

## CASE FOUR

**Short case number: 3\_27\_4**

**Category: Cardiovascular**

**Discipline: Surgery**

**Setting: General Practice**

**Topic: Varicose veins**

### Case



**Sandra Tutil is a 48 year old mother of three. She presents today because she has increasing aching in her legs and she thinks it is about time she did something about her 'ugly varicose veins'**

**Sandra has noticed that her legs have become worse with each pregnancy and that lately she finds that at the end of day her feet are swollen and her legs ache.**

***"it's hard to put your feet up with three young children and a part time job as shop assistant"***

### Questions

1. Define a varicose vein?
2. Summarise the venous drainage of the lower limb and explain to Sandra why varicose veins develop.
3. What are the key features of your history and examination of Sandra and why?
4. Outline the aetiology of primary and secondary varicose veins and detail the secondary effects of varicose veins.
5. What investigations can be undertaken in the assessment of varicose veins and outline Indications and advantages of each method.
6. Sandra explains that during her third pregnancy she was advised to wear support stockings, this was difficult as she was pregnant during the summer. Summarise the use of compression hose in the management of varicose veins.
7. Sandra has seen a number of advertisements for 'injections' she asks if she should have this done. Outline the technique of sclerotherapy in the management of varicose veins. What are the indications and complications of this procedure?
8. What are the indications and contraindications for surgery in the management of varicose veins? Briefly outline the surgical techniques of saphenofemoral and saphenopopliteal ligation.

### Suggested reading:

- Garden OJ, Bradbury AW, Forsythe JLR, Parks RW, editors. Davidson's Principles and Practice of Surgery. 6<sup>th</sup> edition. Philadelphia: Churchill Livingstone Elsevier; 2012.
- Henry MM, Thompson JN, editors. Clinical Surgery. 3<sup>rd</sup> edition. Edinburgh: Saunders; 2012.
- Talley, O'Connor. Clinical Examination – A systematic Guide to Physical Diagnosis. 8<sup>th</sup> Churchill Livingstone 2017.

## ANSWERS

1. Define a varicose vein?

A vein is said to be varicose when its normal anatomy is distorted by dilatation and tortuosity. Veins anywhere in the body can be affected, but for practical purposes this common condition affects the lower limbs

Varicose veins (VV) are so prevalent that they could almost be considered a variant of normal for a creature that spends its life on two as opposed to four legs. Their prevalence increases markedly with age and they are an almost universal finding in individuals over the age of 60.

### Trunk varices

These involve the main stem and/or major tributaries of the Long and Short Saphenous veins (LSV and SSV), are usually > 4 mm in diameter (and may be much larger), lie subcutaneously, are palpable, do not usually discolour the overlying skin, and are present in about a third of the adult population.

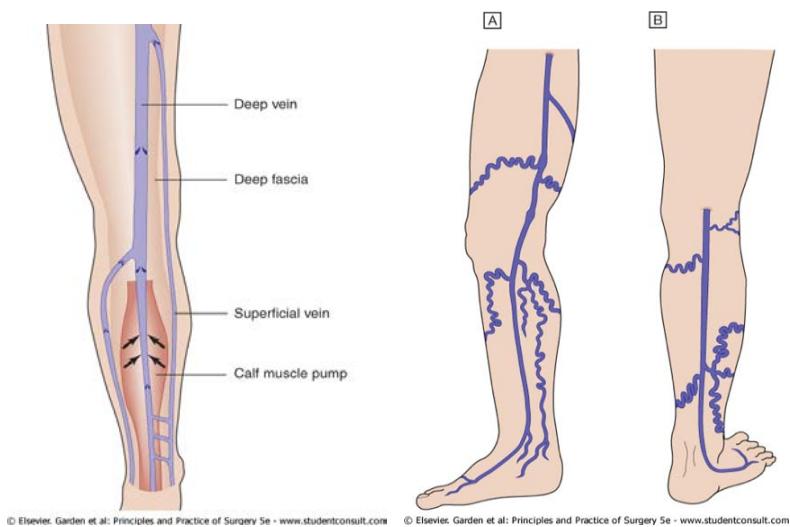
### Reticular varices

These lie deep in the dermis, are < 4 mm in diameter, are impalpable, and render the overlying skin dark blue. They are present in about 80% of the adult population, and may or may not be associated with trunk varices.

### Telangiectasia

These are also called spider and hyphen web veins. They lie superficially in the dermis, are usually 1 mm or less in diameter, are impalpable, and render the overlying skin purple or bright red. Again, they may be associated with trunk and reticular varices, and are present in 90% of adults.

2. Summarise the venous drainage of the lower limb and explain to Sandra why varicose veins develop.



A. Long saphenous system B. Short saphenous system.

The LSV and SSV and their tributaries lie outside the deep fascia and carry only 10% of the venous return from the limb. The LSV begins at the medial end of the dorsal venous arch, crosses in front of the medial malleolus and ascends the medial side of the leg. It penetrates the deep (cribriform) fascia 2.5 cm below and lateral to the pubic tubercle, to enter the common femoral vein at the saphenofemoral junction (SFJ). The SSV starts at the lateral end of the dorsal venous arch, passes posterior to the lateral malleolus, then ascends the median line of the calf to join the popliteal vein at the saphenopopliteal junction (SPJ), usually just above the knee. Anatomical variations are common. The deep venous system comprises intramuscular veins and axial veins that accompany the main arteries; they are usually paired in the calf. Communicating veins perforate the deep fascia to connect the superficial and deep systems.

Weight-bearing compresses the veins in the sole of the foot, which propels blood into the calf ('foot pump'). Pushing off is associated with calf muscle contraction and the compression of venous blood in the muscular sinuses and axial veins; this propels blood further up the leg ('calf pump'). When the leg is lifted off the floor and the muscles relax, blood is prevented from refluxing back down the leg by the closure of valves. During this relaxation phase, blood passes from the superficial to the deep veins via perforators, ready to be expelled during the next step. In motionless standing, the venous pressure at the ankle is approximately 100 mmHg: that is, the hydrostatic pressure exerted by the column of venous blood stretching from the ankle to the right atrium. However, upon walking, the mechanisms described above reduce the ankle pressure to less than 25 mmHg (ambulatory venous pressure, AVP). The symptoms and signs of lower limb venous disease are largely due to failure of these protective mechanisms and the presence of a high AVP.

3. What are the key features of your history and examination of Sandra and why?

**History:**

Presenting illness – pain, cosmetic issues, ulceration and swelling, previous DVT/ thrombophlebitis

Past History – Obesity, pregnancy, intra-pelvic pathology

Family history – Varicose veins

**Examination:**

- *stand* the patient with the legs fully exposed.
- *Inspect* the front of the whole leg for tortuous, dilated branches of the LSV Then inspect the back of the calf for varicosities of the SSV. Look to see if the leg is inflamed, swollen or pigmented (secondary to venous stasis).
- *Palpate* the veins. Hard leg veins suggest thrombosis, while tenderness indicates thrombophlebitis. Perform the *cough impulse test*. Put the fingers over the long saphenous vein opening in the groin, medial to the femoral vein. Ask the patient to cough: a fluid thrill is felt if the saphenofemoral valve is incompetent.

**Trendelenburg test:** with the patient lying down, the leg is elevated. Firm pressure is placed on the saphenous opening in the groin, and the patient is instructed to stand. The sign is positive if the veins stay empty until the groin pressure is released (incompetence at the saphenofemoral valve). If the veins fill despite groin pressure, the incompetent valves are in the thigh or calf.

**Perthes' test:** repeat the Trendelenburg test, but when the patient stands, allow some blood to be released and then get him or her to stand up and down on the toes a few times. The veins will become less tense if the perforating calf veins are patent and have competent valves.

If the pattern of affected veins is unusual (e.g. pubic varices), the clinician should try to exclude secondary varicose veins. These may be due to an intrapelvic neoplasm which has obstructed deep venous return.

Chronic venous stasis is one cause of ulceration of the lower leg. This is often associated with pigmentation and eczema, which are due to venous stasis.

4. Outline the aetiology of primary and secondary varicose veins and detail the secondary effects of varicose veins.

#### Primary varicose veins

The exact mechanism by which valvular failure occurs is still disputed. It was originally assumed that a valve or valves in a communication between the deep and superficial systems became incompetent from above downwards, followed by progressive proximodistal destruction of the valves in the superficial system exposed to increased hydrostatic pressure-e.g., in the long saphenous system, saphenofemoral valve incompetence first, followed by dilatation of the vein itself and valve failure throughout its length. Studies with Doppler ultrasound, however, have suggested that branches of the long saphenous vein may become incompetent without or before incompetence at the saphenofemoral junction.

There is little doubt that there is a familial component, but, this apart, there is not a convincing hypothesis of cause. Contributory factors are:

- obesity
- multiple pregnancy-possibly through hormonal effects on the muscle of the vein wall.

#### Secondary varicose veins

These are less common than the primary type but are still frequent in some groups of the population, such as women who have had multiple or complicated pregnancies. Causes are:  
- deep or (less common) superficial venous thrombosis with recanalisation and consequent deep and/or deep-to-superficial valve destruction  
- obstruction with venous hypertension-a proximal injury or obstruction from a tumour  
- congenital or acquired arteriovenous fistulae, with increased pressure and flow being transmitted from the arterial side of the circulation.

#### Complications

- Cosmetic issues – many patients consider their veins unsightly
- A wide variety of lower limb symptoms have been attributed to VV. Lower limb symptoms are present in about half of the adult population, and there is a weak relationship between these symptoms and venous disease. Experience in the clinic confirms a poor relationship between the size and extent of VV on clinical examination and the presence and severity of symptoms claimed (see above).
- Only a small proportion of patients with VV go on to develop the complications of chronic venous insufficiency (CVI): for example, leg ulcers, haemorrhage and thrombophlebitis. There is on-going controversy as to whether VV are a risk factor for DVT

5. What investigations can be undertaken in the assessment of varicose veins and outline Indications and advantages of each method.

There is considerable debate as to which patients with VV should undergo duplex ultrasound. Imaging is particularly helpful in the following situations:

- recurrent VV
- short saphenous VV
- where there is a suspicion of deep venous pathology: for example, previous DVT or skin changes of CVI
- atypical distribution.

Severe varicose veins, especially if in children, of atypical distribution or associated with cutaneous

haemangioma, soft-tissue hypertrophy or limb overgrowth, should raise the suspicion of congenital arteriovenous malformations. In modern practice, it is increasingly unusual for any patient to undergo interventional treatment for VV without first having had a duplex ultrasound scan.

6. Sandra explains that during her third pregnancy she was advised to wear support stockings, this was difficult as she was pregnant during the summer. Summarise the use of compression hose in the management of varicose veins.

The indications are:

- mild symptoms
- those without skin changes
- the elderly
- those who refuse other treatment
- most pregnant women.

It is important that any garments used should produce linear graduated compression, with the highest compression just above the malleoli and pressure decreasing towards the knee. Badly fitted supports or those which do not achieve graduated compression can produce more annoyance than relief and, on occasion, cause damage to the skin. Poor choice of stockings drastically increases the frequency of non-compliance. Patients should be instructed to apply compression hose before they get up in the morning and only to remove the support last thing at night.

7. Sandra has seen a number of advertisements for ‘injections’ she asks if she should have this done. Outline the technique of sclerotherapy in the management of varicose veins. What are the indications and complications of this procedure?

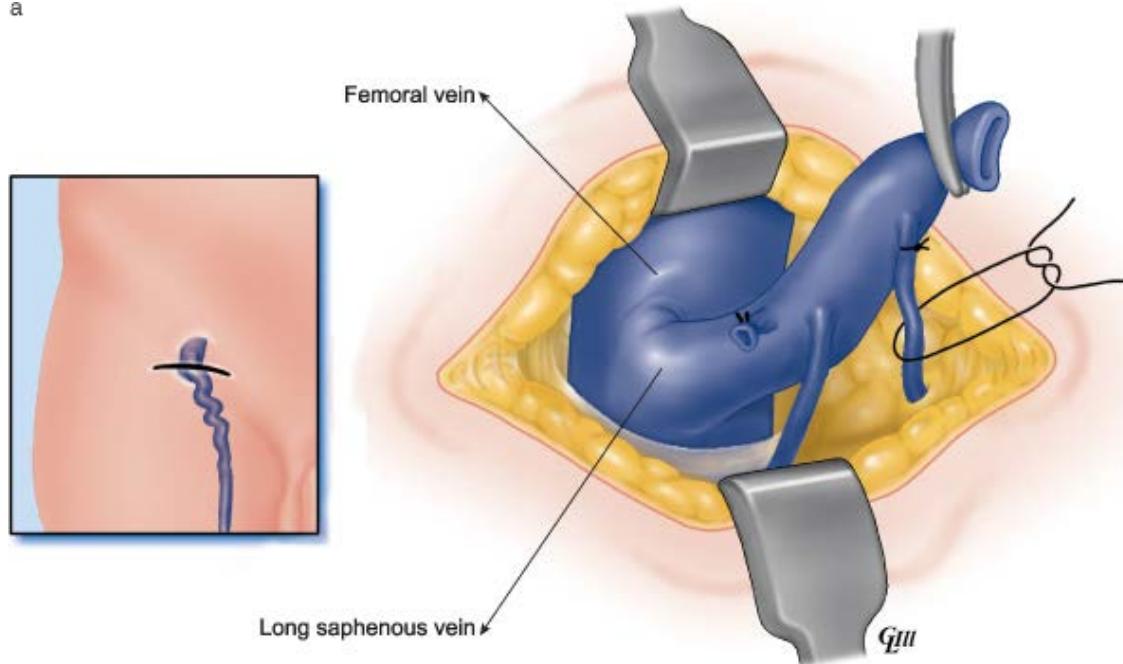
Standard injection treatment using liquid sclerosants is commonly used for small varices below the knee that are due to incompetence of local perforators, for small recurrent varices after surgery, and for reticular and spider veins. Such sclerotherapy is not satisfactory for trunk varices associated with saphenofemoral or saphenopopliteal incompetence, as recurrence is inevitable. However, ultrasound-guided foam sclerotherapy (UGFS) appears to be an equally effective alternative to surgery in a proportion of patients. In this procedure, the sclerosant is prepared and used as foam, and introduced into the LSV or SSV under direct vision using duplex ultrasound control. UGFS can be performed as an outpatient procedure with no requirement for general anaesthesia, skin incisions or time off work.

8. What are the indications and contraindications for surgery in the management of varicose veins? Briefly outline the surgical techniques of saphenofemoral and saphenopopliteal ligation.

History or physical finding	Indication	Contraindication
Pain	Definite if established as not due to another cause	Doubt as to cause
Phlebitis	Varicose veins the only cause	Other conditions not excluded
Bleeding	Episode of considerable bleeding	Minor bleeding, systemic disorder not excluded
Skin and subcutaneous changes	To prevent ulceration	Deep venous disease must be excluded
Ulceration	Adjunct to healing	Surgery not able to correct venous hypertension

The aim is to interrupt by ligation the major points of incompetence between the superficial and deep venous systems and, if appropriate, to remove the varices for both functional and cosmetic reasons. The two most common operations are saphenofemoral and saphenopopliteal ligation.

In the saphenofemoral ligation great care has to be taken to demonstrate the anatomical arrangement of the tributary veins precisely, because failure to make a flush ligation of the junction of the saphenous with the femoral is the main cause of recurrence. The procedure is usually combined with removal of the saphenous trunk down to a variable level in the calf by stripping, i.e. passing a flexible guide down the lumen of the vein, securing it to the divided vein and forcibly removing the vein subcutaneously. This not only improves the cosmetic result but seems also to be associated with fewer recurrences, perhaps because small incompetent perforating connections are avulsed.



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