NEW TRENDS IN MANAGEMENT OF VARICOSE VEINS OF LOWER LIMBS

Essay
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INTRODUCTION

Varicose veins are generally identified by their tortousity, bulging,Superficial appearance on the lower extremities. They also can be found in the vulva, spermatic cords (varicoceles), rectum,anal canal (hemorrhoids), and esophagus (esophageal varices).Varicose veins are a common problem, with widely varying estimates of prevalence. In general, they are found in 10 to 20 percent of men and 25 to 33 percent of women. (Bergan JJ,et al;2006)

The etiology of varicose veins is multifactorial and may be primary as congenital weakness of mesenchyme or secondary as increased intravenous pressure caused by prolonged standing; increased intra-abdominal pressure arising from tumor, pregnancy, obesity, or chronic constipation; secondary to deep venous thrombosis; or less commonly, arteriovenous shunting.Shear forces and inflammation have recently been recognized as important etiologic factors for venous disease. (Bergan JJ,et al;2006)

The clinical presentation of varicose veins varies among patients. Some patients are asymptomatic. Symptoms, if present, are usually localized over the area with varicose veins; however, they may be generalized to include diffuse lower extremity conditions. Localized symptoms include pain, burning, or itching. Generalized symptoms consist of leg aching, fatigue, or swelling. Symptoms are often worse at the end of the day, and usually disappear when patients sit and elevate their legs. (Teruya TH,et al;2004)

Imaging studies are generally not necessary for diagnosis, but they may be useful in patients with severe symptoms or in patients who are obese. They also may be helpful for planning procedures,

documenting the extent of vascular pathology, or identifying the source of venous reflux. Duplex Doppler ultrasonography is a simple, noninvasive, painless, readily available modality that can assess the anatomy and physiology of the lower extremity venous system.Other less commonly used studies that may be helpful in select patients include venography, light reflex rheography, ambulatory venous pressure measurements,photoplethysmography,air plethysmography, and foot volumetry. (Campbell B,et al;2006)

Conservative treatment options include avoidance of prolonged standing and straining, elevation of the affected leg, exercise, external compression, loosening of restrictive clothing, medical therapy, modification of cardiovascular risk factors. (Bartholomew JR,2006)

Sclerotherapy involves injecting superficial veins with sclerosing material that causes them to fibrose and collapse permanently. sclerotherapy has been in use for nearly a century to treat both telangectasias and small (<6mm) isolated varicose veins.(Campbell B,et al;2006)

Surgery is the best known treatment for varicose veins, especially when long and short saphenous veins are involved. However,some literature does not consistently support surgery as the definitive treatment option. (Bergan JJ,et al;2006)

External laser treatment include multiple laser machines that deliver various wavelengths of light through the skin and into the blood vessels are available to treat any small, straight vein branch However, laser therapy has typically been used on telangiectasias and smaller veins rather than on larger veins.(Campbell B,et al;2006)

Foam sclerotherapy (FST) offers a number of advantages over traditional sclerotherapy, and allows a skilled practitioner to treat veins of larger diameter, including saphenous trunks.The ease of use, low complication rate, and high rate of efficacy make foam sclerotherapy an important tool in the treatment of varicose veins and venous ulcerations (WrightD,etal;2006)

Advances in imaging and catheter technology made the development of Endovenous laser treatment (EVLT) possible. EVLT offers patients a fast outpatient procedur with minimal downtime and discomfort. The procedure is durable and safe It is versatile and allows the practitioner to treat incompetence of the saphenous trunks and accessory branches. (Ravi R,et al;2006)

Endovenous laser treatment (EVLT) and radiofrequency ablation (RF) are rapidly becoming a standard of care in the treatment of varicose veins, because they can offer treatment in an outpatient setting and patients can return to normal activity levels almost immediately. (Ravi R,et al;2006)

AIM OF WORK:

Discussing new trends in management of varicose veins of lower limb,and enumerate the results of new trends versus surgery.

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List of Abbreviations

AP	:	Ambulatory phlebectomy.
ASV	:	Anterior saphenous vein.
AVCs	:	Anterior venous communications.
CFV	:	Common femoral vein.
CVD	:	Chronic venous disease.
CVI	:	Chronic venous insufficiency.
DCI	:	Disulfiram
DVT	:	Deep vein thrombosis
EVLT	:	Endovenous laser therapy.
FDA	:	Food and drug administration.
GSV	:	Great saphenous vein.
LSV	:	Lesser saphenous vein.
LSVS	:	Lateral subdermic venous system junction.
POL	:	Polidocanol
PTV	:	Posterior tibial vein
RFA or RF	:	Radiofrequency ablation.
SFJ	:	Saphenofemoral junction.
SPC	:	Superficial posterior compartment
SPJ	:	Saphenopopliteal junction.
SSV	:	Short (small) saphenous vein.
STD	:	Sodium Tetradecyl Sulfate
STS	:	Sodium Tetradecyl Sulfate

ANATOMY OF THE VENOUS SYSTEM OF THE LOWER LIMB

Gross anatomy of the veins of the lower limb:

A. Deep venous system of lower limb.
B. Superficial venous system of lower limb.
C. Communicators and perforators of lower limb.

The veins of the lower limb can be divided into superficial and deep group. The superficial veins are subcutaneous and lie in the superficial fascia; the deep veins (beneath the deep fascia) accompany the major arteries. Both groups have valves, which are more numerous in the deep veins. Venous plexuses occur within and between some of the lower limb muscles ***(Gray's, 2005*)**.

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About 10 -15% of the venous drainage of the lower limb is carried by the superficial system while deep veins carry the rest ***(Alimi et al.,1994)***

A) The deep venous system of the lower limb:

Soleal muscle drainage:

The soleus muscle contains thin walled venous reservoirs within its substance called soleal sinuses which vary in number from 1 to 18, they are usually connected to each other by small venous channels between them often contain valves. On phlebography the soleal sinuses appear as fusiform,

dilated venous channels, which empty high in the calf into posterior tibial vein ***(Strandness and Thicle, 1981)***.

Gastrocnemial veins:

Each belly of the gastrocnemius muscle is drained by a single large vein which enters the popliteal vein in the lower part of the popliteal fossa at the same level, as does the short saphenous vein. They drain into the popliteal vein by S-shaped junction, either separately (30% of the cases) or by joining the small saphenous vein (70 % of the cases). ***(Belcaro et al., 1995)***.

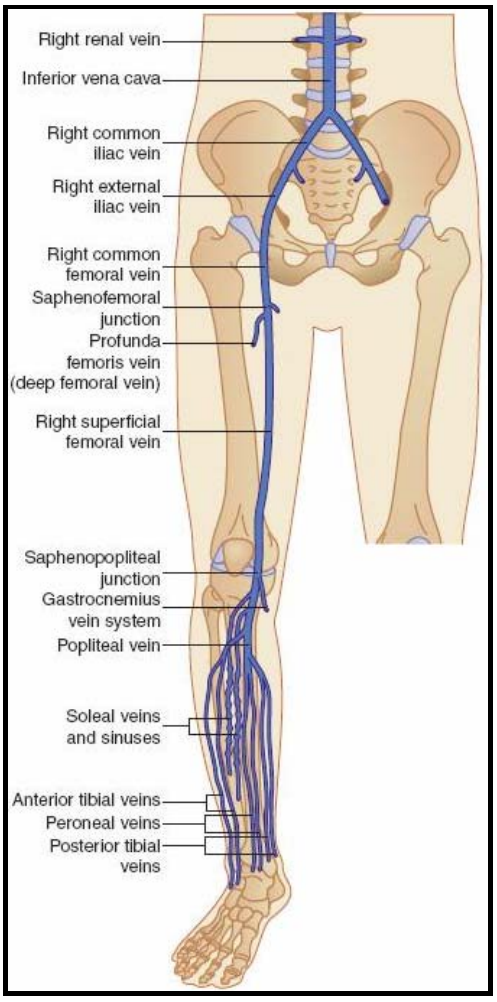

Fig. (1): The deep venous system of the lower limb.

- ***Deep veins of the lower limbs accompany the arteries and their branches:***

1. Posterior tibial veins are pair of vena commitantes accompany the posterior tibial artery; they communicate with each other at frequent intervals around the artery and jointed by the Peroneal veins ***(McMinn, 1994)***.
2. Peroneal veins are pair of vena comitantes accompany the Peroneal artery. They are present in the distal third of the

leg running deep to the muscles in close relation to the interosseous membrane. In the upper half of the leg they emerge from under the muscles to lie in the posterior compartment and here they receive several large tributaries from the lateral aspect of the soleus muscle, which convert them into large veins before the unit with the posterior tibial veins ***(Warwick and Allanl, 2002)***.

3. Anterior tibial veins are the upward continuations of vena comitants of the dorsalis pedis artery. They leave the anterior leg by passing between the tibia and fibula, over the interosseous membrane, and unite with the posterior tibial to fom the popliteal vein. The anterior tibial veins run, one on each side of the artery, in close contact with it and anastomose by cross channels at frequent intervals ***(McMinn, 1994)***.

4. Popliteal vein: ascends through the popliteal fossa to the opening in the adductor magnus where it becomes the femoral vein. Its relationship to the popliteal artery changes as the vein ascends. Distally it is medial to the artery, between the heads of gastrocnemius it is superficial (posterior) to it, and proximal to the knee joint it is posterolateral to the artery. Its tributaries are the short saphenous vein, veins corresponding to the branches of the popliteal artery and muscular veins ***(Gray's, 2005)***.

5. Femoral vein: is the continuation of the popliteal vein at the adductor opening, accompanies the femoral artery, and ending posterior to the inguinal ligament as the external iliac vein. In the distal adductor canal, it is more posterolateral to the femoral artery; more proximally at the base of the triangle, it is medial ***(Gray's, 2005)***.

The vein occupies the middle compartment of the femoral sheath, between the femoral artery and canal, fat in the latter allow expansion of the vein. It has many muscular tributaries ***(Gray's, 2005)***.

6. External iliac vein; the proximal continuation of the femoral vein is the external iliac vein. It begins posterior to the inguinal ligament, ascends the pelvic brim and ends anterior to the sacro-iliac joint by joining the internal iliac vein to form the common iliac vein ***(Gray's, 1995)***.

On the right side, it is first medial to the external iliac artery, gradually inclining behind it as it ascends; on the left, it is wholly medial. This is a point of great surgical importance. Disease of the external iliac artery may cause it to adhere closely to the vein at the point where it is in contact, and (especially on the right side) the wall of the vessels may become fused. Medially the ureter and internal iliac artery cross the external iliac vein ***(Gray's, 1995)***.

In males it is crossed by ductus deferens, in female by round ligament and ovarian vessels. Lateral is psoas major. The vein is usually valvelss, but may contain a single valve ***(Gray's, 1995)***.

Tributaries. These are the inferior epigastric, deep circumflex iliac and pubic veins ***(Gray's, 1995)***.

B) The superficial venous system:

The principal named superficial veins are the long and short saphenous veins ***(Gray's, 2005)***.

The superficially located vein network of the lower extremities is the most poorly supported and is the source of the earliest subcutaneous varicosities ***(Caggiati et al., 2002).***

1. The long saphenous vein:

The longest vein in the body, starts distally as a continuation of the medial marginal vein of the foot, and ends in the femoral vein a short distance distal to the inguinal ligament. It ascends 2.5-3cm anterior to the medial malleolus, crosses the distal third of the medial surface of the tibia obliquely to its medial border, then ascends a little behind the border of the knee. Proximally is posteromedial to the medial tibial and femoral condyles (hand breadth posterior to the medial edge of the patella), and then ascends the medial aspect of the thigh. It passes through the saphenous opening and

finally opens into the femoral vein. The centre of the opening is often said to be 2.5-3cm inferolateral to the pubic tubercle, and the vein is then represented by a line drawn from this point to the femoral adductor tubercle. However the saphenous opening varies greatly in size and position so that this centre is not a reliable surface marking for the saphenofemoral junction ***(Gray's, 2005)***.

In its course in the thigh the long saphenous vein is accompanied by branches of the medial femoral cuteneous nerve. At the knee the saphenous branch of the descending genicular artery (the saphenous artery) and, in the leg and foot the saphenous nerve are anterior to it ***(Gray's, 2005)***.

It has from 10 to 20 valves, which are numerous in the leg than in the thigh ***(Gray's 2005)***.

The most important of these valves is present at the termination of the vein into the femoral vein (sapheno-femoral junction) ***(McMinn, 1994)***.

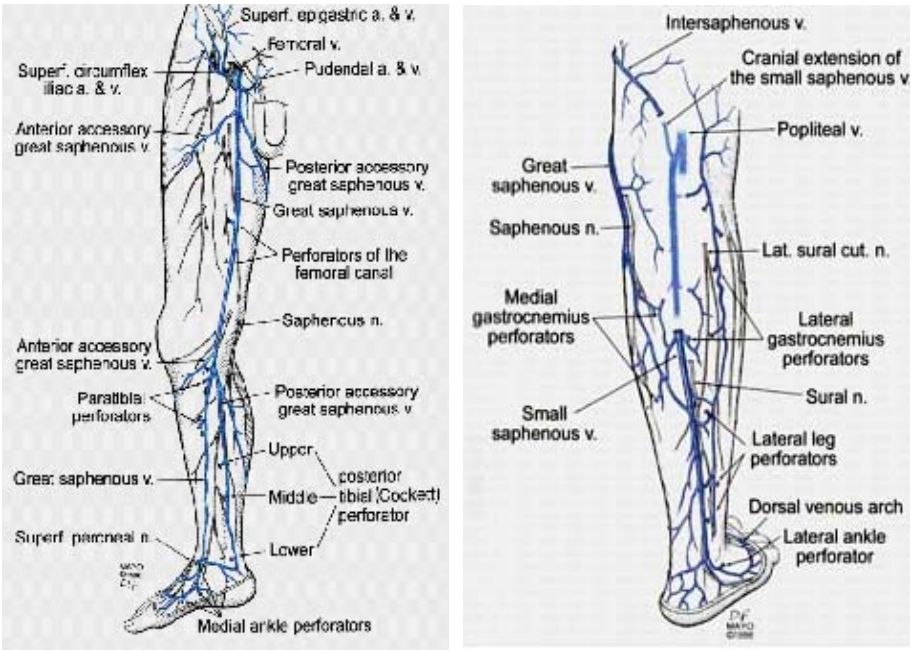

Fig. (2): Anatomy of long saphenous vein and perforators **(*Mozes et al., 2006)***

The long saphenous vein is doubled in the calf in 25% of the population and in the thigh in 8% ***(Thomson, 1979)***.

The accessory long saphenous veins are frequently present and run parallel to the long saphenous vein. Both in the thigh and in the leg they lie anterior, posterior, or superficial to the main trunk. The posterior accessory long saphenous of the leg (Leonardo's vein or posterior arch vein) is a common tributary, it begins posterior to the medial malleolus, ascends on the posteromedial aspect of the calf, and joins the long saphenous vein distal to the knee. The anterior accessory long saphenous of the leg drains the anterior aspect of the leg below the knee. The posterior accessory long saphenous of the thigh,