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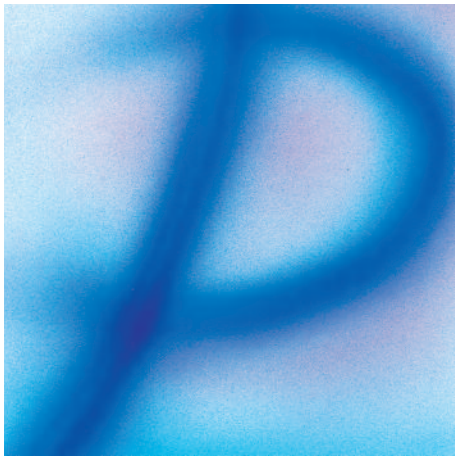

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AIMS AND SCOPE

Phlebolymphology is an international scientific journal entirely devoted to venous and lymphatic diseases.

The aim of *Phlebolymphology* is to provide doctors with updated information on phlebology and lymphology written by well-known international specialists.

Phlebolymphology is scientifically supported by a prestigious editorial board.

Phlebolymphology has been published four times per year since 1994, and, thanks to its high scientific level, was included in the EMBASE and Elsevier BIOBASE databases.

Phlebolymphology is made up of several sections: editorial, articles on phlebology and lymphology, review, news, and congress calendar.

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Phlebolymphology

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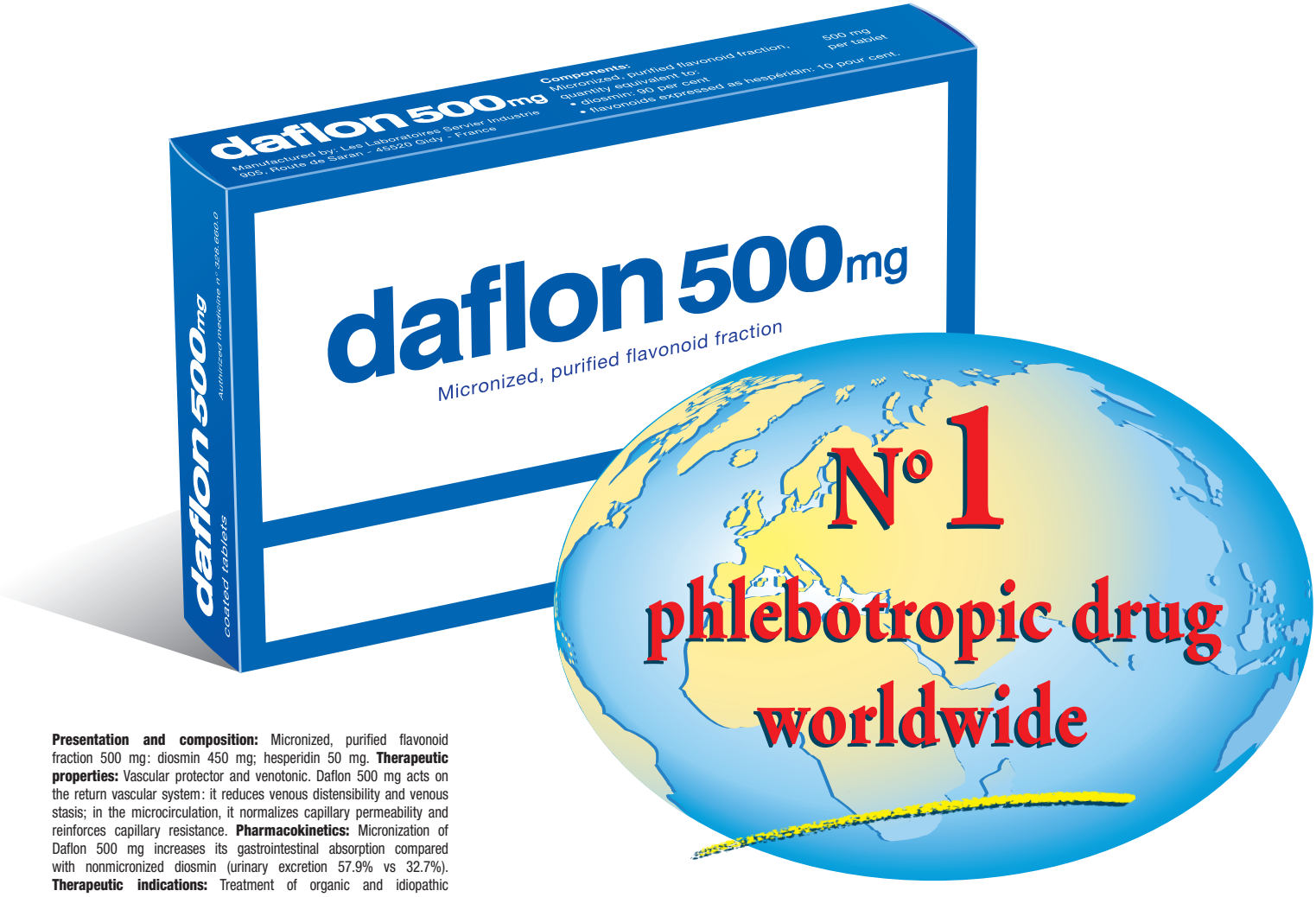
A micronized form and a comprehensive mode of action for better clinical efficacy



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Chronic venous insufficiency

2 tablets daily

Hemorrhoidal disease

up to 6 tablets daily

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Summary

I - Report by the Members of the Medical Reporters' Academy of the Asian Chapter of the Union Internationale de Phlébologie The Westin Miyako Hotel Kyoto, Japan Monday June 18-Wednesday June 20, 2007

1. Highlights
2. Epidemiology and risk factors
3. Basics
4. Investigations
5. Treatments
6. Miscellaneous

II - Report by Dr Jan T. Christenson, Geneva, Switzerland of the Spring Meeting of the Swiss Society of Phlebology University Hospital of Geneva, Switzerland, Friday June 15, 2007

I

World Congress of the Union Internationale de Phlébologie

Asian Chapter Meeting

Report

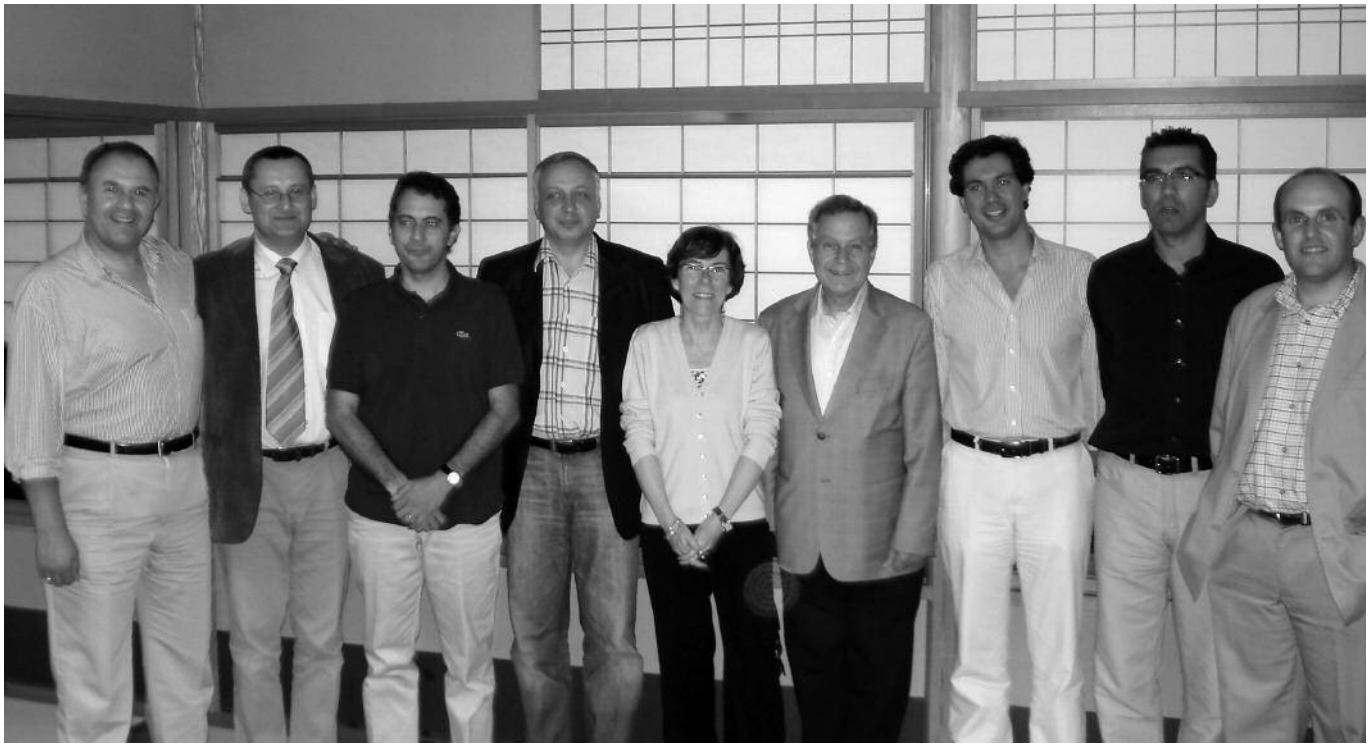
June 18-20, 2007

The Westin Miyako Hotel

Kyoto, Japan

Medical Reporters' Academy (MRA)

The reports from the International Congress of Angiology were prepared by the following members of the MRA team:



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Report Contents from the Asian Chapter of the UIP,

Kyoto, Japan, June 18-20, 2007

1 - Highlights

The following highlights from the Asian Chapter of the Union Internationale de Phlébologie, June 18-20, 2007, Kyoto, Japan were published in *International Venous Digest* in July 2007. This document was produced by the members of the **Medical Reporters' Academy** (see picture on page 144 of the present issue).

Flow in the popliteal vein is markedly reduced (-40%) during sleep in the sitting position. This is partially ameliorated by standard foot exercises recommended by airlines. Blood flow is actually increased over and above baseline readings (+20%) with foot exercises against severe resistance. According to Fletcher's study, the effect is short-lived and exercise needs to be repeated every 15 to 30 minutes.

Following an earthquake, Japanese people tend to sleep in their cars for several days as a precaution against subsequent tremors. The incidence of duplex detected calf deep vein thrombosis (DVT) in these individuals is 30% and decreases with increasing distance from the epicenter of the earthquake.

An outstanding review by A. Skyropoulos (USA) of thromboprophylaxis with LWMH emphasized the high prevalence of VTE in hospital patients, emphasizing the fact that recent studies have shown that the prevalence in Asia is similar to that found in Western countries. Evidence-based medicine has established the efficacy of LMWH and its superiority over vitamin K antagonists. However, despite the availability of guidelines , recent registries highlight the fact that many surgical patients continue to receive suboptimal thromboprophylaxis (what is needed is education not only of doctors but also the public - Editors' comments).

The value of the D-dimer test in modern practice was highlighted by 2 presentations (M. Dalsing, USA, and G. Palareti, Italy). A negative D-dimer result as a screening tool in symptomatic low- to moderate-risk patients (Wells assessment method) suspected of having DVT reduces the need for duplex scanning in 30% of patients. In patients with established DVT, the finding of a high D-dimer value one month after stopping vitamin K antagonists is associated with a high DVT recurrence rate (OR 2.27; 95% CI 1.15 to 4.46). These patients should be considered for more prolonged therapy.

Iliac vein stenting with or without recanalization performed for outflow obstruction or restenosis in a series of 982 limbs by S. Raju, USA, has been shown to have a primary and secondary patency rate of 79% and 100% at 6 years. Relief of pain and swelling at 6 years (cumulative) was 62% and 32%, respectively. 58% of the ulcers remained healed at 6 years despite the residual reflux.

Data from the Bonn epidemiological study (Presentation by E. Rabe) including 3072 participants, aged 18-79, have provided information on the prevalence of chronic venous disease according to the CEAP classification: telangiectasias 87%, varicose veins 23%, chronic venous insufficiency (C3- C6) 17%. The prevalence

of venous leg ulcers (C5-C6) was 0.7%. The risk factors for varicose veins (age over 60, female gender, number of pregnancies, and family history of varicose veins) were different from the risk factors for chronic venous insufficiency (age over 50, obesity, urban residence).

B. Eklof, Sweden, presented the 14 projects the members of the American Venous Forum have volunteered to lead during the 5th Pacific Vascular Symposium (January 2004, Hawaii, USA). These projects are a vision for the future: what we know, what we do not know, and what we dream could be done over the next 10 years. A committee was created to support and encourage completion of the projects. The next step for the committee is to produce a supplement for *J Vasc Surg*.

2 - Epidemiology and risk factors

Chronic venous disease

Epidemiology of severe stages of chronic venous insufficiency in the Bonn Vein Study

E. Rabe / Germany

The author presented the Bonn Vein Study, a population-based, cross-sectional, one-year study with participants from a single random sample out of population registers. The 3072 participants ranged in age from 18 to 79 years (43.9% male, 56.1% female). The response rate was 59%. The CEAP classification and duplex scanning were used.

Chronic venous disorders are very common in the general population. The prevalence was 87.5% for telangiectases, 23% for varicose veins, 17% for chronic vein insufficiency (CVI) (C3-C6), and 0.7% for C5-6 (venous leg ulcers) in both males and females. The most important risk factors for telangiectases and varicose veins were age (over 60), female gender, pregnancies, and family history of varicose veins. The most important risk factors for CVI besides age (over 50) were obesity and urban residence.

Symptoms and signs of chronic venous disorders: what can we learn from epidemiologic studies?

E. Rabe, F. Pannier / Germany

The authors presented an epidemiological study from Germany to evaluate the prevalence and risk factors associated with venous insufficiency in the general population (screening of 3072 individuals aged 18 to 79) of the city of Bonn and two rural cities. The prevalence was determined by means of the response to a specific questionnaire and one duplex ultrasound study.

The majority of symptoms associated with venous insufficiency appeared in patients at stages C3 to C6 of the CEAP. The presence of varicose veins relates to genetic factors, obesity, female gender, and advanced age. Obesity, low social class, living in a city, and sedentary lifestyle were associated with CVI.
The authors intend to continue the study to answer questions like: Why do symptoms vary in patients with the same type of varicose veins and degree of reflux?

Chronic venous insufficiency: clinical presentations among Malaysian patients

N.C. Liew, K. Moissinac, L. Lee / Malaysia

The authors have produced a venous registry of 343 patients (520 limbs) with symptoms of CVI. The incidence of CVI among the Asian population is not known. In this series, patients tend to present late: 50% belong to CEAP classes C4-C6. Postthrombotic syndrome is not infrequent, affecting 5% of the general population. Better education of the general population so that medical advice is sought at

earlier disease stages may perhaps alter the spectrum of patients presenting to a venous clinic.

Venous thrombosis

Prevalence and indicators of deep vein thrombosis in medical patients

K. Sato, K. Hanzawa, T. Okamoto, F. Asami, M. Takekubo, O. Namura, J. Hayashi / Japan

In Japan, venous thromboembolism (VTE) is thought to be a rare disease, and thromboprophylaxis is not routinely used in clinical practice. In this study, the authors aimed to determine the risk of VTE in hospitalized medical patients and to identify indicators of this risk.

Of 158 patients (mean age 60 years) bedridden for at least 48 h in an internal medicine ward with an acute medical condition and who underwent compression ultrasonography, 68 (43%) had thrombosis. Older age was associated with a higher thrombotic risk. This incidence is particularly high, but it included 26 isolated soleal vein thromboses, 5 superficial vein thromboses, and 5 upper limb thromboses after catheter insertion. These results suggest Japanese and Westerners have a similarly high risk and underline the importance of preventing thromboembolic risk in medical patients.

Prevalence of calf deep vein thrombosis in residents in rural Japan, and diameter of soleus vein indicates a risk of calf DVT in Mid Niigata prefecture Earthquake 2004

K. Hanzawa, J. Hayashi, I. Fuse, F. Aizawa / Japan

During earthquakes, people often take refuge in their cars, sometimes for many days because of the frequent aftershocks over the following days. After an earthquake in 2004, 11 persons taking refuge in their cars suffered from pulmonary embolism (PE), of which four died. This prompted a Japanese team to conduct investigations on VTE risk in such a context. They performed systematic ultrasonography of the calf in all residents taking refuge in their cars one week after the quake and found 30% of them to have calf deep vein thrombosis (DVT). One year after the quake, a similar study was performed in 1365 persons living in the affected area. Prevalence of calf vein DVT was 7.8%. The authors found a correlation between the Richter scale value at the place of residence and the risk of thrombosis. The same study was performed in a control group in another city 100 km from the area of the quake. In this city, only 1.8% of tested subjects had DVT. Also, the authors found the diameter of the soleal veins to be associated with DVT risk. In particular, in the area hit by the quake, soleal vein diameters were significantly higher in subjects who took refuge in their car than in those who did not. It was higher in patients with calf DVT than in those without DVT, with a 2.5 (95% CI 1.7 to 4.0) odds-ratio at the cut-off of 9 mm. The proportion of subjects with an increased soleal vein diameter (above 9 mm) was higher in the quake area than in the control study, and one year after the quake a significant association between the soleal vein diameter and the risk of DVT was also found.

The high proportion of calf DVT, even asymptomatic, observed after confinement in cars for several days might represent a danger for the exposed population. Although the criteria for selection of controls were not clearly stated, the risk of thrombosis during the following year seems to be higher than in unexposed patients.

Risk profile of patients with deep vein thrombosis diagnosed in ambulatory care - Data from the German TULIPA Registry

H. Gerlach, S.M. Schellong, V. Hach-Wunderle, E. Rabe, H.B. Riess, H. Carnarius, N. Banik, R. Bauersachs / Germany

Nowadays, patients with DVT are managed on an outpatient basis. The aim of the German TULIPA registry (comprising 4976 patients referred by their GP for a clinically suspected DVT to 341 ambulatory care vascular medicine physicians) was to provide information on patient risk profiles in such a setting.

Prevalence of classic risk factors was higher in patients with DVT at ultrasonography than in those without. Male gender, older age, a recent history of plaster cast, surgery, confinement to bed, or acute disease were associated with DVT, as well as a family history of VTE, active malignancy or the use of estrogens, corticosteroids or anticancer therapy. However, odd-ratios for the association between these risk factors and DVT were lower than usually reported, most of them being between 1.4 and 1.8. Varicose veins and long distance travel were not associated with DVT in this study.

These results are not surprising, due to the study design. In fact, this was not a case-control study. All patients were referred by their GP because DVT was suspected, partly because of the patients' risk factors. This reduced the contrast between patients with and without DVT, those without DVT not being good controls for an association study.

Importance of combination of persistent underlying factors in deep vein thrombosis

H. Yasuhara, N. Ohara, T. Hattori, O. Shigeta / Japan

In a cohort study of 122 patients with lower limb DVT, the authors aimed to 1) identify factors linked with an associated PE at the time of DVT diagnosis; 2) identify factors associated with a higher risk of VTE recurrence during a mean 21-month follow-up. 67 patients (55%) had an associated PE. Those patients with recurrent DVT, prolonged bed rest, or who underwent venous catheter insertion were more prone to associated PE. This was also true for patients with persistent underlying risk factors (coagulopathy, active malignancy, collagen disease, or iliac compression): hazard ratio 1.6. During follow-up, patients with a history of VTE (hazard ratio 3.9) had a higher risk of DVT recurrence, as had those with one of the predefined persistent underlying risk factors: hazard ratio 3.6.

These data confirm that a stratification of patients based on VTE history and the presence or absence of transient or persistent risk factors for VTE is useful in predicting severity and the risk of DVT recurrence, and have the potential to improve management.

Risk of recurrent deep venous thrombosis in patients with genetic thrombophilias

J.R. Gonzalez-Porras, I. Alberca, M.L. Lopez, F. Lozano / Spain

259 patients with DVT were included in the investigation. Genetic polymorphisms of factor V Leiden, G20210A prothrombin and 677T methylene tetrahydrofolate reductase and their influence on DVT recurrence were assessed. The authors concluded that the double defect, and homozygosity or double heterozygosity for factor V Leiden and G20210A were associated with an increased risk of recurrent DVT. Patients who were heterozygous for factor V Leiden or G20210 had a risk of recurrent DVT similar to that of patients who had neither mutation. The 677T MTHFR mutation alone or combined with hyperhomocysteinemia was not associated with an increased risk of recurrent DVT. In conclusion, the authors recommended active (LMW-heparin or warfarin) thromboprophylaxis for all patients at high risk of re-thrombosis.

A nonsense polymorphism in the protein Z-dependent protease inhibitor increases the risk of venous thrombosis

J. Corral, J.R. Gonzalez-Porras, R. Gonzales, I. Alberca, F. Lozano, V. Vicente / Spain

Z-dependent protease inhibitor (ZPI) is a new hemostatic serpin with anticoagulant activity. There were 6 genetic mutations affecting the ZPI gene. All of them induced ZPI deficiency and significantly increased the risk of DVT. The ZPI mutation is the root cause of primary DVT in 0.9% cases.

Deep venous thrombosis incidence in patients immobilized by multiple sclerosis: a prospective study

G. Arpaia, P. Bavera, D. Caputo, L. Mendozzi, R. Cavarretta, G.B. Agus / Italy

Patients affected by multiple sclerosis experience a progressive reduction in walking capacity and spend increasing time in a wheelchair or in the sitting position. Leg swelling occurs in a short time often with pain and can lead to DVT. Up to now, DVT in these patients has been underestimated and not much considered by neurologists. The aim of this prospective study was to screen 200 patients with multiple sclerosis: 100 with usual rehabilitation, 100 with the same but also wearing below-knee stockings. The author presented preliminary data on 50 patients with a follow-up of 6 months and evaluation by duplex scan at several levels (below-knee deep veins, popliteal, and femoral veins). DVT (either distal or proximal) was found in 13 patients (19.6%) at the end of the 4 weeks of rehabilitation.

Factors to predict the risk of venous thromboembolism recurrence

G. Palareti / Italy

The optimal duration of oral anticoagulant therapy (OAT) to prevent recurrences after a first unprovoked venous thromboembolism (VTE) event is still uncertain. The author reported data from a recently published, prospective, open label, randomized controlled study to assess whether the D-dimer (DD) test may be used to establish OAT duration. The DD test was performed 1 month after

anticoagulation withdrawal in patients with a first unprovoked proximal deep venous thrombosis or pulmonary embolism who had received OAT for 3 months. Patients with a normal DD did not receive OAT. Patients with abnormal DD were randomized to receive further such treatment or not. DD was abnormal in 223/608 (36.7%) patients. Recurrent VTE occurred in 24/385 patients with abnormal DD. The adjusted hazard ratio of patients with abnormal DD who stopped anticoagulation versus those with normal DD was 2.27 (1.15-4.46; *P*=0.02). In conclusion, the DD test after OAT withdrawal can assess the risk of VTE recurrence. Patients with abnormal DD have a higher risk of recurrence and should benefit from prolonged anticoagulation.

Incidence and clinical predictors of deep vein thrombosis in patients hospitalized with heart failure in Japan

S. Ota, N. Yamada, M. Nakamura, N. Isaka, M. Ito / Japan

The aim of this study was to estimate the incidence of venous thromboembolism (VTE) in in-hospital patients with heart failure (HF). This study was performed in 108 patients admitted to hospital with class 2 to 4 HF. They underwent systematic compression ultrasonography during their stay. Despite the use of anticoagulant therapy in 21 patients (mainly warfarin for their underlying cardiac condition), the overall incidence of DVT was 13%. This correlated with the severity of HF: 5.4%, 7.1% and 23.2% in NYHA classes 2, 3 and 4, respectively. In a multivariate analysis, class 4 HF and anticoagulation were independent predictors of risk, with odds-ratios of 18 (95% CI, 3.0 to 117) and 0.22 (95% CI, 0.1 to 0.9), respectively. Because LMWH use is restricted in Japan, where VTE is thought to be a rare disease, this Japanese study provides valuable confirmation of the high incidence of VTE in hospitalized HF patients and highlights the need for thromboprophylaxis in such patients.

3 - Basics

5th SERVIER FELLOWSHIP. Presentation of the new winner's project:

Erythrocyte diapedesis during chronic venous insufficiency

C. Rosi / Italy

Chronic venous insufficiency (CVI) causes venular hypertension with erythrocyte diapedesis and cutaneous deposition of hemosiderin leading to lipodermatosclerosis and ulceration. In a preliminary study, the author evaluated skin samples from legs with CVI to assess the mechanism of dermal damage by means of histology, histochemistry, and immunohistochemistry data, and with drug administration of micronized purified flavonoid fraction (MPFF). Skin samples were from patients of CEAP classification C2, C3, C4a, C4b, C6. The erythrocyte diapedesis occurred only during active inflammatory phases of skin dermopathy. In the presence of MPFF, the action of MPFF mitigated the effects of the inflammatory action and deposition of hemosiderin.

4th SERVIER FELLOWSHIP. Presentation of the 2005 winner's research:

Physiological and histological characteristics of porcine model of superficial varicose veins

G.T. Jones, M. Grant, I.A. Thomson, A.M. Van Rij / New Zealand

This study determined the pathophysiological basis of superficial varicose veins in a novel porcine model, as assessed by intravenous blood pressure, duplex ultrasound, histology, and vein wall homogenate substrate zymography.

Right femoral arteriovenous fistulae were surgically fashioned in adult pigs. Gross superficial varicosities developed after an initial lag period of 1-2 weeks. Varices appeared to have a postural component to their filling and did not seem to be the direct result of venous hypertension per se (non-pulsatile, with a mean pressure of 23 mm Hg).

Venous blood flow velocities were elevated from approximately 5 cm/s in controls to 15-25 cm/s in animals with patent fistulae.

Histopathological changes in porcine vein structure included the development of enlarged tortuous veins, valve degeneration, failure of elastic tissue, and focal medial atrophy with or without overlying intimal thickening. It was concluded that the superficial varicose veins that developed within this porcine model have a pathophysiology that is consistent with that observed in humans.

HMG-CoA reductase inhibitors reduce matrix metallo-proteinase-9 activity in human varicose veins

S. Nomura, K. Yoshimura, N. Morikage, A. Furutani, H. Aoki, M. Matsuzaki, K. Hamano / Japan

Varicose veins are an important public health problem because of their prevalence and morbidity. Because the molecular pathogenesis of varicose veins is still unclear,

few pharmacological options to treat varicose veins are available. The effects of MGH-CoA reductase inhibitors (statins) on matrix metalloproteinase MMP-9 were therefore investigated in human varicose veins, because MMP-9 is implicated in disruption of extracellular matrix in varicose veins.

Saphenous vein samples were obtained from 7 varicose vein patients and from 4 patients undergoing artery bypass grafting. Expression levels of MMP-9 protein in the vein walls were analyzed by Western blotting and by immunostaining. Human varicose vein tissue was cultured ex vivo to determine the effect of statins on MMP-9 and urokinase-type plasminogen activator (u-PA), an activator of MMP-9. Secretion levels of MMP-9 and u-PA in the culture media were determined by gelatin zymography and enzyme-linked immunosorbent assay, respectively. The selected activity and mRNA level of MMP-9 were determined by MMP-9 activity assay and quantitative RT-PCR, respectively.

MMP-9 was significantly increased in varicose veins compared with controls mainly in smooth muscle cells at the media, where marked degradation of extracellular matrix was observed. Simvastatin and pravastatin caused striking suppression of MMP-9 activity in ex-vivo culture of varicose vein tissue, while they modestly reduced MMP-9 protein and tended to reduce its mRNA levels. Interestingly, simvastatin significantly suppressed u-PA secretion. Furthermore, while tumor necrosis factor TNF-α, a proinflammatory cytokine, caused a large increase in MMP-9 activity secreted from varicose veins, simvastatin reduced MMP-9 at both the mRNA and protein levels and also u-PA protein level, resulting in the dramatic suppression of MMP-9 activity induced by TNF-α.

Statins suppressed multiple mechanisms of MMP-9 production and activation, resulting in synergistic suppression of MMP-9 activity in varicose veins. Statins may be useful in treating this common disease.

Vascular endothelial growth factor (VEGF) and VEGF-Receptor (VEGF-R) in the pathogenesis of primary and recurrent varicose veins

S. Rewerk, K. Labretsas, M. Winkler, H. Nüllen, C. Duczek, A.J. Meyer, A. Gruber, R. Grobholz, N. Thomas / Germany

VEGF is known to be one of the strongest stimulators for angiogenesis in many different tissues. To initiate this process, the VEGF-R must be present on the endothelial cell surface. Patients were distributed into a control group (n=16), a primary varicose vein group (n=110), and a group with recurrent varicose veins after crossectomy (n=24). Thin-walled veins embedded in scar tissue (neovascularization) were stained immunohistochemically with antibodies against VEGF and its receptor VEGF-R. Higher staining intensity was seen in the recurrence group than in the controls, indicating that VEGF and VEGF-R may play an important role in angiogenesis associated with recurrent varicose veins.

4 - Investigations

Venous obstruction

Assessment of venous obstruction with air plethysmography and duplex ultrasound

F. Lurie / USA

This study combines air plethysmography (APG) and duplex ultrasound (US) in patients with deep venous obstruction. The study included 25 patients with deep vein obstruction (10 iliac and 15 femoral) and a control group of 25 healthy volunteers studied with both APS and US. The segmental distribution of the flow was defined as a fraction of the total volume outflow contributed by each of the three veins (superficial femoral vein SFV, profunda femoral vein [PFV], great saphenous vein [GSV]) expressed in percent.

APG is a good test to determinate iliac vein occlusions, but is not effective in femoral vein occlusions. In healthy volunteers, SFV contributes 40% to 60%, PFV 20% to 30%, and GSV 10% to 20% to the total outflow. In the presence of SFV occlusions, the GSV flow increases to 80% of total flow, with no changes in PFV flow. It appears that in the case of SFV occlusions, GSV flow makes an important contribution to venous return. The contribution of PFV is these cases seems minor.

High peak reflux velocity in the proximal deep veins is a strong predictor of advanced postthrombotic sequelae

T. Yamaki, M. Nozaki, H. Sakurai, M. Takeuchi, K. Soejima, T. Kono / Japan

The presence of reflux in the deep venous system after an acute deep vein thrombosis is considered to contribute to the development of advanced postthrombotic syndrome. The aim of this study was to determine the ultrasound parameters reflecting the progression of PTS. The study included 131 limbs (130 patients) for which there was complete 6-year follow-up after an acute DVT. The patients were studied by means of ultrasound at 2 and 6 years. The ultrasound parameters analyzed at the popliteal vein (VP) and femoral vein (FV) were vein diameter, peak reflux velocity (PRV), reflux time (RT), and the total refluxed volume. The patients were divided into two groups depending on venous insufficiency severity measured by CEAP score: group I (C0 to C3) and group II (C4 to C6).

There were 98 patients in group I and 33 in group II. The frequency of venous reflux was significantly higher in group II, without differences in venous occlusion between the two groups. The proportion of FV and PV incompetence was higher in group II. There was no between-group difference in RT. Fifty-eight per cent of group II patients developed advanced symptoms of PTS during follow-up. Statistical analysis demonstrated that PRV>25.4 cm/s in PV and PRV>24.5 cm/s were strong predictors of advanced CVI.

In conclusion, PRV in patients with deep vein thrombosis is an independent predictor of the development of chronic venous insufficiency.

The utility of quantitative calf muscle near-infrared spectroscopy in the follow-up of acute deep vein thrombosis

T. Yamaki, M. Nozaki, H. Sakurai, M. Takeuchi, K. Soejima, T. Kono / Japan

The study was designed to examine venous segments in terms of occlusion, partial recanalization, and total recanalization with the application of quantitative calf muscle near-infrared spectroscopy (NIRS). The NIRS-derived calf venous blood filling index (HHbFI), calf venous ejection index (HHbEI), and the venous retention index (HHbRI) were assessed as markers of occlusion, partial recanalization, and total recanalization.

A total of 78 limbs with an acute deep vein thrombosis (DVT) involving 156 anatomic segments were evaluated with duplex scan and NIRS.

At 1 year, the HHbFI in POPV reflux patients was significantly higher than in those with resolution (0.19±0.14, 0.11±0.05, P=0.009, respectively). Similarly, there was a significant difference in the HHbRI between the two groups (3.08±1.91, 1.42±1.56, P=0.002, respectively). In patients with femoral vein occlusion, the value of HHbRI was significantly higher than in those with complete resolution (2.59±1.50, 1.42±1.56, P=0.011, respectively).

Calf veins showed more rapid recanalization than proximal veins. NIRS-derived HHbFI and HHbRI could be promising markers of venous function during follow-up in acute DVT. Thus physicians may detect patients who require much longer follow-up studies.

Changes in the outpatient evaluation of deep venous thrombosis

M.C. Dalsing / USA

Currently, two main diagnostic approaches exist for patients with suspected DVT. Serial proximal compression ultrasonography (CUS), which is mostly used in North America, and which when negative has to be repeated one week later when scanning is not performed below the knee. However, a negative single complete (proximal and distal) ultrasonography has been shown to safely rule out the diagnosis of DVT. Scanning proximal to the knee repeating the CUS one week later is costly and time-consuming. This has led to the use of the D-dimer test as part of the diagnostic algorithms. D-Dimer testing is useful in excluding DVT (negative predictive value >95%), thereby reducing the need for duplex scanning in 39% of patients as demonstrated by a randomized controlled study (Wells et al, NEJM 2003). This strategy has proven effective and cost-effective.

Dalsing et al. propose the following approach. Patients with a high clinical probability of DVT as assessed by the Wells' score (Wells et al. *Lancet* 1997) undergo a full duplex examination. Patients with a low or intermediate clinical probability undergo a D-dimer test and, if positive, proceed to a full duplex scan. If negative, they are left untreated. During off hours, patients in whom a CUS is required receive a single injection of LMWH while awaiting the ultrasonic diagnostic test. However, the safety and cost-effectiveness of this latter strategy remains to be formally validated.[1,2]

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Varicose veins

The evaluation of vein filling index of air plethysmography for type of varicose and lower-limb varicose vein treatment

M. Ojiro, S. Sane, S. Nakajima, K. Ehi, I. Omoto, T. Kuwahata / Japan

Aim: Although treatments of varicose veins include stripping sclerotherapy (foam) with high ligation, sclerotherapy only, and compression stockings, in Japan the main therapies are stripping (ST) and sclerotherapy with high ligation (LiG-SC). However, evaluation of these two therapies has been controversial. So, we studied the vein filling index (VFI) of air plethysmography (APG) and the clinical effects of ST and LiG-SC.

Methods: VFI was measured in 40 limbs of the ST group and 117 limbs of the LiG-SC group before and after treatment of varicose veins. VFI and improvement in VFI were evaluated according to the method of treatment (ST vs LiG-SC), the number of ligations (saphenofemoral junction, Dodd, Boyd's perforation, and other incompetent perforations), the type of varicose veins (saphenous major: 87 limbs, saphenous minor, and special type; 10 limbs), the severity of varicose veins (CEAP classification), and recurrence (18 limbs).

Results: In the ST group, the level of VFI decreased from 6.95 A (4.3 to 2.1 A) 1.4 mL/s after treatment. In the LiG-SC group, VFI was high in severe cases, but decreased to normal levels in almost all cases. The number of ligations increased in severe cases. VFI improved in all cases in the ST group, but was still abnormally high (above 2.2 mL/s) in 13 cases. In the LiG-SC group, VFI was abnormally high in 30 cases (25.0%): 43.8% of cases with under 3 ligations, 24.4% of cases with 4-6 ligations, and 21.7% of cases with above 7 ligations. VFI was not abnormal in saphenous vein minor and special types of varicose veins, and CEAP class 4-6 had a higher VFI than the other classes, but recurrence did not depend on VFI.

Conclusion: There was no significant difference in VFI improvement between the ST and LiG-SC groups. However, in the LiG-SC group, the number of ligations influenced the effect of VFI. Little improvement in VFI was noted for fewer than 3 ligations. The incidence of recurrence was higher in the LiG-SC group than in the ST group. The severity of varicose veins depended on the VFI, but the relation between recurrence and VFI is unknown.

Venous valve

Femoral vein valves: implantation of external support assessed by phleboscopy

G.M. Makhatilov, G.R. Askerkhanov, M.A. Kazakmurzaev, I.S. Ismailov / Russia Federation

The authors treated 28 limbs (24 patients) with primary venous valvular insufficiency in the superficial femoral vein by means of external implantation of Verdensky spirals. Phleboscopy identified 11 valves with elongated cusps and 16 with wide separation of cusps. Spirals restored valve competence in all 16 cases of cusp separation. The authors conclude that the technical success of the intervention depends on the type of valve insufficiency and the correct choice of spiral diameter.

Lymphedema

New concept regarding lymphatic malformation

B.B. Lee, J. Laredo, D. Deaton, R. Neville / USA

The aim of this presentation was to enhance understanding of the two distinct conditions of extratruncular and truncular lymphatic malformations (LMs), clinically known as "cystic/cavernosus lymphangioma" and "primary lymphedema".

Retrospective analysis was done on N=445 patients with predominantly LM lesions between 1995 and 2004. Lymphoscintigraphy was the most frequent diagnostic test for the primary lymphedema due to the truncular LM. CDT (complex decongestive therapy) or compression therapy or both were used to treat all cases of truncular LM.

Surgical therapy was added to the CDT to improve its clinical management. MRI and duplex ultrasonography were the basic tests for the lymphangioma due to extratruncular LM. Sclerotherapy with OK-432 and/or ethanol was the primary therapy, and surgical therapy was added mostly when the response to sclerotherapy was poor.

Appropriate identification of truncular or extratruncular LM is essential for safe management of either primary lymphedema or lymphangioma. A multidisciplinary approach in which surgical treatments are added to conventional treatment can improve the overall clinical management of both truncular and extratruncular LM.

Indocyanine green fluorescence imaging to detect lymphedema

I. Katoh, Y. Ogawa, H. Sogabe, H. Fujita, Y. Wakisaka, T. Kitagawa, M. Miwa, T. Shikayama / Japan

Pathological lymphatic dermal backflow is observed in patients who suffer from local lymphatic obstruction or segmental lymphatic incompetence. It is possible to investigate the superficial lymphatic system in swollen limbs with pathological

skin backflow using indocyanine green (ICG) fluorescence. After ICG injection into the normal leg or palm, the lymphatic channels and superficial nodes appeared as a shining streams and spots with fluorescence from the side of injection to proximal parts of the limb. Real-time observation of the skin lymph transport visualizes superficial but not deep lymphatic channels and nodes.

For patients who suffer from lymphedema, an injection of ICG shows skin lymphatic capillaries spreading out in all directions from the point of injection. Reticulated patches of ICG are visible within one hour after injection and remain for several days in this group of patients. This phenomenon is never observed in the normal limb.

Patients with chronic venous insufficiency rarely present skin backflow. Further investigation and adaptation of this method to the needs of medical practice can provide a good and inexpensive tool which helps to differentiate lymphatic pathology from chronic venous insufficiency or to recognize the coexistence of both types of pathology.

5 - Treatments

Venous thrombosis

Thromboprophylaxis

Thromboprophylaxis with LMWH: an evidence-based approach for clinical practice

A.C. Spyropoulos / USA

This was a key-note lecture. The author emphasized that venous thromboembolism (VTE) is a major public healthcare problem worldwide. Recent epidemiologic data indicate that there are nearly 300 000 VTE-related deaths in the USA and over 340 000 VTE-related deaths in the European Union, with approximately 60 000 fatal postoperative VTE events (1,2). In Asia, venographic studies reveal that the range of incidence of asymptomatic DVT is similar to that found in Western studies (3). The recently completed AIDA study conducted in Asia (including China, South Korea, Taiwan, Thailand, Malaysia, and the Philippines) found a 25%, 42%, and 58% incidence of venographic DVT in patients undergoing total hip replacement, hip fracture surgery, and total knee replacement surgery, respectively (4). These rates are similar to venographic rates of DVT found in earlier Western studies in patients undergoing major orthopedic surgery prior to the systematic use of thromboprophylaxis.

Patients undergoing major orthopedic surgery and major general surgery over the age of 40 years are at high risk of VTE, with fatal pulmonary embolism (PE) occurring in up to 7.5% of patients after hip fracture surgery (5). Patients with cancer undergoing surgery are another high-risk group, as this group has a three-fold greater risk of fatal PE compared with patients without cancer undergoing similar procedures (5).

The current global consensus guidelines from the American College of Chest Physicians (ACCP) and the International Consensus Statement (ICS) guidelines recommend the use of low-molecular-weight heparin (LMWH), unfractionated heparin (UFH), vitamin K antagonists (VKA), and fondaparinux, depending on the type of surgery (5,6). Aspirin as monotherapy is discouraged in VTE prevention due to limited efficacy. In orthopedic surgery, LMWH is more effective than UFH in reducing DVT and PE, whereas the ICS guidelines state that parenteral therapies are preferred for in-hospital prophylaxis over oral anticoagulant therapy. In general surgery, LMWHs are as effective and safe as UFH, with the advantages of once-daily dosing and less risk of heparin-induced thrombocytopenia (7). The guidelines also recommend extended out-of-hospital thromboprophylaxis with LMWH in patients undergoing major surgery for cancer (5,6). Lastly, while mechanical methods such as intermittent pneumatic compression and elastic stockings can reduce the risk of DVT, they have not been shown to reduce the risk of PE (8).

The use of LMWH has become the standard of care of thromboprophylaxis in the orthopedic and general surgical patient due to an excellent efficacy and safety

profile. Despite effective means of thromboprophylaxis and the advent of evidence-based guidelines, recent registries highlight the fact the many surgical patients continue to receive suboptimal thromboprophylaxis (9).

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Deep vein thrombosis in thrombophilia. Clinical tendency to and necessity for anticoagulant therapy.

Y. Watanabe, H. Shigematsu, Y. Obitsu, N. Koizumi, S. Makimura, H. Sato /Japan

Among 208 patients with DVT, 19 (9.1%) had thrombophilia: 9 (4.3% of all DVT patients) with protein S (PS) deficiency, 5 (2.4%) with protein C (PC) deficiency, 4 (1.9%) with antithrombin III (ATIII) deficiency, and 1 (0.5%) with antiliphospholipid antibody syndrome. Five patients with thrombophilia had a family history of DVT. The initial onset of DVT occurred significantly earlier in patients with thrombophilia (average 41.4 years old) than in the other patients (average 58.3 years old) ($P<0.05$). The authors concluded that confirmation of thrombophilia is necessary in all cases of DVT. Patients with confirmed thrombophilia need anticoagulant therapy, which should be lifelong.

Prevention of venous thromboembolism after varicose vein surgery

J.P. Fletcher / Australia

J. P. Fletcher reported 4 cases (1.4%) of venous thromboembolism (VTE) diagnosed by Doppler ultrasound in 257 patients after varicose vein surgery. Although there is a lack of data and further work is needed, he defined three categories of risk of VTE after varicose vein surgery: low risk (operation <45 minutes, age <60 years and no other risk factors like obesity, immobility, congestive cardiac failure or infectious disease; operation >45 minutes, age <40 years and no other risk factors), moderate risk (operation >45 minutes, age 40-60 years and no other risk factors; operation <45 minutes, age >60 years and no other risk factors; operation <45 minutes, age 40-60 years, history of VTE, estrogen therapy, other risk factors), and high risk (operation >45 minutes, age >60 years and no other risk factors; operation >45 minutes, age 40-60 years, cancer, history of VTE or other risk factors; thrombophilia).

In his opinion, low-risk patients for varicose vein surgery must use graduated compression stockings in addition to early walking and adequate hydration. Prophylactic LDUH or LMWH is recommended in moderate-risk patients, and in

high-risk patients, LDUH or LMWH should be continued for 7-10 days postoperatively.
Finally, Fletcher concluded that most patients undergoing varicose vein surgery are at low or moderate risk of developing VTE.

Thrombolysis

Subclavian and axillary vein thrombosis treated by catheter-directed thrombolysis therapy with urokinase: report of three cases

N. Ushida /Japan

The author presented three consecutive cases of successful treatment DVT of the upper extremity. Catheter-directed thrombolysis with urokinase (240 000 IU/day) and unfractionated heparin (10 000 U/day) were administered for 3 to 5 days. Full resolution of the thrombus was achieved in all cases. Warfarin was administered to all patients.

Efficacy of catheter-directed thrombolysis for acute deep vein thrombosis

T. Hattori, H. Haeda, H. Umezawa, H. Goshima, T. Nakamura, H. Kobayashi, A. Takasaka, H. Kawachi, N. Negishi /Japan

Thirty patients with DVT (18 patients with iliac DVT, 4 patients with femoral vein DVT, and 8 patients with inferior vena cava DVT) underwent catheter-directed thrombolysis after implantation of a temporary IVC filter. Thrombolysis with urokinase (500 000 IU/day) was carried out for 2 to 5 days. In 19 patients there was complete thrombus resolution. Stenting for persistent stenosis was performed in 5 cases. There was one patient with early re-thrombosis treated with repeat thrombolysis.

Both presentations confirmed the benefits and efficacy of early thrombolytic therapy of DVT of the upper and lower extremities.

Others

Inferior vena cava filters in the management of pulmonary thromboembolism: overview and personal experience

S. Kalva / USA

The three unquestionable indications for inferior vena cava (IVC) filter insertion are the coexistence of an acute venous thromboembolism (VTE) and 1) a formal contraindication to anticoagulant therapy, 2) a complication of anticoagulant therapy, or 3) recurrent VTE despite well-conducted anticoagulant therapy. The author reported a series of 3438 patients who had an IVC filter since 1973 at the Massachusetts General Hospital. Some patients had a filter for indications other than those mentioned above: added protection in patients with compromised cardiopulmonary reserve, patients who underwent catheter-directed thrombolysis of proximal DVT, or patients noncompliant with anticoagulant therapy. Finally, it was sometimes used as VTE prophylaxis in high-risk patients, mainly those with major trauma or pelvic/long bone fractures.

Although no conclusions can be drawn regarding filter indications on the basis of the report, because almost all available filters were used over time in this institution, it provides interesting data on safety. Before 1998, the overall prevalence of post-filter PE was 5.6%, and that of IVC thrombosis 3.1% among 1753 patients. More recent filters seem to be safer, with a 3.1% post-filter PE risk and no risk of symptomatic IVC thrombosis among 751 patients. Finally, patients in whom a retrievable filter was inserted experienced a 0.7% risk of post-filter PE, without IVC thrombosis. Overall retrieval success rate was 78%. However, the post-filter risk of PE in those patients should be interpreted with caution, because prophylaxis was the indication for IVC filter in two- thirds of patients receiving retrievable filters, as compared with 30% of those who received other types of filter.

Process of thrombus regression among different venous segments after deep vein thrombosis

Y. Hosoi, M. Nunokawa, N. Takahashi, N. Takahashi, H. Kubota, T. Fujiki, K. Tonari, H. Endo, H. Tsuchiya, S. Kenichi / Japan

The authors studied the differences among venous segments and degree of resolution within 12 months after an episode of DVT. Eighty-eight limbs of 81 patients with acute DVT were evaluated and treated with i.v. unfractionated heparin followed by oral warfarin. In calf veins, total recanalization was observed in 71% of cases at 3 months and in 87% at 6 months. For popliteal veins, total recanalization was seen in 45% of cases at 3 months and in 66% at 6 months. In contrast, the regression process was relatively slow in the femoral and iliac veins. It was concluded that calf veins show more rapid recanalization than proximal veins.

Air travel–related venous thromboembolism

Effect of leg exercises on popliteal venous blood flow during prolonged immobility of seated subjects: implications for prevention of travel-related deep vein thrombosis

J.P. Fletcher, K. Hitos, M. Cannon, S. Cannon, S. Garth / Australia

The aim of this study was to determine the most effective form of exercise in preventing venous stasis in the lower limb veins of seated young healthy subjects. Four interventions were compared: 1) control: sitting without exercise; 2) exercising as recommended by airline companies; 3) foot exercises against moderate resistances; or 4) foot exercises against strong resistances. The outcome was the popliteal volume flow, as calculated from the popliteal vein velocity and cross-sectional area. A single examiner performed all the tests, blinded to the exercise group.

In the control group, a 40% decrease in blood flow was observed after 90 minutes. The decrease was more marked in those who were sleeping and in those whose feet were not flat on the floor. Airline recommended exercises were beneficial but did not return venous flow back to baseline. The more vigorous the exercises, the greater improvement was observed in venous flow during the 90-minute period. In the group with foot exercises against strong resistances, there was a 20%

increase of popliteal flow compared with baseline flow. During question time, Prof Fletcher indicated that the response is variable and the effect of exercise lasts approximately 15 to 30 min. These findings might form the basis for future exercise recommendations for airline passengers.

Anything new in air travel–related venous thromboembolism?

B. Eklof / Sweden

In view of the growing evidence of an association between air travel and an increased risk of VTE, the World Health Organization decided in March 2001 to promote investigations whose objectives were 1) to confirm and evaluate the magnitude of the thrombotic risk in travelers, 2) to examine whether or not specific risk factors linked to air travel exist, and 3) to determine which preventive measures should be taken.

Whereas the absolute risk of VTE in Dutch pilots was lower than in the overall Dutch population, an epidemiological study conducted among airline employees found a 3.5-fold increased risk of VTE during the 4-week post-flight period (incidence 4.0 per 1000 person-years of exposure) as compared with other periods (incidence 1.2 per 1000 person-years). Studies on specific air travel–related risk factors yielded conflicting results. Whereas some coagulation markers (thrombin generation, thrombin-antithrombin complex, but not factor VIIa, VIIIc or APCsr) were found to be higher in healthy volunteers after an 8 hour-flight as compared with control subjects exposed to a movie marathon, another study did not find any effect on coagulation of 8-hour exposure to mild hypobaric hypoxia in a hypobaric chamber. Unfortunately, no funding has yet been found for interventional studies on prevention. Meanwhile, the author proposed a risk stratification based on risk factors and history of VTE. General measures alone could be recommended to low-risk patients (abundant fluid intake, no alcohol, no sleeping pill abuse, leg exercises). Medium-risk patients (mainly those with VTE risk factors) should wear compression stockings, whereas a single LMWH injection should be considered in high-risk patients (that is, those with a personal history of VTE, an active malignancy, or recent major surgery).

Telangectasias

With the participation of A.I. Shimanko / Russia, G. Serpieri / Italy, R.K. Miyake / Brazil, M. Kielar / Poland

This session consisted of a number a presentations from several countries, dealing with the value of different techniques of sclerotherapy or laser therapy in the treatment of telangiectasias.

R.K. Miyake (Brazil) presented data on 191 patients treated with an Nd:YAG 1064 nm laser followed by dextrose sclerotherapy, both used with a forced air-cooling device. The VeinViewer ™ was used to guide laser light. In 86% of patients, there was partial or total improvement. No allergic, systemic reactions or skin burns were

observed. In conclusion, the author suggested ambulatory phlebectomy to complete treatment of those with unsatisfactory outcome.

H. Kielar (Poland) reported the use of electro-optical synergy technology (ELOS) which consolidates diode 915 nm laser and radiofrequency (RF) simultaneously during one exposure. ELOS was used to treat 150 women (mean age 41.4 years). The medical evaluation was very good (total decline of spider nevi), good ("shadows" of spider nevi), acceptable (better local appearance after 1-3 exposures), poor (no visible changes after one exposure). After one exposure, 62% of patients showed a good and very good effect, 11% acceptable, and 28% poor. After the last exposure, effects were good and very good in 72% of cases, and poor in 28%. No photodermatoses, skin irritation, residual lesions were observed. In conclusion, ELOS was safe, effective and had a very low complication rate.

Varicose veins

Interventional treatments

Open surgery

Morphological changes in deep veins of the lower limbs before and after stripping surgery—measurement of venous cross-sectional areas by color Doppler ultrasonography

H. Tanaka, Y. Ishihara, A. Hakamata / Japan

Two groups of the patients were examined: a control group (40 normal limbs/20 healthy volunteers) and a varicose vein group (116 limbs with superficial varicoses/82 patients). Cross-sectional areas of deep veins were measured using a color duplex scan. Measurement was performed in 4 venous segments: common femoral vein (CFV) above and below the saphenofemoral junction, superficial femoral vein (SFV) above the knee, and the popliteal vein (PV). Investigation was performed in the standing and supine positions before and after surgery. The cross-sectional area of the PV was significantly increased in the standing position before surgery, compared with post-surgery ($P<0.0001$). In the standing position, the cross-sectional areas of the CFV and SFV in the varicose vein group were larger than in the control group ($P<0.001$). After surgery, the difference in the cross-sectional areas of the CFV and SFV between varicose vein patients and the control group became smaller. The authors concluded that measurement of the cross-sectional area of the deep veins could be useful for evaluation of the degree of restoration of venous hemodynamics.

Should complete stripping to the ankle be used to treat primary varicose veins caused by long saphenous vein insufficiency?

H. Uncu /Turkey

GSV stripping from groin to ankle was done in 96 patients (102 limbs). Common postoperative complaints were pain (79.1%) and cosmetic problems (37.5%).

There were small temporary complications: hematomas (19.6%), edema (10.8%), local inflammation (13.7%), bruising (11.8%), calf deep vein thrombosis (2%). Median follow-up time was 3.4 years after surgery. All complaints due to varicose veins were resolved. Permanent paresthesia was found in two patients (2%). The author concluded that total stripping of the GSV is an appropriate technique for surgical treatment of the GSV insufficiency.

Prediction of long-term neurological symptoms after stripping operations by objective assessments of saphenous nerve injury

D. Akagi, H. Arita, T. Komiyama, S. Ishii, K. Shigematsu, H. Nagawa, T. Miyata /Japan

In contrast to the above presentation, in this study 18 patients (27 limbs) were investigated after inversion stripping of the GSV. Quantitative sensory function was determined by current perception threshold (CPT) measurements using a Neurometer® (Neuroton, Inc., USA). Neurological symptoms (pain, anesthesia, paresthesia) were found in 13 limbs (48%), 10 (77%) of which showed a 20% increase in CPT over the preoperative value. In contrast, only one of 14 asymptomatic limbs showed a CPT increase over 20%. So, CPT evaluation could be a good objective method for estimation of neurological symptoms after venous surgery. The discrepancy between these 2 presentations indicates that the prevalence of neurological symptoms depends not only the method of stripping but also on the methods used to investigate postsurgical complications.

Maturation of the treatment of the refluxing great saphenous vein: the role of open surgery

M.C. Dalsing / USA

The author presented his personal experience in the evolution of treatment of varicose veins. Initially, open surgery was the procedure usually used, but varicose vein recurrence was too high (25% at 5 years) with a saphenous nerve injury incidence of 4% to 8%. To reduce this incidence, the author changed his strategy. He stripped the great saphenous vein (GSV) from groin to knee and then, with a small stripper head, stripped the calf GSV. With this maneuver he decreased the bulk of the vein pulled through the distal tunnel, but varicose vein recurrence at five years continued to be high. For this reason, and with the introduction of new therapies, principally endovenous treatment with radiofrequency and laser or sclerotherapy, the author changed his philosophy and offered the patients the new technologies. In the second part of his presentation, the author reviewed the results of the new technologies as published. The most studied procedure is radiofrequency ablation, for which the risk of varicose vein recurrence is 30% at 5 years, with less saphenous nerve injury. Laser ablation is less studied, the incidence of nerve injury is very low, under 1%, but the varicose vein recurrence is similar to that of other techniques (10% at two years). Foam sclerotherapy needs to be repeated several times to obtain good results. In all of these therapies, patient satisfaction, analyzed by quality of life questionnaires, has been very high. Probably in the future, open surgery will be reserved for specific cases where less invasive therapies cannot resolve the varicose vein problems.

It was concluded that minimally invasive procedures are currently as effective as open surgery, appear to cause less trauma to vulnerable nerves, and are preferred by most patients. More long-term results are needed.

Mechanical inhibition of neovascularization to prevent recurrence of varicose veins

R.A. Van Rij, G. Hill, R. Christie, G.T. Jones, M. Amer, I. Thomson, R. Pettigrew, S. Packer / New Zealand

Recurrence of varicose veins following surgery can be attributed in large part to neovascular reconnection at the saphenofemoral junction. The reasons for this pathological process are not well understood and it seems that the surgical technique has a small influence on the intensification of this process. The results of the latest investigations show that neovascularization is dependent on the individual patient's predisposition and is related to the activity of specific markers such as EphB4, NRP2 and COUP II. The process of new vein formation after varicose surgery is totally different than angiogenesis in ischemic tissues. Ultrasound and histological investigation focused on the top of ligated saphenofemoral junction additionally covered by a patch (PTFE or silicon) revealed two ways of new vessel formation. The main one is from the site of ligated SFJ (below the patch), and the other is from the site of the scar proximal to the patch. The frequency of occurrence using ultrasound was estimated as 15% to 20% of all operations, even when there are no visible changes in the groin region. Thus the main problem is how to stop the neoangiogenesis after varicose vein surgery: modify surgical technique, use only the endovascular procedure, which eliminates the angiogenesis related to scarring, or use angiogenesis inhibitors?

Saphenectomy without crossectomy, an alternative solution to endovenous techniques: short-term results

M. Lefebvre-Vilardebo / France

In this study, 285 great saphenous vein (GSV) trunks were removed without high ligation. The indication was dilatation and incompetence of the thigh GSV. Contraindication was incompetent saphenofemoral junction (SFJ). All operations were performed under femoral nerve blockade and tumescent anesthesia. A special flexible stripper was used in combination with microphlebectomy hooks. Postoperative ultrasound investigation demonstrated that the residual SFJ was completely patent, with good drainage through the tributaries in 199 cases (87.7%). 22 SFJs were partially patent. Total occlusive thrombosis was found in 6 SFJs. Parietal thrombosis of the SFJ without penetration into the CFV was found in 20.6% of cases. These thrombi completely resolved without any treatment over 1 to 3 months. Thus surgical avulsion of the GSV without high ligation has all the advantages of the endovenous techniques. Longer follow-up investigations are needed for high ligation-free stripping of the GSV.

Does closing the cribriform fascia contain postoperative neovascularization at the saphenofemoral junction? A prospective study

M.G. de Maeseneer / Belgium

After SFJ ligation in 193 patients (235 limbs) with primary SFJ incompetence, the fossa ovale was closed with mobilized cribriform fascia. Postoperative duplex scanning was performed after 2 and 12 months. The results were compared with two historical control groups: silicone patch saphenoplasty (191 limbs) and no barrier technique (189 limbs). After one year, neovascularization was found in 6.7% cases of the closed fossa ovale with fascia cribrosa. This was comparable with the group with silicon patch saphenoplasty (5.2%). Neovascularization was more frequent (14.8%) ($P<0.01$) in the open fossa ovale group. Thus, the anatomical barrier formed by closing the fossa ovale after SFJ ligation reduces neovascularization.

Varicose great saphenous vein: no need to treat 50% of junctions. A series of 613 legs

M. Lefebvre-Vilardebo, P. Lemasle / France

Nowadays, new treatments of varicose veins in patients with great saphenous vein (GSV) incompetence tend to preserve the saphenofemoral junction (ultrasound-guided foam sclerotherapy, endovenous techniques, crossectomy free saphenectomy), even of the trunk (CHIVA). The question is: does saphenofemoral junction preservation influence varicose vein recurrence?

To answer this question, the author used duplex ultrasound to study 613 legs with primary varicose veins caused by an incompetent thigh GSV. Ultrasound studies specifically investigated the cause of GSV reflux, which was seen in 79.3% of junctions. Ostial valves were pathological in 53.8% of cases. Other causes of reflux were preterminal reflux in 25.5% of cases and incompetent perineal veins in 24.5%. In the rest of the cases, venous reflux was due to dystrophic changes in lymph nodes in 2% of cases, thigh perforator insufficiency in 3.1%, and the saphenopopliteal via the Giacomini vein in 2.6%. The results of this study were similar to those published by Capelli in 2004.

In conclusion, ostial valve incompetence causes only 53.8% of cases of GSV reflux. Crossectomy in the rest of cases may not be necessary. However, more data on long-term outcome are needed.

Endovenous treatment

Bipolar coagulation: a new possibility of intravascular treatment of varicose veins

J. Strejcek, L. Pock, P. Fara, E. Skrivanova / Czech Republic

Bipolar radiofrequency-induced thermotherapy (RFITT), a new technique for the treatment of varicose veins, can eliminate the possibility of vein wall perforation by switching off the coagulation, when the thermal changes of the internal part of the vein are sufficient, in contrast to endovenous radiofrequency and laser

closure. The authors reported good results from a limited number of experiments with RFITT in human saphenous veins obtained by stripping and rabbit saphenous and ear veins, but concluded that a clinical multicenter study must be done.

Endovenous laser ablation: does fluence make a difference? Progression and recurrence of vein disease in patients treated with endovenous laser ablation: one-year experience

T. King / USA

The author reported the use of a 980 nm laser in 240 cases and a 1320 nm laser in 195 cases. There was no statistical difference in the overall failure rate between the 980 nm (20/240) and 1320 nm (21/195) lasers. This was true for treatment of the SFJ and the SPJ. Energy delivery (J/cm^2) does not appear to be as reliable a predictor of successful endovenous laser therapy (ELT) as fluence (J/cm^2), and this was true for both the 980 nm and 1320 nm lasers.

The author also presented a retrospective analysis of 96 patients (112 veins) treated with ELT to evaluate progression and recurrence of vein disease at 12 months. Complete duplex ultrasound scanning was done at 1, 3, 6 and 12 months and any reflux (> 0.5 s) was noted. Incompetent perforators of the thigh (13.5%) and calf (15.2%) and anterograde-flowing branch (feeder) veins (46.8%) were a greater source of recurrence (16/112 at 1 year) in laser-treated veins than failure to close or reopening of the SFJ (21.6%) or SPJ (2.9%). The author concluded that in the first year after ELT recurrence of reflux in the treated veins is far more common than progression of new disease, although the incidence of both decreases over time.

Comparison of endovenous treatment with 980 nm laser versus conventional classic varicose vein surgery in an ethnically diverse society

M. Lakhwani, T.C. Lee / Malaysia

The results of a retrospective study of 292 cases (350 legs) comparing endovenous treatment with 980 nm laser (152 legs) versus conventional varicose vein surgery in nonhomogeneous groups (different CEAP classification) were presented. The conclusion was that more than 95% were satisfied with each of the procedures, but ELT was more widely acceptable due to its minimally invasive nature and better cosmetic results.

T. Noppeney (Germany) gave one current evaluation of endoluminal radiofrequency obliteration of the superficial venous system. He performed a meta-analysis using two major data sources: the still ongoing clinical registry and a prospective randomized trial (EVOLvES study) between RF obliteration and the high ligation and stripping of the GSV. The overall occlusion rate after RF obliteration was 87% up to 5 years postoperatively and during the follow-up period more than 80% of the treated veins could not be seen by duplex ultrasound any more. He concluded that midterm results up to 5 years are as good as those of high ligation and stripping, with clear advantages for RF obliteration regarding faster recovery and better quality of life perioperatively. Thus RF can be considered a very established and standardized procedure for treating varicose veins.

Complications of endovenous laser treatment- avoidance and treatment

F. Pannier / Germany

The author presented the results of a prospective, open, nonrandomized study of the efficacy and safety of endovenous laser treatment (ELT) in 89 limbs with GSV or SSV incompetence. Traditional small complications were found over four weeks: superficial ecchymoses (41%), moderate pain (50%), and paresthesia (10%). There were only two serious complications: 1 case of the skin burn and 1 case of arteriovenous fistula. There was no DVT or pulmonary embolism. Occlusion of the treated veins was found in 95% cases during 2-year follow-up. The author concluded that ELT is an effective, minimally invasive method for patients with GSV and SSV incompetence.

Endovenous laser ablation compared with stripping—preliminary results of an ongoing, randomized, controlled multicenter trial in Japan

T. Ogawa, S. Hoshino, S. Makimura, H. Shigematsu, N. Azuma, T. Sasajima, H. Sugawara, M. Ichiki, S. Shokoku / Japan

In this prospective, randomized, controlled, open multicenter study of 92 patients, 67 cases were analyzed. The ratio between endovenous laser treatment (ELT) and stripping was 2:1. The patients were evaluated by duplex scan, air plethysmography, CIVIQ2 quality of life score and clinical examination at 6-month follow-up. There were no significant between-group differences in the frequency of adverse postoperative events. There was significant improvement in the quality of life score in both groups of patients without significant difference in the dynamics. The authors underlined that the main significant difference between the ELT and stripping groups was the shorter hospital stay after ELT (average 1.14 vs. 2.76 in stripping group).

Randomized trial comparing endovenous laser ablation of the great saphenous vein with high ligation and stripping in patient with varicose veins: short-term results

L.H. Rasmussen, L.B. Rasmussen, M. Lawaetz, B. Lawaetz, A. Blemings, B. Eklof / Denmark

One hundred twenty-one patients (137 incompetent GSVs, CEAP C2-C4) were randomized (envelope method) into two groups for EVL or high saphenous ligation and Oesh stripping (HL/S). All procedures were performed under tumescent anesthesia. The following criteria were recorded: occlusion or absence of the GSV, complications, varicose vein severity score (VVSS), postoperative pain score, Aberdeen score, SF-36 QoL, time off work and time of normal activity and costs. There were no significant between-group differences in the frequency of the complications and adverse events. Improvements in the quality of life (SF-36 and Aberdeen scores) and in VVSS at three months were similar in the two groups. Postoperative pain score was higher in the HL/S group than in the ELT group (NS). Sick leave was 7.7 and 6.9 calendar days, while time to normal physical activity was 7.6 and 7 days in the HL/S and ELT groups, respectively (NS). The total cost of the procedures including work loss was 4053 USD per patient in the HL/S group and 4492 USD per patient in the ELT group. There were no differences between the two treatment modalities except for slightly increased postoperative pain in the HL/S group. The ELT procedure was 10% more expensive.

Endovenous ablation

With the participation of P.J.S. Montemayor / Philippines, C.K. Oh, H.K. Kim / Korea, K. Wasilewski / UAE, M. Hirokawa / Japan, J.R. Kingsley, T. King, L. Cunningham / USA

Endovenous laser treatment (ELT) is a new alternative to surgical stripping of the saphenous veins. It is performed by various specialists such as vascular surgeons and dermatologists, preferably under tumescent local anesthesia.

The 1320 nm laser is the most effective. However, a large study analyzing the data of 1000 cases showed that 98.5% and 98.1% of patients exhibited complete ablation at six-month and one-year follow-up, respectively.

ELT is rarely followed by major complications such as deep venous thrombosis, skin burns, arteriovenous fistula, or paresthesias. However, minor complications such as redness, tenderness, hematoma, superficial thrombophlebitis, skin hyperpigmentation, and prolonged pain are recorded more frequently. There are also a few reports of satisfactory short- and intermediate-term results of ELT of the small saphenous veins.

A new device, the closure FAST, has been introduced to reduce the duration of the operation.

There are no available results assessing the long-term success of ELT and its effect on quality of life. Therefore, prospective, randomized, comparative (to surgery) studies should be designed and performed.

Results of treatment of superficial venous insufficiency: what do we really know?

B. Eklof / Sweden

The author reviewed the evidence concerning treatment of superficial venous insufficiency (great saphenous vein, small saphenous vein, perforators and varicose veins). In the past decade, the development of minimally invasive endovenous techniques like endolaser treatment (ELT), radiofrequency (RF), and foam sclerotherapy (FST) has changed the standard of care, which is considered to be surgical treatment with high ligation and stripping (HL/S). The advantage of RF over HL/S was demonstrated in four randomized, controlled trials (RCTs), the most significant differences being quicker patient recovery, reduction in postoperative morbidity, and improvement in quality of life.

Two RCTs comparing ELT with HL/S showed similar results apart from less bruising and swelling for ELT in one of the studies. In one RCT comparing RF with ELT, the occlusion rate was higher after RF, while the adverse event rates were the same. There are two RCTs comparing surgery with FST. In the first surgery was superior to Varisolve foam, and in the second FST combined with HL was less expensive, required less treatment time, and resulted in more rapid recovery. The author concluded that we need a large, randomized, multicenter study comparing the three endovenous methods with surgery.

Long-term results of endovenous ablation: consensus statement and illustration by 5-7 years of results at the Straub Clinic and Hospital

F. Lurie / USA

The consensus statement on Reporting Standards for Endovenous ablation (EVA) recently published by the American Venous Forum and the Society of Interventional Radiology was debated. This document emphasizes the need for standardization of terminology (recanalization, neovascularization, primary ablation, primary assisted ablation, secondary ablation) and methodology for clinical research studies in this area and major points of consensus include general information (patient population, age, gender, race, clinical indication, anatomic location of treated veins, CEAP staging, clinical severity score, study design, comorbid diseases, functional status and quality of life, pre-treatment imaging, primary reason for treatment), treatment description (pre-treatment preparation, method of vein access, intra-procedural imaging, device or chemical agent description, energy source and duration, total energy deposited, or dose of sclerosant, adjunctive techniques, anesthesia, length and diameter of vein), and post-EVA evaluation (complications, follow-up imaging at regular intervals, follow-up of clinical status, quality of life assessment, uniform duration of follow-up, need for additional procedures, costs/cost effectiveness, primary outcomes) required and recommended.

Endovenous laser treatment versus surgery for incompetent great saphenous veins: a prospective study

S. Jianu, E. Ursuleanu / Romania

A total of 546 patients were enrolled in a prospective study comparing endovenous laser treatment (ELT) versus surgery (high ligation and stripping, HL/S) for incompetent great saphenous veins. ELT (810 nm laser) was used in 264 patients and HL/S in 282, under local anesthesia in all cases. In the ELT group the vein occlusion rate was 91% at 18 months, morbidity rate was 4%, and 2 patients required further crossectomy. In the surgical group, 2 patients required further surgery and the morbidity rate was 10%. It was concluded that ELT is associated with fewer complications than surgery and requires less recovery time, and that the rate of further operations is the same for the two techniques.

Endovenous laser treatment of saphenous vein reflux: mid-term results

S. Shokoku / Japan

Mid-term follow-up results were presented for endovenous laser treatment (ELT) of great saphenous vein (GSV) reflux (131 patients) caused by saphenofemoral junction incompetence and small saphenous vein (SSV) reflux (27 patients) caused by saphenopopliteal junction incompetence. Occlusion rate was 100% immediately and 96.6% after 1 year, with most cases of recanalization concerning the SSV, due to low energy delivery.

Four-year results after ELVes for saphenous varicose veins

H.C. Wenzel / Germany

A single-center, retrospective, four-year study of ELVeS (980 nm diode laser) for saphenous varicose veins (62 GSV and 12 SSV) found an occlusion index of about 96%, 91% satisfaction, and no significant side effects.

Venous stasis ulcers successfully treated with endovenous saphenous vein ablation: the first reported series

J.R. Kingsley, J.H. Isobe, S.A. Tadros / USA

This is the first reported series with results concerning venous stasis ulcers successfully treated with endovenous saphenous vein ablation. There were 75 patients with venous stasis ulcers of the medial or lateral malleolus who underwent 82 saphenous vein ablation operations. Seventy-four procedures were performed on the GSV and the remainder on the SSV. Twenty-two percent of patients also underwent high ligation, 61% micro-phlebectomy, and 40% ultrasound-guided FST. Seventy-three patients were treated with a 1320 nm laser, 7 with radiofrequency, and 2 with a 940 nm diode laser. The ulcer healing rate was 93% within one to six months and the author concluded than this may be a good option for patients suffering from venous stasis ulcers and saphenous vein reflux.

Noninterventional treatments

Compression

4th Bauerfeind Phlebology Award

How to utilize compression therapy after ultrasound-guided sclerotherapy with foam for the treatment of varicose saphenous veins, a randomized controlled trial

R.P.M. Ceulen / The Netherlands

This award-winning, ongoing study is designed to determine the role of compression after sclerotherapy with foam. The hypothesis is that compression decreases the extent of thrombus formation, thus decreasing the risk of recanalization and the incidence of postsclerotic pigmentation. This prospective, randomized, controlled study included 72 patients with great or small saphenous vein insufficiency divided into two groups according to venous diameter (<4 mm and >4 mm). Both groups were divided into three subgroups depending on the type of compression (no compression, compression for 1 week, compression for 4 weeks). Patients with very dark skin tone, GSV or SSV diameter greater than 1 cm, ankle/brachial index <0.7, age <18 years or >65 years, presence of obesity, malignancy, acute superficial or deep vein thrombosis were excluded. The results will be analyzed through blind assessment of photographs by 6 independent reviewers. The presence of thrombophlebitis was analyzed by means of clinical and ultrasound signs. Other variables analyzed are vein disappearance, hyperpigmentation, and neovascularization. Clinical improvement was assessed with one scale from 4 to 12 (4 poor result, 12 excellent result). Obliteration

measured by duplex ultrasound, presence of venous complaints, and quality of life are analyzed too. The study will start in September 2007, the final inclusion will be in February 2008, follow-up will end in April 2008, and the results will be presented in June 2008.

Postinterventional compression after active therapy of varicose veins

H. Partsch / Australia

The optimal compressive therapy after endovascular treatment of great saphenous vein (GSV) insufficiency is not established. The pressure necessary to reduce the vein lumen to avoid secondary effects after GSV endovascular treatment like edema, local inflammation, and hematoma are not well defined. Professor H. Partsch described the use of an inflatable cuff to determine under-cuff pressure and vein diameter reduction measured by duplex ultrasound. The pressure necessary to reduce GSV diameter was between 50 to 70 mm Hg in the upright position. This high pressure is not easy to obtain with the bandages normally used. The application of a specific pad over the treated vein, under the bandage, allows the bandage pressure to be reduced to 30-40 mm Hg, maintaining vein diameter reduction in the upright position.

Sclerotherapy

Efficacy and safety of Aethoxysklerol foam in a prospective randomized multicenter trial (ESAF-Study): results of the first phase

E. Rabe, J. Otto, D. Schliephake, F. Pannier/ Germany

F. Pannier and E. Rabe described the study procedures and presented the results of the ESAF-study, a prospective, multicenter, randomized clinical trial comparing the efficacy and safety of polidocanol-foam with polidocanol-liquid for ultrasound-guided sclerotherapy of great saphenous vein (GSV) incompetence. Patients with incompetent GSV with a diameter <12 mm, a reflux >1 s (3 cm below junction) and a PPG refilling phase <25 s were included (106 patients) and were treated with up to 5 mL foam or up to 4 mL of 3% polidocanol liquid per treatment session, and up to 3 sessions were allowed. To assess the efficacy of both treatments, duplex ultrasound 3 cm below the saphenofemoral junction 3 months after the last injection was done and patients with no reflux or a reflux <0.5 s were considered as responders. The responder rate among patients treated with foam was 70%, whereas the responder rate in the liquid group was just 31%, with no differences in safety. The most successful centers injected a mean volume of 4.2 mL foam in comparison with 3.2 mL foam at the other centers. The authors concluded that ultrasound-guided foam sclerotherapy is an effective and safe technique, with better results than liquid. However, the optimum maximum volume of foam to be injected must be standardized.

The current role for sclerotherapy in the management of venous disease: the Australian perspective

G.M. Malouf / Australia

The sclerosants used included Aethoxysklerol, Fibrovein and hypertonic 20-24% saline (restricted to microslerotherapy). After different phases, sclerotherapy is now used as a follow-up to surgical or thermal truncal ablative procedures, or for microslerotherapy. Ultrasound-guided therapy using liquid or foam is used just for narrow (< 5 mm) refluxing GSV, SSV, Giacomini veins, and recurrent varicose veins. The Australian experience showed fewer allergic reactions and less severe complications for Aethoxysklerol, and stockings have been used to replace bandages for compression after sclerotherapy, and the duration of compression has fallen from 6 to 2 weeks or less.

The Japanese Polidocanol (Aethoxysklerol) clinical trial

H. Satokawa, S. Hoshino, S. Sakaguchi, C. Yamada / Japan

The first phase assessment of suitable concentration, safety and tolerability included 261 patients, none of whom developed any treatment-related systemic adverse events, with a safety limit of 2 mg/kg polidocanol. In the second phase a double-blind test to evaluate clinical usefulness included 86 patients, and the 69.2% to 100% efficacy noted with a single use of polidocanol was greater than that of placebo.

Update on foam sclerotherapy: the 2nd European Consensus Meeting on Foam Sclerotherapy, April 28-30, 2006, Tegernsee, Germany

F.X. Breu, S. Guggenbichler, J.C. Wollmann / Germany

The authors reported the guidelines from the last consensus on foam sclerotherapy which took place in Germany in 2006. A total of 35 000 patients affected by small and large varicose veins were managed. The main topics were access location, foam volume, foam preparation, safety, and contraindications.

Access: when treating the great saphenous vein (GSV), access is by direct puncture at the proximal thigh. Long catheters can be used to access the GSV below the knee. When treating the small saphenous vein (SSV), access is at the proximal or middle part of the calf.

Foam volume: the foam volume has to be limited to no more than 10 mL. If treating large veins, a compact, viscous foam should be used: liquid/gas ratio 1/4

Foam preparation: the Tessari method is recommended in all situations.

Safety: to increase safety during treatment of the GSV, most operators use a volume per puncture and per session. Also, for injection with needles and short catheters, a minimal distance to the junctions of 8 to 10 cm should be used. Immediate compression over the injected areas should be avoided. Ultrasound monitoring of foam location should be used. Inject very viscous foam. There should be no

movement of the patient or leg for 2 to 5 minutes, and no Valsalva maneuver or muscle activation.

Contraindications: a known asymptomatic patent foramen ovale is a relative contraindication. History of thromboembolism is a relative contraindication. Heparin prophylaxis is appropriate in such cases, using low concentrations and small volumes.

Ultrasound-guided foam sclerotherapy in the elderly patient: a minimally invasive treatment for chronic venous disease

C. Vandenbroeck, M. De Maeseneer, P. Van Schil / Belgium

The authors described the treatment of varicose veins with foam sclerotherapy (USGFS) in an aging population. Fifty-eight patients (15 male, 43 female, age range 70-84) were treated and examined at 14 days and 6 months using duplex ultrasound. The sclerosant used was 3% Polidocanol and the foam was created by the Tessari method. After 14 days, full obliteration was obtained in 89% of cases; 8 legs needed a second session because of only partial occlusion. No serious side effects occurred. Minor symptoms as bruising, pigmentation, or induration occurred in 28% of patients. Three patients required heparin for delayed superficial thrombophlebitis.

After 6 months, full obliteration was observed in 72% of cases. The authors conclude that an adequate understanding of chronic venous disease can lead to optimal foam sclerotherapy results in a group of patients who would otherwise be left untreated.

Ascent of foam sclerotherapy in treating venous disorders

J. Bergan / USA

Dr Bergan gave a personal overview of the changes in practice due to the advent of foam sclerotherapy, which has revolutionized the treatment of superficial venous insufficiency and nowadays is an alternative to surgery and laser obliteration.

Surgery for varicose veins requires anesthesia, is often associated with pain, sometimes nerve injury, and above all unacceptable varicose vein recurrence rates (30-60%). Endovenous laser therapy involves day surgery, local anesthesia, and has a high equipment cost. It produces ecchymosis, patient discomfort, and often multiple treatments are needed. Foam is made from a detergent solution. The ratio is 1 part agent to 4 parts room air. Most practitioners use ultrasound-guided saphenous vein access, some simply cannulate a varix, but both techniques involve massaging the foam into the saphenous vein and into target varicosities. A varix can be cannulated directly and the foam directed proximally, then leg elevation directs the foam distally. Groin pressure is maintained and more foam is added if necessary. Leg elevation is maintained to fix foam in the vein. Of 116 patients with varicose veins treated with foam sclerotherapy, during a mean follow-up of 24 months, 72% showed complete fibrosis of saphenous vein, 21% 2-3 mm fibrotic saphenous vein, 7% persistent reflux without varices.

The tangle of dilated venules under the ulcer are the target of treatment by foam sclerotherapy. In his personal experience of 869 patients, Dr Bergan has recorded a low rate of adverse effects (cutaneous necrosis 2 cases, DVT 3 cases, chest pain 2 cases, ocular symptoms 4 cases, dry cough 3 cases, migraine-like attack 2 cases, in total 3.2%).

In conclusion, surgery of varicose veins is nearly obsolete. Laser procedures are acceptable surgical substitutes. Sclerosant foam is effective as an endovenous procedure in obliterating dysfunctional veins. It is less expensive, painless, nondisabling, efficient, and easy to use.

Obstruction and stent placement

Long-term outcome of iliac vein stenting

S. Raju / USA

Iliac venous stenting is a minimally invasive technique indicated for iliac obstructive lesions. The procedure is percutaneous, carried out on an outpatient basis and does not constitute a contraindication for future operation.

Iliac obstructive lesions occur commonly in postthrombotic disease (PTS), in primary chronic venous disease (CVD) (for >90% of patients). They are called obstructive non-thrombotic iliac vein lesions (NIVLs) and are diagnosed by means of intravenous ultrasound (IVUS). MR imaging reveals asymptomatic NIVL in about 60% of the general population.

Iliac obstructive lesions (permissive), although silent, may become symptomatic when secondary pathologies such as reflux, infection, or trauma are superimposed. Remission of symptoms may be achieved by correction of iliac obstructive lesions alone, even when secondary pathologies are not addressed.

The author presented his experience on iliac vein stenting in 982 limbs stented over an 8-year period: 518 for primary lesions and 464 in patients with PTS. Follow-up was complete for 94% of them. Mortality (30 days) was zero. The early (30 days) thrombotic event rate was 1.5% and the late rate was 3%.

Primary chronic venous disease: cumulative primary and primary assisted patency were 79% and 100% at 6 years.

Postthrombotic disease: primary, primary assisted, and secondary patency were 57%, 80% and 86%, respectively.

In-stent restenosis was rare <5%.

Although 70% of stents were extended below the inguinal ligament, there were no stent fractures or erosions.

Complete relief of pain and swelling at 6 years was 62% and 32%, respectively, and 58% of ulcers healed and remained healed at 6 years, although residual reflux was not addressed in most of them.

In conclusion: long-term stent patency is excellent in PTS and 100% in primary chronic venous disease, resulting in excellent clinical results. In primary chronic venous disease, stenting of NIVLs results in clinical relief even when the associated reflux is left uncorrected. Therefore, iliac venous stenting is the primary choice in the management of iliac obstructions.

Follow-up results of 71 patients after stent placement for malignant obstruction of the superior vena cava

T. Nagata, S. Makutani, H. Uchida, K. Kichikawa / Japan

This was a retrospective review of a series of patients with superior vena cava syndrome (SVCS) secondary to a compression for malignancy treated by Spiral Z-Stent implantation, habitually used in the treatment of tracheobronchial and biliary system stenosis. The right femoral vein approach was used. After crossing the lesion, the hydrophilic guide was replaced by a stiffer guide. Normally it was necessary to predilate to implant the Spiral Z-Stent. After treatment, the patients were anticoagulated with heparin for two days followed by oral anticoagulation and antiplatelet therapy. The Spiral Z-Stent was chosen because of its radial tension, adaptability, and the possibility of implanting it through a smaller introducer (12Fr).

Treatment was 100% technically successful in 71 patients. Improvement in edema was obtained in 87% of cases, between the first and ninth day. The primary clinical patency rate was 88% (57/65) and the secondary rate was 95% (62/65). All the patients died, and the survival of 57 patients varied between 1 and 29 months. There was no recurrence of SVCS. Unilateral stenting was useful in the 8 patients with bilateral brachiocephalic vein thrombosis.

In conclusion, spiral Z-Stent placement seems to be effective in the treatment of malignant obstruction of SVC, with an excellent clinical patency rate.

Iliac vein compression syndrome

The results of endovascular treatment for iliac vein compression syndrome

W.-H. Kwun, H.-J. Kim, B.-Y. Suh, W.-K. Park / Korea

This is a retrospective review of a series of 31 patients with iliofemoral vein thrombosis and iliac vein compression (May-Thurner syndrome or Cockett syndrome) treated by thrombolysis with local urokinase and aspiration thrombectomy. Complete lysis was obtained in 28/31 patients, with subsequent stenting in all. All patients had clinical improvement (100%). Iliac thrombosis recurred in four cases. It seems that aggressive therapy can result in a high patency rate.

Chronic venous insufficiency and venous leg ulcer

Effectiveness of ulcer stockings

M. Neumann / The Netherlands

For medical elastic compression stockings (MECS), the three characteristics of major importance are elasticity, stiffness, and hysteresis. In this study, the Medi Ulcer Kit was administered. Effectiveness was determined in terms of capillary filtration rate (CFR) reduction, compression, and hysteresis. These parameters were measured as follows.

In the supine position, the pressure exerted by the stocking exceeded the pressure in the femoral vein, and caused significant reduction of edema by reducing CFR. In the standing position, two stockings were used: low + class II stocking = class III stocking. Two separate stockings result in increased hysteresis, which in turn leads to a higher dynamic stiffness index. Therefore they are highly effective during walking.

Limit of free skin grafting and application of free flaps for intractable venostatic crural ulcer

K. Tanaka, R. Murakami, A. Hirano / Japan

Venostatic ulcer complicates leg varices and often recurs after treatment. However, there are a few cases of intractable ulcer, for which free skin grafting is less effective. The authors presented an alternative method of ulcer reconstruction using a free flap. A free flap from the groin was transplanted in 3 patients. No ulcer has recurred as of 7-10 years after the procedure. Transplantation with good circulatory conditions and anastomosis with a deep vein may have allowed inflow of venous blood around the flap into the deep vein. Consequently, venous circulation may have improved with tissue replacement.

Importance of surgical treatment in venous leg ulcers – Consensus document of the "Surgical Treatment in Venous Leg Ulcers" study group of the German Society of Phlebology

H.J. Hermanns, C. Schwahn-Schreiber, F. Waldermann / Germany

Venous leg ulcers are still a major medical problem worldwide, especially in industrialized societies. The poor results reported after have prompted further search for more effective procedures.

Scientifically well founded and successful methods of surgical treatment of venous leg ulcers are now available. The "Surgical Treatment in Venous Leg Ulcers" study group of the German Society of Phlebology evaluated the current long-term results from German vascular centers using different surgical methods. The conclusions of the conferences in Vienna 2005 (Austria) and in Berlin 2006 (Germany) were summarized as a consensus document.

Three therapeutic concepts for the treatment of venous leg ulcers are available: varicose vein surgery or endovascular techniques, methods including the fascia cruris (fasciotomy and fasciectomy), and shave therapy or other local treatments.

Varicose vein surgery and endovenous techniques are used to eliminate primary and secondary varicose veins. The indications for treatment of an incompetent perforator have recently changed. In Germany only 0.8% are managed by SEPS. Fasciotomy, indicated by a CEAP classification C4 to C6, has declined from 12.8% (2001) to 7.1% (2004).

Shave therapy is the first choice of treatment of nonhealing leg ulcers, and has given good long-term complete healing in 77.5% (Hermans) and 70.6% (Schmeller) of cases. Fasciectomy is reserved for special indications (deep transfascial necrosis and failure of shave therapy).

Fasciectomy in lateral venous leg ulcers: a nerve-sparing procedure

A. Obermayer, K. Göstl / Austria

The great medical problem after fasciectomy for nonhealing venous leg ulcer is paresthesia related to peroneal nerve injury. The results of modified fasciectomy for lateral located and nonhealing leg venous ulcer were presented. Fourteen legs (12 patients) with chronic active venous ulcers (CEAP: C6) all lateral, were surgically treated. The surgical procedure included surgical interruption of the causative reflux and fasciectomy with mesh graft transplantation. As the superficial peroneal nerve was adherent to the inflamed fascia, meticulous dissection was performed in all cases. Afterwards the superficial peroneal nerve was transposed between the musculus peroneus longus and musculus extensor digitorum longus. The intensity of pre- and postsurgical pain was measured using a visual analogue scale and the Nottingham Health profile. A median follow-up of 3 years after surgery showed significantly reduced levels of pain. The excellent outcome of healing (initial healing rate of 86% in a median 4.5 weeks) and recurrence (recurrence ratio of 0) underlines the benefits of this surgical technique. Except for two unhealed leg ulcers, there were no postsurgical complications.

Painful venous leg ulcers located on the lateral side of the lower leg benefit from surgical interruption of the pathogenetic reflux, fasciectomy combined with the sparing of the superficial peroneal nerve, and mesh graft transplantation.

Combined treatment of arterial and venous insufficiency by using the incompetent saphenous vein as graft in patients with ulcer

O. Nelzén / Sweden

Elderly patients with combined arteriovenous insufficiency are often difficult to treat and the risk of later amputation is high. The main aim of this study was to look at ulcer healing and the durability of vein grafts.

All 13 patients (14 legs) with combined arteriovenous insufficiency and ulcer underwent high ligation of the great saphenous vein (GSV) and short saphenous vein (SSV), and a bypass procedure using the incompetent saphenous vein as a graft was performed. Patients were followed up for 12 months or until the ulcer healed. Long-term follow-up was conducted through repeated telephone contact.

In-situ bypass was used in 7 legs, and the remaining 7 had reversed short bypasses. One graft occluded within 30 days and the patient had to undergo amputation. Within the first 12 months, 9/14 ulcerated limbs healed. Two patients died with patent grafts but unhealed ulcers after 5 and 6 months, respectively. One patient had successful re-do surgery with a vein patch procedure and precutaneous transluminal angioplasty (PTA) of the distal anastomosis. One had PTA + stenting of the iliac artery. The median long-term follow-up was 3.5 years (range 1.5-10). Two patients had later PTA, both combined with successful thrombolysis, and they had no remaining ulcers. At the last follow-up, 8/11 (73%) legs followed up beyond the first 12 months were healed. By intention-to-treat, 57% were successfully healed.

It appears that this combined arteriovenous treatment gave satisfactory palliation and ulcer healing for the majority of these elderly patients with a relatively short life expectancy.

Recalcitrant and recurrent leg venous ulcer after surgical treatment: long-term follow-up

K. Ziaja, G. Biolik, D. Ziaja, T. Urbanek, P. Nowakowski, M. Kasibucki, M. Glanowski / Poland

Recurrent or nonhealing leg venous ulcer is the most serious complication of chronic venous insufficiency (CVI). Conservative treatment and surgical treatment have proven unsatisfactory. Sufascial endoscopic perforator vein surgery (SEPS) is recognized as an effective method of treatment of incompetent perforator veins, but in many cases this is not a sufficient procedure. The aim of the study was to determine the efficacy of SEPS + saphenectomy and SEPS + crossectomy in patients with nonhealing or recurrent venous leg ulcers. The study was performed in 63 patients (11 men and 52 women) aged 54 years (22 to 76 +/- 4.23) who were divided into two groups:
- group I – SEPS + crossectomy – 37 patients
- group II – SEPS + saphenectomy – 26 patients

The 10-year observation period was from 1996 to the end of 2005.

Recalcitrant leg venous ulcer was observed in 10.8% of patients in the crossectomy group and in 3.8% in the saphenectomy group. Venous ulcer recurred at the same site in 21.6% of patients in the crossectomy group and in 19.2% in the saphenectomy group. Venous ulcer at a new site of the same leg was noted in 8.1% of patients in the crossectomy group and in 3.8% in the saphenectomy group.
Investigation of valvular competence of the deep venous system revealed that valvular insufficiency was 3 times more frequent in the superficial femoral vein (10.8% patients) and nearly 2 times more frequent in the popliteal vein (24.3% patients) in the crossectomy group.

New calf vein thrombosis was observed in 10.8% of patients in the crossectomy group and in 3.8% of patients in the saphenectomy group. Insufficiency of the Cockett I perforator vein was 50% in both groups.

On the basis of these findings, the author drew the following conclusions:

- In most patients treated by SEPS + crossectomy, there was GSV insufficiency, which was the main cause of ulcer recurrence or nonhealing.
- Valvular insufficiency of the popliteal vein is probably the second most important factor in ulcer recurrence or nonhealing.
- There is no single ideal method of treatment which eliminates all signs and symptoms of CVI and leads to permanent ulcer healing.

Miscellaneous

The future management of acute and chronic venous disease: report from the American Venous Forum's Hawaiian Summit in 2006

B. Eklof / Sweden

At the American Venous Forum (AVF) in Washington DC in September 2004, three major goals were formulated:

- to create a curriculum in venous disease for the new fellowship program in vascular surgery in collaboration with the program directors,
- to introduce a national screening program for venous disease in collaboration with the American Vascular Association (AVA),
- to organize a meeting of experts to draw up the guidelines for venous disease research and development over the next 5-10 years.

Thanks to help from many AVF members, Joann Lohr submitted the venous curriculum to the program directors in early 2006. The screening program for venous disease started in the fall of 2005 through the efforts of Robert McLafferty and his committee, in collaboration with the AVA.

The 5th Pacific Vascular Symposium on January 20-24, 2006 in Hawaii covered the following topic: "Mapping the future of venous disease, an international summit".

In the invitation to the experts, we wrote: "Would you be willing to explore where the field stands at present, to identify where sticking points; and perhaps… propel the field into a new orbit, by defining the next 5-10 years, including postulation of research and development priorities?". Sixty experts were invited representing all the continents and several specialties—angiology, clinical physiology, dermatology, interventional radiology, thrombosis / hemostasis, and vascular surgery. Twelve experts represented industrial research and development for artificial valves and stents, compression therapy, obliteration of veins using laser or radiofrequency, pharmacologic and mechanical endovenous thrombus removal, venotonic drugs, and wound care. Before the meeting, 32 AVF members had each produced an updated report on the state of the art in acute and chronic venous disease, reports that were sent to all participants before the meeting.

The first day was a conventional meeting with presentation of the 32 reports. The following four days were completely different, as the meeting was taken over by four professional facilitators, who each took care of one of the four groups into which we were divided: diagnostics/hemodynamics, acute venous thromboembolism, primary chronic venous disease, and secondary chronic venous disease. Irv Rubin, the chief facilitator, said that "This will be a dramatic departure from the previous symposium format. Using an intense fast-pace novel process my colleagues and I will ask you to join in with open-minded and open-hearted full participation, and we are confident that you will be able to shape the future to hasten beneficial change in the way you treat your patients". The process was

built on the theory of "Appreciative inquiry—a positive approach to building cooperative capacity where the four D's can describe the phases of activity: discovery, dream, design, and destiny". Alternating between break-out sessions for the groups and plenary sessions where the group outcomes were discussed, the second day was devoted to the issue "Where have we come to in our field—the discovery phase" followed by "Sharpening a vision for the future—the dreaming phase". The third day we were "defining and prioritizing critical issues—the design phase", which was further discussed during the fourth day when we were defining a plan of action for the next ten years. During the fifth and last day the plan of action was discussed with commitment from the experts to participate in special projects, and ways to monitor progress of the projects—the destiny phase.

IMUA mission statement: to promote venous health through innovative research, education and technology.

The AVF created a committee to follow up the meeting, the IMUA committee (IMUA is Hawaiian for moving forward!) with the following members: Bo Eklof (chair), Peter Gloviczki, Robert Kistner, Joann Lohr, Fedor Lurie (secr), Mark Meissner, Gregory Moneta and Thomas Wakefield, and we have added Michael Dalsing (AVF President), Brajesh Lal (Chair of AVF research committee) and Sardra Shaw (Chair of AVF's industrial advisory committee). Each of the four groups came up with >20 projects. These >80 projects were reduced to 21 after voting within the groups and at the plenary sessions, and the IMUA committee has merged and reduced the number to 14 projects: 12 investigational and 2 administrative projects. AVF members have volunteered to initially lead these 14 projects:

1 - MR outflow obstruction of venous disease. PI Mark Meissner
   a. Explore the use of MRV for assessing venous obstruction
   b. Use CINE-gated MRV to evaluate and quantify outflow obstruction
   c. Perform pre- and post-therapy testing

2 - Duplex ultrasound in diagnosis and prognosis of DVT. PI Mark Meissner
   a. To evaluate if a single US is sufficient for the evaluation of acute DVT
   b. Produce better guidelines for diagnosing acute DVT and define adequate scan techniques
   c. Evaluate the natural history of DVT in relation to the characteristics of the thrombus

3 - Early clot removal. PI Tony Comerota
   a. Create a multicenter international RCT comparing
   b. Catheter-directed thrombolysis
   c. Endovenous mechanical/pharmacological thrombectomy
   d. Vs anticoagulated controls
   e. Assessing iliofemoral patency, femoropopliteal competence and quality of life

4 - Biomarkers in diagnosis and prognosis of DVT. PI Thomas Wakefield and Tony Comerota
   a. To study the utility of biomarkers such as D-dimers, TAT, F1-2 and PAI-1 antigen in diagnosing DVT and for providing prognostic information to guide type and duration of therapy
   b. End points will include thrombus extension, recurrence and incidence of PE

5 - Core-lab consortium and genetic database. PI Peter Pappas
   a. To identify measuring parameters at the tissue level: vein skin/blood samples
   b. Specimens bank, analysis, database
   c. Correlation between genes, the inflammatory reaction and clinical status of CVD
   d. A repository of information for researchers, drug industry

6 - Evaluation and standardization of venous testing. PI Fedor Lurie
   a. Standardize testing for acute and chronic venous disease for both clinical practice and research
   b. Identify a standard for quality of life outcomes and hemodynamic outcomes
   c. Develop uniform protocols
   d. Develop a wireless functional venous test to enable real-time study during exercise

7 - Assessment of reflux and its relation to progress of CVD. PI Joann Lohr
   a. Correlate patterns of reflux parameters that most accurately identify CEAP categories
   b. Identify patterns of reflux that will identify those patients who will go on to develop class 3-6 clinical signs
   c. Develop a severity score for valvular incompetence

8 - IVC filters in trauma patients. PI David Gillespie
   a. To develop a prospective study comparing
   b. Permanent IVC filters vs
   c. Removable IVC filters vs
   d. A strategy of DVT surveillance
   e. In trauma patients and patients with intracerebral hemorrhage

9 - Improvement of existing endovenous valves and venoscopic valve repair. PI Seshadri Raju
   a. Develop a valve which is nonthrombogenic, nonimmunogenic, flexible and size-adaptable to all venous segments
   b. Develop the least invasive techniques to restore valve function

10 - Pathophysiology in chronic venous disease. PI Joseph Raffetto
   a. Hypothesis: capillary endothelium contains the sensor mechanism which detects the blood flow changes produced by venous hypertension
   b. Plan human and animal experiments to assess role of endothelium and identify mechanisms of ambulatory venous hypertension, inflammatory skin changes and ulceration.

11 - External compression device. PI Joseph Caprini
   a. To develop a compression device to treat severe stages of CVI that
   b. Is as portable as compression stockings
   c. Is easy to use
   d. Responds to patient movements and position
   e. Positively assists venous return
   f. Gives feedback to the physician

12 - Development of dedicated venous stent. PI Peter Neglen
   a. To create a modular stent system for caval confluence
   b. Identification of vessel reaction to stent material
   c. Rate of in-stent restenosis and nature of mechanism
   d. Assess modification by preoperative pharmacotherapy

13 - Joint Venous Council. PI Robert Kistner
   a. To form a new organization
   b. To raise awareness about venous disorders among physicians, government, industry, and the general public
   c. To foster relationships with industry, government, academics and pertinent national and international societies
   d. To consolidate resources to minimize duplication of effort and to maximize progress in the field
   e. To identify and develop sources of funding and other support for the activities needed to advance the venous field

14 - AVF a broad-based inclusive organization. PI Michael Dalsing
   a. Achieve influence through critical mass and excellence
   b. Act as project/grant clearing house
   c. Create evidence-based practice guidelines

The IMUA committee's tasks are to:
- Produce a supplement for *Journal of Vascular Surgery* containing the 32 guidelines and the proceedings from the Venous Summit. A 370-page manuscript is submitted: publication planned in the summer of 2007.
- Support and encourage completion of the projects.

Contemporary approach to Budd-Chiari syndrome among Asians with endovascular management

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Budd-Chiari syndrome (BCS) is hepatic venous outflow obstruction at the suprahepatic inferior vena cava and/or hepatic veins. There are various primary and secondary causes of BSC: congenital, inflammatory, infectious, etc.

Primary, idiopathic BCS is a relatively rare condition with great geographic variance and etiologic or predisposing factors that differ between Caucasian and Asian patients. The "thrombosis theory" is more compatible with the situation in Caucasian patients than the "developmental anomaly theory", which is more frequently relevant in Asian and African patients. Management strategy remains

a critical issue: decompression procedure versus curative radical procedure. Today the gold standard of interventional treatment for different types of BCS has not been established. Thus the indication for combination of various surgical and endovascular procedures needs further investigation.

The last study of an Asian population revealed that the initial process leading to BCS starts during embryogenesis and is related to pathological formation of the vitelline vein and umbilical veins. All these produce an outflow obstruction on the proximal hepatic veins or supraphrenic part of the inferior vena cava. The majority cases of BCS in Asian populations are related to the segmental stricture of the supraphrenic segment of the IVC and/or malformations of the hepatic veins. Pathological segmental venous hypertension results in hepatic vein thrombosis. So, decompression of hepatic outflow seems to be very important. In many cases it can be achieved by endovascular procedures—endovascular balloon decompression of the supraphrenic part of the IVC with or without stent placement even after IVC thrombosis. When it is not possible to obtain IVC decompression, or if BCS is related to hepatic vein malformation, cirrhosis and hepatocellular carcinoma are subsequently common in these patients.

Transjugular intrahepatic portosystemic shunt (TIPS), a typical endovascular procedure, is very useful for treatment of patients without obstruction of the supraphrenic segment of the IVC. This procedure is widely performed in Europe and Japan. However, the benefits of this procedure are very limited for patients who present with IVC stricture or malformation of hepatic veins. Liver transplantation is possible, but not a good solution because the long-term results are poor. So prophylaxis against BCS seems to be very important for Asian and African patients, optimal medical treatment being conditional upon early diagnosis of the IVC stricture or segmental hepatic vein hypertension.