited hemodynamic impact especially when exists as a solitary independent lesion. However, when extratruncular LM is combined with truncular LM and continue to grow per embryologic characteristics, its indirect impact to the lymph transporting system would result in augmentation of pre-existing CLI by truncular LM. Combined condition of CVI and CLI of ‘primary’ PLE is therefore, extremely variable depending upon the extent/severity of VM and LM lesions, truncular and extratruncular, involved to the PLE.

CB4.6-3

Nuclear Medicine in Phlebolymphology
P. Bourgeois
Abstract not available

CB4.6-4

The treatment of lymphoedema arm
R. Damstra
Ny Smellinghe hospital, Drachten, The Netherlands

Breast cancer related lymphedema (BCRL) is one of the most frequent causes of lymphedema (LE) of the arm. When a proper diagnosis is made and tumour recurrence is ruled out, a treatment program can be designed for the initial treatment phase. The goals for conservative treatment are to eliminate edema by reducing interstitial fluid production and to stimulate lymphatic propulsion by compression. In addition lymph flow is stimulated by manual lymph drainage (MLD) and by exercises that improve the functional capacity. To minimize the risk of infection, maintenance of skin integrity and proper skin care are mandatory. The combination of these therapeutic modalities is called complex decongestive therapy (CDT). When the maximal therapeutic result is obtained and the maintenance phase is reached, flat knitted, tailor made compression garments are then essential for the long-term management. Especially in early stages of LE (stage 1 and 2) non operative treatment is effective to reduce pitting component. Therefore, early diagnosis and treatment are mandatory for a successful approach. Although compression therapy is the cornerstone in LE treatment, no figures are known which interface compression pressure is most effective. We aimed to compare the effect of low-versus high interface pressure for arm volume reduction in 36 patients with BCRL after 2 and 24 hours. The study showed that inelastic, multi-layer, multi-component compression bandages with lower pressure (20-30 mm Hg) are better tolerated and achieve the same amount of arm volume reduction compared to bandages applied with higher pressure (44-58 mm Hg) in the first 24 hours. This observation gives clues to developing new treatment options in LE of the arm. Although good treatment options are available for BCRL patients should be pressed optimal when after cancer treatment a multidisciplinary co-operation is organised focussing on early diagnostics, awareness by patients and healthcare workers and self management.

CB4.6-5

The interstitial lymphography
E. Foldi
Abstract not available

CB4.6-6

The surgical indications in Lymphedema
H. Voesten
Lymphedema Unit, Ny Smellinghe Hospital, Drachten, The Netherlands

In this presentation we will start with a focus on the organization of a multidisciplinary outpatient department for patients with Lymphedema. Since our start in 1995 patient turnover has been exponentially as our clinic is the only in its field in the Netherlands with 40% tertiary/ university referrals. A very strict documentation in combination with validated measurement methods as inverse water volumetry and Perimeter are important to ensure good last results. Talking about lymphedema and surgery two main topics will be discussed. First of all the problem of the patient with lymphedema who happens to need surgical treatment in the extremity or region afflicted by lymphedema already. Can a surgeon get away with surgery in the presence of lymphedema? After all even a patient with breast cancer related arm lymphedema can sustain a wrist fracture or suffer from carpal tunnel syndrome. What to do about a groin hernia or a hydrocele in case of leg lymphedema? Every day problems will be demonstrated with corresponding measures. Secondly are there any surgical options in the treatment of lymphedema when all conservative possibilities have failed and the patient is suffering from elephantiasis, recurrent erysipelas, joint problems, loss of function of leg or arm and severe social isolation? A critical review of the literature on lymphovenous shunts will be presented followed by a demonstration of several surgical procedures and their pitfalls in the treatment of lymphangioma, papillomatosis, lymphedematous complications in lipedema patients, and cancer related lymphedema of scrotum, arm and legs. Our experience with the Cesar technique as pioneered by Dr Hakan Brorson will be demonstrated: after training in Sweden / Malmo we started in 2004 with arm patients (75 cases May 2009) and in 2007 with leg patients (35 cases May 2009). In conclusion: conservative treatment of lymphedema is still the treatment of choice; surgical options are starting to be of help and give lasting results in desperate cases who do not respond on conservative treatment anymore. Surgical therapy needs to be embedded in a multidisciplinary clinical setting with the moral obligation to take part in permanent international prospective research to maximize scientific results.

CB4.6-7

IVA microsurgical indications
C. Campisi
Abstract not available

CB4.6-8

Evidence based compression therapy in phlebolymphology
H. Partsch
Private Practice, Vienna, Austria

**Aim.** To review existing experimental work studying the effects of compression therapy and randomised controlled trials and meta-analyses show the clinical efficacy in different indications.

**Methods.** A report of two consensus meetings organized by the ICC (International Compression Club) is given, in which existing proofs for the efficiency of compression treatment had been discussed and recommendations for further research had been worked out concentrating on clinical relevant effects of compression therapy, 2. randomised clinical trials (RCTs) in association with various clinical indications.

**Results.** Experimental data. Compression stockings are able to prevent and to reduce leg oedema and to decrease venous diameter and to increase venous flow velocity in the lying position. Several phlebographic studies showed an improvement of the venous pump by medical compression stockings, bandages and by a Velcro band device. Inelastic bandages reduce venous reflux, increase the ejection fraction of the calf pump depending on the exerted pressure and are able to reduce ambulatory venous hypertension. Concerning the optimal compression pressure there is a close-reduced oedema decrease in lymphoedema of the lower, but not in the upper extremities. Randomized clinical published randomized controlled trials in the field of acute and chronic venous and lymphatic diseases is given concentrating on the clinical efficiency of compression devices in different indications.

**Conclusion.** Well documented literature proofs the efficacy on compression therapy. However, several fields are still open for future research.

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August 2009
CB4.6-9
Prevention of lymphedema: give good advices to the patients, but essentially to the surgeons and the radiotherapist!
A. Pissas
Abstract not available

CB4.6-10
European consensus for physical treatment of phlebothrombo-lymphoedema
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VRIJE Universiteit Brussel, Brussels, Belgium, Haute Ecole P. H. Spaak, Brussels, Belgium

Commonly recognized situations are: Slight oedema when the size is less than 20% difference Moderate or severe oedema when the size is more than 20 or 40% difference. Treatment of slight oedema: - MLD (Manual Lymph Drainage) 3 to 5 times per week for 2 to 4 weeks followed by reducing sessions until the end of the treatment. - Treatment of moderate or severe oedema: First stage (intensive treatment): - MLD + IPC (Interm. Pneumatic Compression). - + Multilayer Bandages -Second stage: - MLD + IPC + compression stockings. Treatment is initially commenced daily for 3-4 weeks and the frequency is progressively reduced to eventually once a week.

BO4.7 - Session of the American College of Phlebology

BO4.7-1
Preliminary results of low energy density laser ablation treatment of incompetent truncal veins
J. Mauriello, E.J. Sanchez, J. White, W. Schroeder, B. White
Vein Center at Bayte Cardiovascular, Bradenton, Florida, USA

Aim. Over the past eight years, endovenous laser ablation (EVLA) has evolved as an effective method of treating incompetent truncal veins. A variety of laser wavelengths are in use in the U.S., including 810, 940, 980, 1064, 1319, 1520 nm, and most recently 1470 (Ceralas E 15, Biolitec, Inc.). Traditionally, the linear endovenous energy density (LEED) used for EVLA treatment ranges between 60 and 80 joules/cm centimeter. We report a small series of our initial patients using 1470 nm laser using substantially lower energy densities.

Methods. 49 vessels (21 GSV, 27 SSV, and 1 anterior lateral tributary) in 24 patients (18 females, 6 males with a mean age of 66, range 38-89) were treated with a CEAP clinical class of 6 at C2, 12 at C3, 5 at C4, and 1 at C5. Mean diameter of the GSV at the SFJ was 8.1 mm (range 3.8 - 14.0) while the mean diameter of the proximal SSV was 4.9 mm (range 2.5 - 9.6). After placement of tumescent anesthesia, the veins were ablated using a radial emitting fiber at 5 watts, delivering a mean LEED of 25.6 joules/cm (range 14.1 - 56.2). Patients were followed up with an initial duplex ultrasound at 4.3 days (range 2-11) post procedure, and again at 6 months (mean 186 days).

Results. At the initial follow-up, there were two (2) GSVs that remained patent but sclerotic for 4-6 cm past the superficial epigastric vein but distally were totally occluded to the access point below the knee.). There was very minimal perioperative pain and bruising as compared to our previous experience with EVLA using a 980 nm laser. There were no cases of paraphrenia or heat induced thrombosis. At 6 months, one SSV recanalized (7.7 mm diameter treated with 16.6 J/cm) in spite of the vein being notably sclerotic. The same two GSVs remained patent for 4-6 cm past the superficial epigastric vein and closed distally.

Conclusion. These preliminary data show that lower energy density may be equally effective at ablating incompetent truncal veins, while significantly minimizing patient discomfort, and other potential complications.

BO4.7-2
Understanding duplex venous ultrasound for phlebology
J. A. Zygmunt
Centers for Advanced VeinCare, Delray Beach, FL, USA

The diagnosis and treatment of chronic venous disease has undergone a quantum leap forward in recent decades. In many ways, the venous system is now considered more complex than the arterial system. Primarily our understanding of venous disease because of duplex ultrasound has had a profound impact not only on venous disease pathology, but also the treatments historically provided and those conceived and developed because of our increased understanding. The increased understanding is a direct result of the advances and improvements in duplex ultrasound equipment, diagnostic techniques and communication standards as they relate to findings in anatomy, pathology and hemodynamics. Currently, it is self evident that duplex ultrasound has become the gold standard for diagnosis of the venous system providing anatomic and functional information. Mapping techniques, concepts regarding superficial reflux, and other factors which affect duplex ultrasound findings are presented. The advantages, limitations and impact of these variables are also presented. Since these techniques, concepts, and factors all impact diagnostic results, their presence impacts diagnostic interpretation. The direction of treatment, future research and development of other diagnostic or therapeutic applications are all impacted. Most importantly our improved understanding has significant impact on the planning and approach to treatment of primary and recurrent venous insufficiency for our patients.

References

BO4.7-3
A new phlebectomy algorithm: first, second, third
L. Kabnick
NYU, NY, USA, American College of Phlebology, Ga, USA

There is also substantial controversy over whether ambulatory phlebectomy (AP) should be performed at the same time that truncal reflux is being eradicated. The existing data suggests advantages to either AP in conjunction with truncal reflux treatment and to performing the procedures independently. In a retrospective study by Welch et al, the initial success of endovenous ablation to treat truncal reflux allowed most patients to defer subsequent stab phlebectomy. Conversely, in a controlled study by Mekakio et al, patients who underwent concomitant endovenous laser therapy and ambulatory phlebectomy did not need to return for ensuing phlebectomy procedures. When considering the treatment algorithm, the physician must be selective and make decisions based on the needs of each individual patient. It is appropriate to combine procedures if the varicose veins involve the zone of influence regarding the truncal reflux. Staging is indicated if the varicose veins lie outside the zones of influence. Lastly, should phlebectomy be performed at all?

References
BO4.7-4
Board certification: a historic milestone in United States phlebology
S. Zimmern
Private Practice, Austin, USA

The creation of the American Board of Phlebology (ABPh), an independent non-profit specialty board, is a historic milestone in US phlebology. This development will improve the recognition and acceptance of phlebology and improve standards of patient care. The ABPh is organized to: 1) Improve the standards of medical practitioners and the quality of patient care related to the treatment of venous disorders; 2) Serve the public and the medical profession by establishing initial and continuing qualifications for certification and maintenance of certification as physician specialists in the practice of phlebology; 3) Examine physician candidates for certification and maintenance of certification in the practice of phlebology; 4) Establish educational standards for teaching and training programs in phlebology; and 5) Maintain a registry of individuals who hold certificates issued by the Board. The ABPh Certification Examination was developed using the Standards for Educational and Psychological Testing. These standards are published and adopted by the American Educational Research Association, the American Psychological Association, and the US National Council on Measurement in Education. The computer-based examination is comprised of approximately 200 multiple-choice questions. The content of the examination includes Basic Science, Venous Diseases and Syndromes, Diagnostic Tools and Screening, Duplex Ultrasound and other Imaging Modalities, Treatment and Professional Standards. Certification is for a period of ten years. The first American Board of Phlebology Certification Exam was delivered via Pearson Vue testing centers in April 2008. Two hundred seventy six (276) applicants, from a variety of specialties, took the exam. Two hundred forty eight (248) passed the exam. An absolute passing point was established against which all candidates’ results were compared. The candidate separation reliability was .89, indicating the exam was delivered successfully separated candidate ability. The 2009 exam was delivered via Pearson Vue testing centers in April 2009 to 190 candidates.

BO4.7-5
Compression therapy after phlebologic interventions: how much? How long? How high? A United States perspective
T. Morrison
American College of Phlebology, San Leandro, CA, USA

Aim. Compare compression protocols used following cosmetic and medical vein procedures in the US. This review seeks to examine the current standards in compression therapy after minimally invasive phlebologic procedures and query methods of enhancing patient compliance.


Results. There are five different classifications in use for compression hose: British, German, French, European, USA standard. The British standard Class one is 18-24 mm Hg, while USA Class one standard is 20-30 mmHg. Therefore, we need to refer to mmHg instead of Class I or II. Compression stockings are classified on the basis of the pressure applied at the ankle.

Conclusion. The survey supported the use of compression stockings post cosmetic and medical vein procedures in the United States. The majority (44%) used compression 3 weeks after cosmetic sclerotherapy, 2 weeks (68%) after endovenous thermal and chemical ablation, and Phlebectomy. The majority (42%) used 20-30 mmHg post cosmetic procedures. Fifty percent used 20-30 mmHg post medical procedures vs. 48.6% for 30-40 mmHg. The majority used thigh high compression post cosmetic and medical vein treatments.

BO4.7-6
Effectiveness of single injection of sodium tetradecl sulfate on predicting outcomes following ultrasound foam sclerotherapy using ultrasound scoring system
P. Raymond-Martimbeau
Director, Dallas Non Invasive Vascular Laboratory, Dallas, Texas, USA

Aim. To test the effect of different sodium tetradecl sulfate (STS) dosages on ultrasound scoring system to predict outcomes following ultrasound foam sclerotherapy (UFS) of great saphenous veins (GSVs).

Methods. Sixty-four sutured proximal GSVs in 42 patients with sphenofemoral junction incompetence were classified into four groups (A,B,C,D). Images of ultrasound (US) and color flow Doppler (CFD) were retrospectively analyzed with an ultrasonic vein sclerosis scoring system. The vein score was composed of vein wall thickness, lumen filling percentage and vein diameter reduction. Each group received a single injection of STS at mid-high. Group A was injected with STS 1% i.ml, Group B with 1% 8mL, Group C with 3% i.ml and Group D with 3% 8mL. The GSVs were analyzed at 1 month and 1 year post-injection.

Results. The overall ultrasonic score was significantly affected by the STS dosage. Time of scoring had also significant effect on the overall ultrasonic score with the score being significantly higher at one year compared with at one month (except for group D). There was also significant interaction between dosage and time of scoring indicating that the difference between the four groups did not stay the same over time (comparing one month with one year scores).

Conclusion. The ultrasonic score is significantly affected by STS dosage, time of scoring and interaction between the two factors. Ultrasound great saphenous vein sclerosis images can be differentiated by their characteristic features of wall thickness, endoluminal filling and vein diameter reduction. The ultrasound vein sclerosis score is useful in prediction of vein successful sclerosis.

BO4.7-7
Differences in saphenous vein reflux detection according to patient positioning
D. Neuhardt
Abstract not available

BO4.7-8
The complementary roles of surgery, endovenous thermal ablation, and foam sclerotherapy in the treatment of chronic venous insufficiency - The U.S. perspective
N. Morrison1, D. Neuhardt 2
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2 Compudiagnostics, Scottsdale, USA

The objectives of the various treatment modalities are the ablation of axial and perforator vein reflux, improvement of leg function and cosmesis, and minimization of recurrence and complications. Pre-treatment assessment, in addition to a thorough history and physical examination, must include duplex evaluation. Treatment methods range from surgical extirpation to more limited vein ablation and saphenous sparing procedures (technical details will be described). In phlebologic practices in the U.S., minimally invasive, percutaneous, endovenous
treatment methods have largely replaced traditional surgical extirpation. Adjunctive treatment is considered by most U.S. phlebologists mandatory to avoid high rates of recurrent patency in saphenous vein, and must include ablation of incompetent accessory saphenous tributaries, persistently incompetent perforator veins, and incompletely ablated truncal veins. Incompetent distal saphenous vein, incompetent tributaries and persistently incompetent perforators must be eliminated. It is believed by most that unless one is committed to careful follow-up and adjunctive treatment, the practitioner and the patient will be left with unsatisfactory results. Mid term results of endovenous thermal ablation techniques appear to be on a par with more invasive surgical treatment with overall fewer complications. Endovenous foam chemical ablation also appears to be effective, with infrequent complications, but with rare serious neurologic adverse events. Whilst some surgeons have expressed the view that none of the minimally invasive techniques have yet been shown to better conventional surgery in the long term, the patient’s perception has uniformly been that minimal invasion is better.

BO5.7-2

Endovenous procedures - The German experience
E. Rabe 1, F. Pannier 2
1 Department of Dermatology, University of Bonn, Bonn, Germany
2 Departments of Dermatology, AZM Maastricht, Maastricht, The Netherlands

In the last year's endovenous procedures like endovenous laser ablation treatment (EVLA) and radiofrequency ablation (RFA) have become alternative treatment options in the treatment of great saphenous and small saphenous veins. The same is true for foam sclerotherapy: German Experience: The majority of specialised phlebological centres in Germany use endovenous procedures, foam sclerotherapy and surgery in an alternative way to treat their patients. In the majority of the cases however endovenous procedures, phlebectomy and foam sclerotherapy may be combined. Quiet a number of papers in reviewed journals have been published out of these centres in recent years. Nevertheless the percentage of endovenous procedures stays below 10%, compared surgery. This is due to the fact, that the decision which kind of treatment will be chosen is not only evidenced based but also reimbursement based. In Germany venous surgery is fully reimbursed by the health insurances whereas endovenous procedures may only be reimbursed by the majority of private insurance companies. Hopefully the situation will change when the growing number of the prospective comparative studies will convince the health officials of the safety and effectiveness of these treatment options.

BO5.7-3

Radiofrequency indication and usefulness
V. Gasbarro
Abstract not available

BO5.7-4

Scleromousse as first choice
L. Tessari
Abstract not available

BO5.7-5

Scleromousse: a technique in progress?
M. Sica
Abstract not available

BO5.7-6

Thromboembolic complications: is it a problem?
P.L. Antignani
Abstract not available
SPONSORED SATELLITE SYMPOSIA
CB1.6 - STD Symposium
Foam sclerotherapy in 2009

CB1.6-1 Foam sclerotherapy - The current state of the art
P. Coleridge-Smith
British Vein Institute, London, United Kingdom, UCL Medical School, Lon-
don, United Kingdom

Foam sclerotherapy evolved from Orbach’s ‘air block’ technique more than 60 years ago. Several major enhancements have been added to the original method, including the use of ultrasound guided injection, the injection of ‘microfoams’ and systematic treatment of saphenous trunks as well as varices. As a result ultrasound guided foam sclerotherapy is a treatment which offers similar efficacy in the management of venous disease to any of the currently available methods. A randomised controlled study has been performed comparing the efficacy of sclero-
therapy; foam sclerotherapy and surgery in a group of patients with truncal saphenous reflux. After 12 months the surgeons had eliminated truncal saphenous reflux in 130 of 176 patients (74%) by foam sclero-
therapy and in 89/94 (88%) by surgery, assessed by duplex ultrasonogra-
phy. In comparison, sclerotherapy had eliminated reflux in 239 of 254 patients (91%) by foam and 194/125 (85%) by liquid sclerotherapy. Much additional information is available from clinical series. My own published data shows that 85%-90% of saphenous trunks were eliminated by foam sclerotherapy 12 months following treatment assessed by ultrasonogra-
phy. After 5 years clinical examination revealed recurrence of varices in only 11% of patients. This is comparable with surgical series reported us-
ing similar criteria. Recurrent varicose veins present a particularly difficult problem to address surgically. Clinical series suggest that foam sclero-
therapy is as effective in recurrent as primary varicose veins, avoiding the morbidity of surgical treatment. A number of clinical series also address the problem of leg ulceration due to superficial venous incompetence. Foam sclerotherapy is also effective in this context, resulting in high rates of healing. Problems which remain include the lack of availability of a licensed pharmaceutical product to use for foam sclerotherapy. There has also been some concern about the fate of gas bubbles which reach the systemic circulation in patients with a patent foramen ovale. These areas in particular require more research.

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Berge, C.H.A. Wittens, A. Sommer, O. Nelzen, D Hamer, and The Varsoloe®
European Phase III Investigators Group, Varsoloe® polidocanol microfoam
compared with surgery or sclerotherapy in the management of varicose veins
in the presence of trunk vein incompetence. European randomized

CB1.6-2 Foam sclerotherapy in Italy with post sclerotherapy compression
N.A. Cavezzi
Vascular Unit, Clinica Stella Maris and Poliambulatorio Hipocrates, S.
Benedetto del Tronto, Italy

Foam Sclerotherapy (FS) has spread worldwide in phlebology com-
munity. Italy was one of the very first countries where FS has been
proposed and developed. Tessari method has become the reference
method in Italy since 1999 and several clinical and experimental stud-
ies have been published by Italian and International authors; multiple
and different pre-intra-post-treatment procedures have been reported to
increase efficacy and safety of FS. Italian practice of FS is based on a few
technical references when forming the sclerosant foam: a) one to four
liquid to gas ratio, b) CO2 or CO2/O2 are slowly replacing air to form
c sclerosant foam, c) low/no silicone content syringes are used, d) Sodium
Tetradecylsulfate(for larger veins especially) or Polidocanol are used as
sclerosing drugs. As to the injection of foam: a) 25G or larger needles are
used to avoid foam degradation, b) multiple injections are preferred to
one shot, if no long catheter is used, c) up to 10 ml of sclerosant foam is
generally injected per session, d) long catheters are gaining popularity,
especially when injecting sclerosant foam intraoperatively, in combina-
tion with hook phlebectomy (or FS) of the varicose tributaries. The most
common adjuvant procedures are the following: a) elevation of the limb
prior to the injection, b) prolonged immobilisation of the treated limb,
avoiding especially Valsalva manoeuvres (i.e. wearing stockings), c) 5-10
minutes after the injections compression is based on 20-30-40 mmHg
elastic stockings, with pads over the injected areas and especially over
the varicose tributaries, to increase the local pressure.

FS in Italy has become a valid alternative to surgery, laser or radio-
frequency, mostly in medium-small size varices (up to 5-10 mm size?),
while in larger varices a few technical improvements to potentiate the
final outcomes are under scrutiny.

CB1.6-3 Recurrent varicose veins – Foam sclerotherapy
M. Perrin
Please refer to the annexe p.181

CB1.6-4 Ultrasound Guided Foam Sclerotherapy (UGFS) for Vari-
cose Veins (VV) - an experience from 1200 cases
A. Bradbury
University of Birmingham, Department of Vascular Surgery, Sollibull Hos-
pital, Sollibull, United Kingdom

We have been offering UGFS for VV over 7 years and to date have
treated c. 1000 patients (c. 1500 procedures). Over that time we have observed 1. occlusion rates of 92.5%, 93.3% and 82.5%, and absence
of visible VV in 84.9%, 89.7% and 84.8%, of our patients at 1, 6 and 12
months 2. rapid healing and a low rates of recurrence in a small series
of patients treated for open ulcers 3. significantly quicker return to
normal activities (e.g. work, driving, social and leisure pursuits), and
significantly less pain, bruising and analgesia requirement, than after
surgery 4. statistically significant improvements in both disease-spe-
cific (Aberdeen questionnaire) and generic HRQL (Short Form, SF-12)
at 1, 6 and 12 months 5. high levels of patient satisfaction with most
patients having their expectations met in terms of symptom relief,
cosmetic improvement and other life benefits (for example, choice of
clothes, work performance, social and leisure pursuits, and relation-
ships) 6. A low level of side-effects and complications: a. Systemic: 2
DVTs, 5 transient visual disturbance, 2 procedure-induced migraine; 1
(mild) allergic reaction; nil else b. Local: transient skin pigmentation
c. 20%, thrombophlebitis c. 5%; nil else In summary, we have found
UGFS to be an extremely safe, clinically and cost-effective treatment
for VV that has largely replaced surgery and the other minimally inva-
sive techniques (RFA, Laser) in our academic department.

CB1.8 - Pierre Fabre Symposium
1st Part: Venous ulcer: the final stage in chronic venous disease -
Managing it in 2009

CB1.8-1 From pathophysiology to clinical evaluation
A. Nicolaides
Please refer to the annexe p.181
Since chronic venous disease (CVD) is one of the most common afflictions affecting the populations of developed countries, proper patient assessment, classification, and strategies for treatment are important. The international CEAP classification properly profiles the patient with CVD at the time of presentation. The Villalta scale and the Venous Disease Severity Score are more dynamic instruments used to assess outcomes of therapy. Guidelines for patient care are an important aid for physicians when treating typical patients. The two major guideline publications for CVD use available evidence to determine the strength and quality of their recommendations. Pathophysiology Our understanding of the pathophysiology of CVD has broadened, allowing physicians to adopt targeted treatment strategies. Ambulatory venous hypertension is the initiating hemodynamic perturbation leading to leukocyte activation, adhesion, and emigration through the endothelium. Protease production follows, producing edema and the physical signs of CVD. Guidelines Management strategies directed at eliminating thrombus in patients with extensive deep vein thrombosis are now recommended to restore patency, reduce venous pressures, and reduce postthrombotic morbidity. Early ambulation and effective leg compression are recommended to reduce postthrombotic morbidity. Pharmacotherapy is specifically addressed using pentoxifylline and micronized purified flavonoid fraction (MPFF) to speed healing of venous leg ulcers. MPFF also reduces edema, improves transcutaneous oxygen pressure, and improves quality of life, forming the basis for its recommendation for the treatment of the spectrum of symptoms of CVD. The recent American College of Chest Physicians guidelines have added new recommendations and suggestions for the treatment of patients with CVD. The physical and pharmacologic measures recommended will substantially improve the care of patients with CVD.
Unmet needs in assessment of symptoms and signs
A. Jawien
Ludwik Rydygier University Medical School, Bydgoszcz, Poland

Chronic venous disease (CVD) lacks specific and consensual instru-
ments for adequate assessment of its signs and symptoms. Needs
are still unmet regarding the tools currently available for the assess-
ment of the therapeutic efficacy of drugs like Daflon 500 mg. As-
essment tools for physicians: The CEAP classification has facilitated
meaningful communication about the disease. The adjuncts to the
CEAP are a useful complement, and should be used for research. Pre-
vious methods remain valid for objective measurement of symptoms
and signs of CVD: for symptoms, visual analogue scales may be used.
For assessment of venous edema, leg volume can be assessed simply
by by ankle and calf circumferences. Other methods reported are
water displacement volumetry, optoelectronic methods, CT scanning,
MRI, and dual X-ray absorptiometry. For leg ulcers, the parameters
most frequently used to measure a wound are the lengths of the
principal axes, the projected surface area, and the perimeter. Most
methods have been used for the study of Daflon 500 mg's efficacy.
Patient-reported outcomes: Self-reported quality-of-life assessments
are valuable adjuncts to both clinical observations and physician-
generated assessments. At least seven specific scales adapted to CVD
(Aberdeen Varicose Veins Questionnaire, Charing Cross Venous Ul-
ceration Questionnaire, Tübingen, Franks, Freiburger, VEINES-QoL,
and CIVIQ) have been developed until now, pointing to the need for
a single scale applicable to a wide spectrum of diseases and validated
in many languages. Most of these tools are validated in a single lan-
guage, while thirteen linguistic versions of the CIVIQ were validated
according to the forward/backward methodology. CIVIQ has been
extensively used as a means of assessment in the treatment of CVD
patients at all stages of the disease.

Guidelines and recommendations: the place of Daflon
500 mg
A. Nicolaides
Vascular Screening and Diagnostic Centre, Nicosia, Cyprus

Recent guidelines have reviewed the place of venoactive drugs
(VADs) in the treatment of symptoms, edema and venous leg ulcer.
Symptoms: A group of 14 experts, chosen to be representative in the
fields of angiology, dermatology, and vascular surgery, from coun-
tries in which venoactive drugs (VADs) were available and who had
experience of their clinical use, published in 2005 the Siena consen-
sus paper on the efficacy of VADs in relieving symptoms. Data from
randomized, controlled trials (RCTs) were selected and classified as
Grade A (RCTs with large sample sizes, meta-analyses with homo-
geneous results), Grade B (RCTs with small sample size), or Grade
C (other controlled trials, non-RCTs). The experts agreed that VADs
were indicated to relieve venous symptoms CEAP clinical class C0S
through to painful venous ulcers (C0S). MPFF (Dalton 500 mg) was
assigned Grade A in this indication. Edema: International guidelines
on the management of chronic venous disease (CVD) used the same
grading system as that of the Siena experts. Outcomes included not
only symptoms but also edema and venous ulcer healing. When con-
sidering VADs, the guidelines largely summarized and endorsed the
positive findings of the recent Cochrane reviews and highlighted the
evidence of efficacy of several VADs in CVD-related edema. MPFF
was assigned Grade A recommendation in venous symptoms and
edema, and as an adjunct to standard compression treatment in the
healing of venous ulcers. Venous leg ulcer: Based on the GRADE
system described by Guyatt, the recent guidelines of the American
College of Chest Physicians recommended MPFF to be added to com-
pression (Grade B) in the treatment of venous leg ulcers in patients
with venous thromboembolic disease. In the last edition of the Hand-
book of Venous Disorders (2009), the use of MPFF in combination
with compression in longstanding or large venous ulcers was recom-
manded (Grade B).

Compression therapy after surgery and endovenous procedures

What is the rational for post-procedural compression?
E. Rabe
Department of Dermatology, University of Bonn, Bonn, Germany

Venous surgery, endovenous laser and radiofrequency treatment or
foam sclerotherapy are different options to treat varicose veins. In all
of these cases compression treatment is recommended after the pro-
cedure in the majority of guidelines and recommendations. Rational:
Reasons to apply compression after venous surgery are reduction of
hematoma formation in the stripping channel and enhancement of
blood flow in the deep venous system to prevent thromboembolic
complications. Following endovenous procedures and foam sclero-
therapy reducing the diameter of the treated vein may also reduce
thrombus formation. By this posttreatment phlebitic reactions could
be reduced. Bruising after endovenous laser treatment may also be di-
minished. However we know from the investigations of Hugo Pansch
that we need a very high pressure on the leg to have any effect on
the saphenous veins in thigh region which are located in the saphen-
ous compartment. For this reason eccentric compression is used to
enhance pressure. In addition to these actions compression treatment
on the leg also enhanced pressure in the subcutaneous tissue and in
tributary varicose veins. In these cases a lower pressure is needed.
In addition compression treatment has an anti-inflammatory effect
not only in these superficial veins but also in the surrounding tissue.
Evidence: There is only very few evidence from prospective com-
parative studies, that these proposed effects of compression treatment
take place in reality. No comparative studies are available comparing
compression and no-compression in most of these indications. New
studies are urgently needed.

Compression therapy after surgery and endovenous pro-
cedures - What is the evidence?
P. Coleridge Smith
British Vein Institute, London, United Kingdom

Compression bandaging and stockings are commonly recommend-
ed following surgery and sclerotherapy, but how much compression is
required and for how long? Very few randomised clinical trials have
been published in this field and much of current practice relies on
opinion and historical practice. Fegan established half a century ago
the need for at least 3 weeks for treated veins to be
replaced by healed fibrous scars. Little other basic science is available
to assist in deciding the best strategy to use. Studies investigating the
duration and method of compression following surgery are very few.
A recent study found that there was no advantage of 5 weeks over 1
week's compression. No clear data indicate whether or not bandaging
or elastic compression stockings are more appropriate. A Cochrane
review has considered available clinical trials concerning the methods
duration of compression following sclerotherapy. The authors
found little evidence for the efficacy of any type of compression fol-
lowing sclerotherapy. One clinical trial has investigated the efficacy of compression following sclerotherapy for telangiectases and reticular varices. Three weeks' compression with stockings was more effective than no compression in achieving resolution of veins. Considerable research is still required to determine the best compression regime following treatment for varicose veins.

References


PP3.7-3

Different forms of compression after different procedures?

N. Morrison
American College of Phlebology, San Leandro, USA

While the evidence is compelling for the use of compression hose in the prevention of postoperative thromboembolic events and post-thrombotic syndrome, and for treatment of active ulcers, there exists no evidence of similar quality in the use of compression following minimally invasive venous procedures. In patients undergoing ambulatory phlebectomy, endovenous thermal or chemical ablation, or high ligation/stripping, one hopes to achieve the following: Patient comfort, Reduction of hematoma formation, Limitation on bruising, Preven-
tion of deep venous thrombosis. These same factors will also help determine which form(s) of compression will be used in specific situations, and the duration of such compression. Factors in deter-
moving the type of compression for postoperative patients include the specific procedures performed, the extent of the procedure, con-current health problems, and patient age and lifestyle. The choices of compression include compression bandages (melastic, short, and long stretch), compression hose, eccentric compression, and/or in-
termittent pneumatic compression devices. For microphlebectomy patients, whether or not in combination with endovenous thermal ablation, most surgeons prefer to use a multilayer combination of absorptive bandages and short stretch bandages, and/or compression hose (30-40mmHg). These bandages are usually replaced at 48hrs, with further limited-stretch bandages or 30-40mmHg compression hose for a variable period. In order to achieve even partial resolution of the saphenous vein diameter in the thigh, some form of eccentric compression must be used. In conclusion, post-procedural compression management is tailored to the procedure performed, and the patient's general medical condition, abilities, and activity levels. The chronicity and severity of their disease process will determine type and duration of compression therapy. And finally compression must accomplish the intended goal while maintaining patient comfort in order to preserve compliance.

PP3.7-4

Thigh compression: how I do it

S. Zimmert
Private Practice, Austin, Texas, USA

This presentation will demonstrate the adjunctive use of a short-stretch bandage system (ABD pads, Artiflex padding, Porelast short stretch bandages) applied to the thigh along with 30-40 mmHg stockings following endovenous laser ablation. Compression stockings are routinely used following endovenous thermal ablation. Postoperative pain has been commonly reported in the initial postoperative period despite the use of stockings. There are some recent preliminary reports of the utility of additional thigh compression after endovenous thermal ablation with regard to reduction of postoperative pain. Using the demonstrated bandaging system plus stockings, the measurement of the subsurface pressure with a Kikuhime pressure sensor, in mid-thigh with the patient in active standing, was 55.8mmHg (44-68mmHg). The mean pressure of a class II compression stocking alone is about 15mmHg at the thigh level. A pressure of 40mmHg has been found to significantly reduce the diameter of the great saphenous vein in the thigh. The increased thigh pressure achieved with this bandaging system may explain the apparent reduction in post-operative pain and bruising seen with this and other similar systems. Even in this era of high-tech innovation compression remains a fundamental and essential treatment modality that requires much more study and wider utilization. Although the concept of increased thigh compression is antithetical to the idea of graduated compression, there may be clinical utility in its use.

PP3.7-5

Requirements of compression garments in the post-procedural management

H. Neumann
Erasmus MC, Rotterdam, The Netherlands

A lack of evidence exists in the literature about the need for compression therapy as well as the amount and the duration of this therapy after phlebological procedural treatments. However in general compression therapy is used. In the last decade the treatment of saphenous incompetence has really changed. Stripping is most replaced by endovenous procedures, like lasers, radio frequency or foam sclerotherapy. From all this new therapies, there is no evidence about the need for post treatment compression. However, most phlebologist will give compression therapy after those therapies. From all compression modalities the use of medical elastic compression stockings (MECS) are the most practical. For proposed treatments round knitted MECS are suitable. The compression should be decrease with the same amount as the gravitation will influence the pressure in the veins, from the ankle to the hip. In general compression at the B level (ankle) is expressed as 100% and at the G level (hip) pressure remains only about 20%. This implicate that with standard class II MECS with an ankle compression of 35 mm mercury remaining pressure at the G level is only 7 mm mercury. In conclusion: After phlebological proce-
dures, compression therapy with MECS is easy, cheap, handy to use, but evidence is leaking about pressure and duration.

PP3.7-6

A new compression device for increasing interface pressures at the thigh level. Pressure measurements and assessment by a CT scan

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2 French University Group for Medical Compression Study, Université des Saints Pères, Paris Descartes, France

And presentation of the device Thigh compression is little used. Nevertheless there are situations when thigh compression can be useful: Mediven Post Op pad is a pad dedicated to this indication. It is made up 2 parts with a hard foam centre and a peripheral softer foam. Objectives. To measure the interface pressures at the ankle (B1)und the middle of the thigh (F) between the skin and the superimposition of 2 compression stockings (CS) before and after adding the pad on the thigh. To evaluate the effects by CT scan with 3D reconstruction, on the great saphenous vein (G3V) trunk of the superimposition of 2 thigh compression stockings (23 mmHg Mediven Struva) before and after adding the pad.

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Methods. The pressures were measured in 10 healthy volunteers with a Kikuhiime device. A CT scan was performed in supine position with and without the pad. The diameter and morphology of the GSV trunk was assessed using a 3D model.

Results. In supine and standing position, the mean pressures in B1 and in F under 2 thigh CS without and with interposition of the foam pad are (median pressure): B1 supine 33.5, standing 42; F supine 19, standing 22; F+ pad supine 57.5, standing 66 mmHg. On the scan, without pad, no compression of the trunk of the GVS is observed in spite of the 2 CS. At the opposite, with the pad, a reduction of the GSV is obtained (50%).

Conclusion. This study shows that the interposition of a specific pad between CS and the skin at thigh level increases the interface pressure. CT scan with 3D reconstruction confirms that the interposition of a specific thigh foam pad produces a reduction of the calibre of the trunk.

PP3.7-7
What is the rationale for the crossed-tape technique?
M. Lugli
Hesperia Hospital, Modena, Italy

When a high interface pressure is required in selected body areas, the application of specific eccentric compression devices may be the answer. The forces dealing with a cylindric body follows the Laplace law, and effectively eccentric compression devices intervene to modify the radius where applied. To optimize the effect of an eccentric compression the pressure-generator must work in an anisotropic way: to this end circumferential compression, such as elastic stockings or bandages, is not the best. The crossed tape technique is an anisotropic pressure generator; elastic tapes are applied to fix the eccentric compression device on the skin and their elastic force is translated into perpendicular pressure. Values as high as 70-80 mmHg of interface pressure can be easily reached. Moreover, when applied on the great saphenous vein track at the tight, the pressure detected during muscular activity is significantly higher than in supine position. By means of this technique, many problems linked to compression therapy may be solved. First of all, every body area may be adequately compressed. This element becomes relevant when compression teraphy is applied after surgical procedures, for pain and drawbacks prevention, after venous procedures or esthetic surgery. The eccentric compression application is stable, well - tolerated and can be applied in strictly delimited areas. High interface pressure values may be reached also by means of very soft eccentric compression devices, thought more comfortable. Since elastic stockings or bandages are not essential for the eccentric compression effect, their application can be adapted to the real clinical necessity of the leg. Nevertheless the crossed-tape technique rationale is complex, based on the analysis of isotropic and anisotropic forces distribution, its application proves simple and effective, probably a cornerstone in compression therapy.

AP3.8 - Bauerfeind Symposium
The venous ulcer - Patient between compression and intervention

AP3.8-1
Venous interventions in ulcer patients – What is evidence based?
M. Perrin, Chassieu
Abstract not available

AP3.8-2
Evidence based compression in venous ulcer patient: bandage or stocking?
T. Wendler
Abstract not available

AP3.8-3
Pain management of venous ulcer
C. Glynn
Abstract not available

AP3.8-4
Modern wound management and treatment of wound infections - Requirement and scope of modern wound dress systems in combination with efficient compression therapy
M. Zutt
Universitätsmedizin Göttingen, Göttingen, Germany

Modern wound care in chronic wounds consists of a combination of treating the causing disease, surgical procedures and...
efficient compression therapy combined with additive lymphatic drainage and physiotherapy. Moreover the correct modern wound dressings and hypoallergenic wound edge treatments are very important. The presentation focuses critically on the different therapeutic options and will give an overview about modern wound therapy.

AP3.8-5
Natural care and protection of skin: advantage of algae ointment for the phlebological patient
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Methicillin-resistant Staphylococcus aureus (MRSA) strains are a worldwide challenge in hospitals. The prevention of the dermal colonization of MRSA and other relevant skin bacteria was investigated using microparticles from a selected microalga (Maresome®). Experimental methods Maresome® containing ointment was tested on animal models mouse ear and cow udder teats. The MRSA test strains used were ST 247, CoI, Mu 50 and N315. Human test Patient (47 y, female) with severe lymph oedema (elephantiasis) of the right leg after cryoaros was treated with Maresome® containing ointment. She suffered from chronic ulcers on both lower legs.

Results. Animal model. The pre-treatment with Maresome® led to a significant decline in cultivability of the introduced MRSA ST 247 on the mouse ear. Maresome® inhibited completely the growth of ST247 at cow udder teats. The prevention of MRSA colonization was also detected for the other multi-resistant MRSA strains, including resistance to vancomycin (Mu 50). Recontamination human in vivo test. The growth of MSSA was inhibited after treatment with Maresome®. The inhibition of pathogenic flora stopped the positive spread of this flora in the environment. After application of Maresome® the former pathogenic flora (S. agalactiae, MSSA, P. aeruginosa) was not more detectable.

Conclusion. In vivo tests demonstrated that Maresome® inhibits the dermal colonization of clinically highly relevant pathogens MRSA, VISA, MSSA, and S. agalactiae as well as their transmission to the environment. This novel strategy reduces pathogenic colonization of the skin and can therefore be advantageous for dermatological applications in phlebology.

AP3.8-6
Microalgae – A global fascinating source for bioactive compounds
G. Ebert
Bauerfeind AG, Zeulenroda, Germany

The term microalgae refers to an assemblage of prokaryotic and eukaryotic microorganisms which practise oxygenic photosynthesis. Microalgae are unicellular or colonial and many of them live in symbiosis. Microalgae are found in marine environments, in soil and freshwater habitats. Algae are known to produce wide chuts of bioactive compounds and structurally diverse metabolites (e.g. pigments, polyunsaturated fatty acids and polysaccharides). This compounds are preferred used as additives in food manufacturing, cosmetics and pharmaceuticals. Also microalgae and cyanobacteria (blue-green algae) produce very specific secondary metabolites – some of them are very specific in their molecular target (e.g. okadaic acid as inhibitor of protein phosphatases in eukaryotic intracellular signal transduction). In this context specially prepared nanoparticles (called MaresomeTM) of selected microalgae shows a selective effect in prevention of the dermal colonization of methicillin-resistant Staphylococcus aureus (MRSA) – relevant in dermatology skin care.

CB4.7 - BSN Jobst Symposium
Patient compliance in compression therapy - Does it really matter?

CB4.7-1
What does compliance mean?
E. Rabe 1, F. Pannier 2
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2 Department of Dermatology, AZM Maastricht, Maastricht, The Netherlands

Compression treatment with medical compression stockings is one of the basic principles in treatment of chronic venous diseases. However compliance with this kind of treatment is always discussed and thought to be very low in venous patients. Quite often good compliance is considered if the patient wears his compression stockings 7 days a week and at least 8 hours per day. This definition of compliance may not be adequate as compression is mainly a symptom-orientated kind of treatment. Some of our venous patients may have permanent swelling and pain in their legs during the whole day; others may only have symptoms when standing during the working hours. By this good compliance could be defined as wearing compression stockings when needed. Not all of the indications for compression stockings are life-long permanent indications. Non-permanent indications may be compression treatment after surgery or sclerotherapy or during pregnancy. In these cases discontinuation of compression treatment is not a sign of bad compliance but of non-permanent indication.

CB4.7-2
Further results of the bonn vein study regarding compliance
F. Pannier 1, E. Rabe 2
1 Department of Dermatology, AZM Maastricht, Maastricht, The Netherlands
2 Department of Dermatology, University of Bonn, Bonn, Germany

Venous disorders like varicose veins and chronic venous insufficiency are among the most frequent diseases among the western population. The basic treatment option is compression treatment with compression bandages or compression stockings.

Methods. In the Bonn Vein Study II we re-investigated 861 men and 1109 women for venous findings who have been already investigated 6.6 years before in the Bonn Vein Study I. The response at follow-up was 85.6%. In this study we also asked for previous treatment for venous diseases.

Results. 16% had ever worn medical compression stockings. Not all of these had a permanent indication for this kind of treatment. Reasons for a non-permanent prescription of compression were varicose vein surgery, sclerotherapy or pregnancy. 40.1% of the compro-
Conclusion. Taking into account that indications for compression treatment are not permanent, the compliance for this treatment option is almost 50%. Medical compression stockings are very well tolerated and the treatment success is well accepted by the patients.

CB4.7-3
Result of a prospective and retrospective research on compliance of CVI patients in Germany
E. Rahe
University Hospital Bonn, Dept. of Dermatology, Bonn, Germany

Patients’ compliance depends on many factors. Compliance is mainly related to the physician’s prescription and one of the main reasons for success or failure in compression therapy if the diagnosis CVI is given.

Aim. The results of the study will show whether patients are compliant or not. It will also give reasons for wearing MCS as well as reasons for not-wearing MCS with a given indication (patient compliance related to MCS).

Methods. Two groups of patients have been asked to wear medical compression stockings (MCS) over the period or 2 to 4 weeks: - patients with a longer history of diagnosed CVI and experienced in wearing MCS (prospective research) - patients with a recently diagnosed CVI and so far no history in wearing compression stockings (retrospective research)

Results. The patients’ wearing diaries have been examined, the individual results of each group as well as differences between both patient groups will be analysed. The diary results will show which factors can enhance or decrease the compliance factor in individuals. Also clear indications can be expected regarding future product development in MCS industry.

CB4.7-4
Compliance issues in venous ulcer patients
C. Moffat
University of Glasgow; Glasgow; United Kingdom

Professionals frequently report that patients with venous leg ulceration do not concord with (not compliant with) professional recommendations of treatment and particularly the use of compression therapy. This presentation will review the literature of how concordance impacts on venous ulcer healing. Concordance is a complex issue that is influenced by many factors including clinical factors, psychosocial aspects of the patient’s life and the relationship that is established between the patient and clinician. Patients are frequently labelled as difficult to manage because of problems they face with managing compression therapy. Factors such as ulcer pain and tight compression may all influence these issues. Most issues of concordance can be solved by assessment and careful application of compression using a bandage or garment that is correctly measured and fitted for the individual patient’s needs. This presentations will present some of these complex issues and how strategies can be developed to solve these issues.

CB4.7-5
Importance of compliance in management of arm lymphedema after breast cancer treatment
S. Vignes
Hôpital Cognacq-Jay, Department of Lymphology, Centre de référence des maladies vasculaires réverses, Paris, France

Upper limb lymphedema occurs in almost 15-20% of women after breast cancer treatment. It is a debilitating disorder which has psychological, social, esthetic and functional impact.

Treatment of Lymphedema. Lymphedema treatment is based on complete decongestive physiotherapy and includes short-stretch bandages, manual lymph drainage, exercises and skin care. Treatment is divided in two distinct phases: the first one leads to intense reduction of lymphedema volume, and the second maintenance phase, sustains durably the reduced volume. The first phase is essentially based on short-stretch multilayer bandages (<100%) after covering the limb with padding (cotton, foam). Manual lymph drainage precedes application of the bandage to increase its efficacy. The reduction of lymphedema volume varies from 20 to 60%. During this intensive phase, patients (even family members) have to learn to bandage themselves with a trained physiotherapist. These techniques are simplified and repeated several times to make it easy for the patient to apply bandages themselves and to increase compliance. Three or more overnight bandages are recommended to further reduce the lymphedema volume. Compression garments are used in the maintenance phase and should be worn every day. Short-stretch bandages and compression garments are the cornerstones of the treatment of upper limb lymphedema. Compliance to this treatment is related to the long-term evolution of lymphedema volume. Regular medical follow-up is required to maintain the indispensable commitment and motivation of patient to obtain the long-term efficacy of treatment of this chronic disorder.

CB4.7-6
Efficiency of low pressure Medical Compression Stockings (MCS) on venous symptoms: a micro-massage effect?
T.P. Benigni, T. Benigni
French University Group for Medical Compression Study, Université Paris Descartes, Paris, France

Pain is the main symptom that leads to the diagnosis of venous disease. Current hypotheses on the mechanisms of pain emphasize an interaction between a local inflammation and a stimulation of venous nociceptors (fibers C). It is frequently associated with other symptoms: sensation of heaviness and evening swelling, itching... Low pressure MCS, with high compliance level, have demonstrated their efficiency in the treatment of symptoms in early stages of CVD (CEAP C0S and C1S). The grade of recommendations and quality of evidence is HB according to the ICC recommendations. The pressure exerted at the level of the ankle is 10 to 20 mm Hg. Mode of action of low pressure MCS: main hypothesis. MCS have a clinical effect if the pressure is >8 mmHg. No effect of low pressure MCS has been proved on macrocirculation. There is no publication demonstrating an effect on microcirculation (the only publication with a positive effect has utilized an MCS with a pressure of 30 mm Hg). But a direct action on nociceptors by micro-massage of the skin can be considered. During a walk, the morphology of leg changes and the local interface pressures under MCS vary. The wool and the stitch of MCS are mobile with movements made when walking. The knitting of MCS is in relief, therefore the yarn exerts pressure and this pressure is transmitted to the skin. All these phenomenon could explain the effect of micro-massage on the skin and an action on the nociceptors. Otherwise, the pressure could be different according to the caliber of the yarn. A yarn of a small caliber exerts a higher local pressure than a yarn with a bigger caliber (Laplace’s law).

Conclusion. A micro-massage effect could explain the efficiency of low pressure MCS. This hypothesis must be confirmed by additional studies.
CB5.6 - Sigvaris Symposium
MCS for venous disorders and diseases
Original studies presented by the authors -
1st Part: MCS for venous disorders

CB5.6-1
Use of MCS in the general population - Data from the Bonn vein study
E. Rabe1, F. Pannier2
1 Department of Dermatology, University of Bonn, Germany
2 Departments of Dermatology, AZM Maastricht, The Netherlands

Aim: The aim of this study was to assess the prevalence of use of medical compression stockings (MCS) in the general adult population in Germany, to comment the indications for which MCS therapy has been described and the patients’ experience with it.

Methods: The population of the Bonn Vein Study I was randomly recruited between November 2000 and March 2002 from the registers of residents of the city of Bonn and two rural townships in the area. In total, 3,072 men and women were included in the trial. In addition to clinical examination and duplex-ultrasound, participants were asked whether any phlebological treatment had been carried out due to a leg disorder or disease. If compression stockings had been worn, we asked for details such as compression class and length of stockings, wearing time, effectiveness, and recognition. In the Bonn Vein Study II we re-investigated 861 men and 1109 women for venous findings who have been already investigated 6.6 years before in the Bonn Vein Study I. The response at follow-up was 85.6%.

Results: In total, 22.9% of participants providing information (12.7% of male, 31.0% of female) mentioned having received a specific phlebological treatment in the past. Therapy with compression stockings had the highest prevalence with 14.0% in the general population (7.5% of males, 20.3% of females). The mean age at the first prescription was 45.5 years (SD = 14.3 years). With increasing severity of venous disease, as rated according to the CEAP classification, the prevalence increased from 1% in C0 patients to 82% in C5/C6 patients. Of 450 participants who had used compression stockings in the past, 309 (68.6%) did not wear CS at the time of the survey. The remainder had generally been wearing them on five or more days per week (73.0%) for 8 or more hours per day (89.4%). On average, 71.3% of the participants said that the disease for which MCS were prescribed, had improved as a result of MCS therapy. Improvement concerned a reduction of sensations of swelling (84.2%), of heaviness (89.4%), leg pain after long periods of standing (60.9), and tension in the legs (78.9). In the follow-up survey 16% had ever worn medical compression stockings. Not all of these had a permanent indication for this kind of treatment. Reasons for a non-permanent prescription of compression were varicose vein surgery, sclerotherapy or pregnancy. 40.1% of the compression population had such a non-permanent indication. Among those with a permanent indication, 45.8% were wearing the compression stockings permanently also at the time of the investigation. Reasons for non-compliance were widespread. In 7.5% medical compression stockings were just no longer prescribed. In 75.8% compression stockings were well tolerated and 76.1% were content or very content with the treatment results.

Conclusions: Taking into account that indications for compression treatment are not permanent, the compliance for this treatment option is almost 50%. Medical compression stockings are very well tolerated and the treatment success is well accepted by the patients.

2nd Part: MCS for venous ulcers and other severe venous diseases

CB5.6-2
MCS after interventions on varicose veins
PKern
Abstract not available

CB5.6-3
META-analysis of MCS for patients with venous disorders
F. Amsler
Abstract not available

CB5.6-4
MCS for occasional leg symptoms
W. Blättler
Abstract not available
Experiences by doctors and patients of MCS 20-36 mmHg
D. Guex Jean-Jérôme
Ganzoni France, St Just St Rambert, France

We report the results of a survey carried out in 2007 with 71 vein specialists and 188 venous patients. The survey allowed to analyze the physicians’ behaviour and prescription choice, the effect of the treatment and the patients’ appreciation. Considering the importance of EBM, of official recommendations and guidelines, observing that French veins specialists have reasonable and appropriate prescriptions is reassuring, even more satisfactory when thinking of the fragility of these patients, concerned by a severe venous pathology. Keywords: compression therapy, compliance, physicians’ survey, patients’ survey, compression (20-36 mmHg).

How to improve compliance of compression therapy (20-36 mmHg)? Biomechanics of MCS - Survey on MCS compliance
D. Rastel, D. Le Floch
Ganzoni France - SIGVARIS, St Just St Rambert, France

Compression therapy is one of the major element of the superficial venous disorders therapeutic strategy. Compression therapy based on MCS is generally preferred to bandages thanks to the better control of the delivered pressure. Nevertheless it is admitted that the compliance to MCS remains insufficient due to difficulties to put on, to wear MCS and sometimes discomfort. To find solutions to improve compliance to MCS over long term periods of treatment such as it is required to treat post thrombotic syndrome or severe venous pathologies, two different studies have been carried out. - First study: Biomechanics of MCS by Dr D. Rastel To optimise the ergonomic description of patients’ body movements during putting on and pulling off processes, morphological parameters and a physiotherapist approach have been considered. Muscle activities were investigated using surface electromyography measurements. - Second study: Survey on MCS compliance by Dr E. Le Floch. Based on an especially studied MCS to facilitate the daily use of this therapy, a test including 30 patients in different situations was conducted. The design of this new MCS is based on a better understanding of the putting on process and patients’ morphologies: the yarns used were selected to reduce friction with the skin during putting on process. First results and following steps will be presented during the symposium.
ANNEXES
Venous Ulcers: How to treat them without surgery
J. J. Bergan

Venous Ulcers represent the most advanced stage of Chronic Venous Insufficiency. They are a product of long-standing venous hypertension, which is caused by axial, longitudinal, reflux and perforating vein outflow. Traditional care includes external compression, which may include gel-paste (Unna Boot) dressings and surgical ablation of the Saphenous Vein and relevant Varicose and perforating veins. This study was done to assess results of modern Day foam sclerotherapy compared to traditional techniques of ulcer care. There were three groups of patients. The first, consisting of a total of 23 patients were all treated with compression and best medical care. The second, including seven Group 1 treatment failures, continued best medical care to which subfascial perforating vein interruption (SEPS) was added in selected cases. The third group of patients was treated with best medical care to which foam sclerotherapy was added to all patients. In Group 1, pain was relieved in 10 patients within 4 weeks, and 11 ulcers closed although 1 required 7 months to heal. Three required Saphenous surgery, and two received a SEPS procedure. In group 2, there were 17 limbs in 12 patients. Nine of 13 ankle ulcers healed within two weeks and 4 of 10 CEAP 4 and 5 limbs lost pain and inflammation. IAT 4 weeks, 2 more ulcers were healed and 11 of 13 ulcers were healed within 4 weeks. In group 3, foam treatment was begun as soon as possible. Improvement was dramatic with 14 of 22 ulcers healed with a single treatment and only 14 more requiring a second treatment. Only 2 of the 23 ulcers failed to heal. One demonstrated arterial insufficiency and another required perforator vein interruption. Foam Sclerotherapy represents a great advance in the treatment of venous ulceration.

CB1.6-3

Recurrent Varicose Veins - Foam Sclerotherapy
M. Perrin
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Recurrent varicose veins after surgery (REVAS) are a common, complex and costly problem. The frequency of REVAS is stated between 20 to 80% depending on the definition given to this status and follow-up duration. As presently minimally invasive procedures are more commonly used a new term has been proposed PREVAIT (Presence of Varices after Interventional Treatment) that covers any kind of intervention. Clinical diagnosis remains essential but does not allow a precise assessment of REVAS. Consequently, the use of imaging investigations is mandatory. Duplex scan (DS) is considered as the method of choice Recurrent Varicose Veins (RVV) Management.

Interventional treatments for RVV include:
- Non invasive treatments (Drugs, Compression) that may improve only symptoms
- Invasive treatment namely open redo surgery
- Minimally invasive treatment including thermal ablation (endovenous laser, radiofrequency) and chemical ablation( liquid and foam sclerotherapy).

Results. There is no data comparing outcome after operational operative vs. non operative treatment. Some data are available to estimate RVV operative treatment outcome. Open redo surgery provides various results knowing that post operative complications are not unusual. Sclerotherapy is minimally invasive and repeatable has provided good results in two series.

Indications for treating RVV rely first on clinical presentation. When hemodynamic abnormalities are found in asymptomatic patients without severe signs who are not concerned by their minor varices as cosmetic problems the decision to treat depends of the severity of the noninvasive findings.

If the patient is not treated follow-up is required knowing that abnormal DS findings precede symptoms and signs. In symptomatic patients presenting with recurrent varices and hemodynamic anomalies or when varices are associated with sign of CVI (C4-G6) interventional treatment must be considered.

Operative treatment: procedure choice.
Although randomized controlled trials comparing outcome of invasive and minimally invasive treatments are not available there is a large expert consensus for recommending ultrasound guided foam sclerotherapy (UGFS) as first line treatment in all patients except when the DS identifies a major reflux at the SFJ in a large residual stump. Reasons are many. UGFS is minimally invasive, safe, efficient, cheap and repeatable.

CB1.8-1

From pathology to clinical evaluation
A. Nicolaides
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In spite of the diversity of signs and symptoms associated with chronic venous disease (CVD), it seems likely that symptoms are related to venous hypertension. Valvular incompetence is the most important cause of venous hypertension. In addition, recent findings suggest that inflammatory processes are involved in the structural remodeling in venous valves and in the vein wall leading to valvular incompetence and the development of varicose veins. The remodeling of the vein wall is likely to involve the complex interplay of a range of factors, among which an altered ratio between metalloproteinases and their tissue inhibitors. Elevated levels of cytokines and growth factors favor an alternation of the extracellular matrix. Neutrophils and mast cells and their interaction with the venous endothelium are believed to play an important role in the initiation of the inflammatory response in CVD. The transmission of high venous pressures to the dermal microcirculation results in the stimulation of an inflammatory process in which the release of cytokine and growth factor leads to leukocyte migration into the interstitium and initiation of further inflammatory events. This process is associated with the intense dermal fibrosis and tissue remodeling seen in chronic venous insufficiency.

The many manifestations of the disease are frequently associated with symptoms usually ascribed to CVD. The proportion of patients with symptoms increases with increasing CEAP clinical classes, but the mechanisms underlying symptom appearance have not been elucidated. It has been postulated that it is related to the release of cytokines, fluid exudates and plasma proteins which stimulate nerve endings resulting in the typical skin changes, ache and eventually skin ulceration.

CB1.8-2

Therapeutic management of venous ulcer
P. Blanchemaison

A venous ulcer, defined as a loss of substance in skin tissues associated with varicosity or post-phlebitic syndrom, is usually difficult to heal. Venous ulcers are typically located at the ankle, where venous pressure remains the highest. The prevalence of venous ulcers (opened or closed) is evaluated at 1% of the population and 4% to 6% of those over the age of 65. Treating the origin of the ulcer combines treatment of venous insufficiency (medication, compression, sclerosis, laser or surgery) and local treatment with topical agents, dressings, local care particularly hydrocolloids and hydrogels. The role of pharmacotherapy (phlebotropics) is particularly important regarding the action on venous insufficiency, oedema, and microcirculation. The best treatment remains prevention. A large use of phlebotropics and contention should lead to the disappearance of ulcers due to primary varicose veins. In case of venous post thrombotic ulcers, the role of bandages and improving of musculo-aponeurotic pump remains, despite spectacular advances, absolutely essential.
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