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A-Z Series

Venous disease A-Z series: n°. 10
Catheter-directed sclerotherapy

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Background: Catheter directed sclerotherapy (CDS) involves the use of a long catheter to deliver a sclerosing agent into a target vessel (saphenous trunks or venous malformations) under ultrasound guidance.

Aims and Methods: This article reviews the history, current techniques and devices and the evidence as it relates to these procedures.

Results: CDS was developed to increase the safety and efficacy of ultrasound-guided sclerotherapy (UGS). With the advent of foam sclerosants and tumescent anaesthesia, the procedure has enjoyed a higher primary success rate. CDS has a better safety profile when compared with UGS with virtually no risk of intra-arterial injection or sclerosant extravasation. Compared with endovenous laser (EVLA) and radiofrequency ablation (RFA), CDS is a quicker procedure with less associated pain. Some balloon catheters, however, have been found to force the sclerosant down the perforators causing femoral vein occlusion. Based on the current level of evidence, no firm conclusion regarding the efficacy of CDS techniques can be drawn in comparison with EVLA or RFA, but the primary success rate is probably higher than the standard UGS.

Conclusion: CDS ensures a safe intraluminal delivery of the sclerosing agent into the trunk of the saphenous veins using a single access point. This procedure preceded EVLA and RFA, and remains a safe alternative for the treatment of saphenous incompetence and venous malformations.

Key Words: *sclerotherapy • ultrasound-guided sclerotherapy • catheter-delivered foam • varicose vein • saphenous vein*

Original Articles

Pelvic vein reflux in female patients with varicose veins: comparison of incidence between a specialist private vein clinicand the vascular department of a National Health Service district general hospital

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Objectives: Mounting evidence suggests that pelvic vein reflux is an important contributing factor to recurrent varicose veins. We compared the incidence in our specialist private unit (Unit A) with that of a District General Hospital (Unit B).

Methods: Results of all female patient lower limb duplex ultrasound (LLDUS) and transvaginal pelvic ultrasound (TVUS) scans performed over a one-year period were retrospectively reviewed. Patients with refluxing veins emanating from the abdomen or pelvis on LLDUS (non-saphenous reflux) routinely proceeded to TVUS in Unit A.

Results: In Unit A, non-saphenous reflux on LLDUS was present in 90–462 female patients (19.5%). In 81.1% of these, TVUS confirmed reflux in truncal pelvic veins (incidence 15.8%). In Unit B, non-saphenous reflux was present in 60–279 female patients (21.5%).

Conclusion: One in five women presenting with varicose veins have reflux of non-saphenous origin. This is the case in specialist and non-specialist units. One in six has associated pelvic vein reflux.

Key Words: *pelvic vein reflux • varicose veins • pelvic vein embolization • non-saphenous reflux*

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Original Articles

Transient adverse events positively associated with patent foramen ovale after ultrasound-guided foam sclerotherapy

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Objectives: To prospectively study the association between patent foramen ovale (PFO) detected by contrast transcranial Doppler (cTCD) and adverse events (AEs) reported by patients after ultrasound-guided foam sclerotherapy (UGFS) for the treatment of varicose veins.

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

Results: Of the 3259 patients who underwent UGFS, AEs were reported by seven (0.21%) patients at their first session. These included visual disturbance, migraine and chest discomfort. Five (71.4%) of these seven patients tested positive for PFO by cTCD. The two-week follow-up confirmed no permanent symptoms.
Published studies show high sensitivity and specificity for cTCD when compared with contrast transesophageal echocardiography (cTEE).

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

Key Words: *chronic venous disorders • patent foramen ovale • right-to-left shunt • contrast transcranial Doppler • ultrasound-guided foam sclerotherapy*

Original Articles

A comparison of interface pressure and stiffness between elastic stockings and bandages

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Objectives: To compare the interface pressure during posture changes and exercise between elastic stockings and bandages.

Methods: Using a pressure transducer (air pack-type analyzer), the interface pressures associated with three different elastic stockings and three different elastic bandages were measured during supine resting, standing and exercise in 15 healthy volunteers.

Results: Short-stretch bandages showed a significantly higher static stiffness index value, which is defined as the pressure difference between lying and standing, than long-stretch bandages and short-stretch stockings ($P < 0.001$). Furthermore, short-stretch bandages showed a significantly greater pressure difference between muscle contraction and relaxation in both tip-toe and knee-bending exercises than long-stretch bandages and short-stretch stockings ($P < 0.001$).

Conclusion: Short-stretch bandages can be expected to have more pronounced benefits for augmenting muscle pump than long-stretch bandages and short-stretch stockings.

Key Words: *elastic stockings • elastic bandages • stiffness • compression pressure • muscle pump*

Short Report

Liposarcoma of thigh presenting as deep venous thrombosis

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Objectives: To discuss the differential diagnosis of a case with leg swelling and pain with special emphasis on soft-tissue malignancy.

Methods: Symptomatic deep vein thrombosis (DVT) of lower limb was treated with standard anticoagulants. In view of persistent symptoms for three months, repeat duplex venography, magnetic resonance imaging (MRI) and biopsy were undertaken to uncover the underlying pathology.

Results: Imaging and biopsy revealed a 5 x 11 cm myxoid liposarcoma, adherent to the vein, that was the cause of her persistent symptoms despite anticoagulation, possibly by its local mass effect and also by its potential to create a thrombogenic milieu. Excision of the tumour led to symptom relief. A Medline search of English language papers was undertaken to review related literature.

Conclusion: The report highlights the importance of considering neo-plastic masses as differential in painful leg swelling. Diagnosis is made by a high index of suspicion in atypical cases and confirmed by follow-up duplex or MRI. Treatment involves surgical excision that provides symptom relief as well as avoids potential tumour extension.

Key Words: *deep vein thrombosis • liposarcoma • painful leg swelling • soft-tissue leg malignancy*

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Original Articles

Endovenous laser procedure in a clinic room: feasibility and side effects study of 1700 cases

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Objectives: To assess the feasibility of saphenous veins ablation by laser in a clinic room. To study immediate and short term (1 to 6 months) complications and to pinpoint those that could be directly linked to this environment. Efficacy of the technique should also be documented.

Methods: Retrospective study (22 centres) carried out in France and Switzerland. Patients with insufficiency of great saphenous vein (GSV) or small saphenous vein (SSV). Clinical stages of clinical, aetiological, anatomical and pathophysiological classification (CEAP) were C2 to C6. Endovenous laser procedures were performed outside an operating theatre, under local anaesthesia and without high ligation. Efficacy criteria: occlusion of the vein and disappearance of the pathological reflux (duplex scan assessment). The side effects and complications were studied.

Results: A total of 1703 procedures (1422 patients) were performed; 74% of the patients were women. The mean age of the patients was 57. A total of 1394 GSV and 309 SSV were treated (mean diameters 7.2 mm and 6.4 mm, respectively).
Overall success level was 97% and mean length of veins treated was 40 cmfor GSVand 21 cm for SSV. Energy applied in joules per centimeterwas homogenous (mean andmedian 64 for GSV and 65 for SSV). Complications were rare and 'simple' apart from one pulmonary embolism which occurred 10 days after a GSV procedure, although no deep vein thrombus was found.
A total of two infectionswere observed: onewas an infection localized at the site of access and the other was erysipelas.

Conclusion: Except 2 limited infections (0.1%), this large retrospective study of laser procedures performed outside the operating theatre did not reveal any significant specific complications as regards the environment required. The efficacy results were equivalent to those found in the literature. Regarding cost and constraints induced by operating theatre environment, the clinic room should be able to offer an easier and economic alternative option for saphenous veins ablation with laser.

Key Words: *endovenous laser; varices; varicose veins; saphenous veins; outpatients; tumescent anaesthesia*

Original Articles

Side-effects and complications of foam sclerotherapy of the great and small saphenous veins: a controlled multicentre prospective study including 1025 patients

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Objectives: Increasing interest in foam sclerotherapy (FS) for saphenous insufficiency has highlighted the need to study the side-effects and complications of this treatment. The aim of this study is to better assess their nature and incidence.

Methods: A multicentre, prospective and controlled study was carried out in which patients treated with FS for great (GSV) and small saphenous veins (SSV) trunk incompetence were included. Immediate untoward events were reported. Duplex ultrasound (DUS) examination was carried out to assess all patients between the eighth and 30th day. In addition, 20% of patients were called by an external auditor.

Results: In total, 818 GSV and 207 SSV were treated in 1025 patients in 20 phlebology clinics. Ninety-nine percent of patients were controlled with DUS and non-duplex-checked patients were all called. The saphenous trunk was occluded in 90.3% of patients. Twenty-seven (2.6%) side-effects were reported: migraine (n = 8, 4 with visual disturbance); visual disturbance alone (n = 7); chest pressure alone (n = 7); and chest pressure associated with visual disturbance (n = 5). Eleven thrombo-embolic events occurred: 10 deep vein thrombosis (DVT) but only five in symptomatic patients, and one pulmonary embolism that occurred 19 days following the FS without DVT identified by DUS. One transient ischaemic stroke, with complete clinical recovery in 30 minutes, and one septicaemia with satisfactory outcome were reported as well.

Conclusion: This study demonstrates in a large sample of patients a low rate of adverse reactions after FS of great and small saphenous trunks. However, but the eventuality of exceptional but more serious complications has to be taken into account in the management of patients. A multicentre study like this one takes into account different practices and reports all possible complications, thus demonstrating the need for a common validated protocol.

Key Words: *foam sclerotherapy • venous insufficiency • side-effect • complication*

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Review

Pathogenesis of chronic venous insufficiency by obesity

Current data and hypotheses

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Keywords: Obesity, chronic venous insufficiency, venous leg ulcer, intraabdominal pressure, venous pressure.

Summary: Obesity (body mass index: BMI ≥ 30 kg/m2) is named as a risk factor for chronic venous insufficiency (CVI) in phlebologic studies, even though the mechanisms of effects are still unclear. Therefore we examined literature for current data and hypotheses and described them.
On the one hand, the correlation between obesity and CVI is explained by chronically inflammatory processes, affected by the lipometabolismofobeseandthemetabolicsyndrome.Ontheotherhand,thisparticularcorrelationisexplainedbyamechanicalapproachbasedonan elevated intraabdominal pressure (IAP), which is transmitted to the venous system of the lower extremities. Recent studies show that the chronically inflammatory processes promote the frequency and manifestation of thrombosis. In regard to the IAP, only the pressure of the elevated abdominal mass (paunch) seems to have a minimal effect in the supine position.
Several studies relativised the correlation between obesity and CVI because of the rising prevalence of venous disease with age, which correlates with a higher BMI as well. Furthermore, studies have shown the phenomena of so-called venous hydrostatic ulcerations in obese patients. That means those patients show the typical skin changes of the CVI without any venous reflux. Depending on the study, their proportion is estimated between 21% and 64% of venous leg ulcers. Additionally, it was shown that after weight loss the skin seems to regenerate from the typical signs of CVI. At the moment, the pathomechanism causing hydrostatic ulcers in obese is unclear.

Case report

Thrombosis as a complication of the Klippel-Trénaunay syndrome and other vascular malformations

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Keywords: Klippel-Trénaunay syndromel.

Summary: The Klippel-Trénaunay syndrome (KTS) is a congenital disorder of vascular malformations characterized by the clinical trias of naevi flammei, varicosis and hypertrophy of the affected limb. According to its clinical development KTS can be diagnosed directly post partum or becomes apparent in the course of the development particularly regarding incomplete forms. The most described symptoms next to swelling are pain and augmented sweating of the affected extremity. Complications of KTS are bleeding from mechanically traumatised vascular malformations or widened vessels, but also thromboembolic events are reported. We report on two patients with KTS and one patient with angiodysplasia, who developed deep vein thromboses in the affected limb at young age. None of the patients suffered from thrombophilia or other predisposing risk factors for thrombosis. KTS and other angiodysplastic disorders seem to be a risk factor for thromboembolic complications even at young age. A comprehensive counceling of the patients concerning the prevention of complications and especially the symptoms of thromboembolic events is important for early diagnosis and immediate therapy.

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Original Article

Tumescent anaesthesia in combination with a femoral nerve block or a sciatic nerve block for surgery of varicose veins

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Keywords: Tumescent anaesthesia, femoral nerve block, sciatic nerve block, surgery of varicose veins.

Summary: Tumescent anaesthesia is a widley accepted anaesthetic procedure for the surgery of varicous veins. In our institution tumescent anaesthesia is regularly combined with femoral nerve block or sciatic nerve block for primary operations of the great saphenous vein (GSV) or small saphenous vein (SSV).
This combined procedure is described. Retrospective data of 154 operations of the GSV and of 27 operations of the SSV are presented. We used 9.5 mg/kg body weight of prilocain for operations of the GSV and 8.6 mg/kg body weight for operations of the SSV. No serious complications occurred.

Original Article

High ligation of the sapheno-femoral junction is necessary ! Results of the German Groin Recurrence Study

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Keywords: High ligation, neovascularisation, varicose vein, groin recurrence, technical error.

Summary: ultrasound Neovascularisation can compromise the success of high ligation and resection of the greater saphenous vein. Studies using duplex-to classify recurrent groin veins have described rates of neovascularisation as high as 60% and raised the question whether high ligation is actually able to prevent groin recurrences. In the present study, recurrent groin veins were excised and examined histologically in order to prove whether neovascularisation is the main cause for sapheno-femoral recurrences. Patients, methods: 419 patients accounting for 458 legs with clinically symptomatic groin recurrences were included in a country-wide multicenter study. The recurrent groin veins were excised in a standardized fashion and subsequently divided into the different types of recurrence based on histopathological criteria. Results: 427 specimen (93%) were available for histopathological examination. In 69 cases (16.2%) a neovascularisation was found to be the cause of recurrence. 311 specimen (72.8%) contained a long residual stump of the greater saphenous vein, out of which 32 (7.5%) showed additional neovascularisation at the site of the ligation. In 29 cases (6.8%) a venous side branch was found to be the recurrent groin vein. 11 specimen (2.6%) did not contain any evidence of venous material and in another 7 cases (1.6%) it was not possible to clearly identify the cause of recurrence during the histopathological workup. Conclusion: The high rates of neovascularisation described in several duplex ultrasound studies could not be confirmed in our investigation. Recurrences seem to be mainly caused by a technically incorrect initial operation which leaves a long residual stump of the saphenous vein in place. Following a technically correct high ligation, clinically relevant recurrences appear to be rare. This finding underlines the necessity of a high ligation of the saphenous vein according to current guidelines.

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