

DEFINITION

1. Varicose veins are veins affected by saccular dilatation. The dilatation is permanent and tends to be accompanied by lengthening and tortuosity.
2. While varicose veins may occur in other parts of the body, the most common site is in the lower limbs. This Appendix concerns only varicose veins in the lower limbs, whether primary or of secondary causation.

CLINICAL MANIFESTATIONS

3. The milder degrees of varicose veins may be symptomless and they are often only brought to notice because of the cosmetic effect of the enlarged veins. Their extent, prominence and tortuosity vary; they may be widespread in both legs or they may be confined to a single varix in one or other leg.
4. The commonest symptom is a tired and aching sensation felt in the whole of the lower leg, especially in the calf, towards the end of the day. Sharp pains, when present, are localised to the site of the varices and are especially noticeable in dilated thigh veins. The ankles may swell towards evening and the skin of the leg may itch. Cramps in the calf of the leg may occur shortly after retiring to bed.
5. The relationship between pain and the visible degree of dilatation and tortuosity is extremely variable from patient to patient. Women tend to suffer more pain than do men with varicosities of similar severity, but the reason for this is obscure.
6. **Secondary effects** may occur, including:
 - 6.1. **Ankle oedema**, which is usually mild and noticeable only towards the end of the day. More severe oedema is likely to have another cause.
 - 6.2. **Skin pigmentation**, which occurs in long-standing cases due to gradual extravasation and the deposition of blood pigment. In some cases this progresses to include induration and inflammation, a combination called lipodermatosclerosis.
 - 6.3. **Varicose eczema**, which may follow minor trauma, chronic irritation due to scratching or deposition of blood pigment and the use of ointments or strapping.
 - 6.4. **Varicose ulceration**, which invariably occurs in the lower half of the leg above the ankle and which is more common in long-standing cases. This is a painful and sometimes intractable condition.
 - 6.5. **Thrombophlebitis** (clotting of the blood with inflammatory changes in the walls of the veins) of superficial veins, often precipitated by minor trauma or a period of bed rest, but in many cases with no predisposing cause.
 - 6.6. **Haemorrhage**, often profuse, which may follow spontaneous rupture of a diseased vein, ulceration or trauma. Subcutaneous haemorrhage from varicose veins causing bruising is a common, alarming but not dangerous, occurrence in the elderly.

7. Varicose veins have a propensity to recur after treatment, more so when this has involved sclerosing injections rather than radical surgery. The wearing of elastic stockings, especially those giving graduated compression, may be helpful in relieving discomfort but has no curative value.

AETIOLOGY

8. To appreciate how varicose veins arise, reference must be made to certain features of the venous circulation of the lower limbs. Venous blood is returned to the heart by virtue of the negative pressure in the thorax and the *vis-a-tergo* (pushing force) of the circulation, as veins have only slight intrinsic pulsatile contractility. In the lower limbs, where gravity hampers the venous return, the veins have valves which allow flow only towards the heart. The superficial veins lie supported in the loose tissues underneath the skin and empty into the deep veins through a series of communicating veins which perforate the deep fascia. The deep veins form large channels in the powerful muscles of the calf and thigh which, in turn, are surrounded by dense, unyielding fascia. These deep veins are compressed by every muscular action of the lower limbs, pumping blood towards the heart. When the limbs are in action, the pressure in the deep veins is high and fluctuant whilst that in the superficial veins is low as they empty into the "venous pump". Any failure of the valve system results in reflux, raising the pressure in the ill-supported superficial veins and varicose veins may result.
9. **Primary varicose veins.**
 - 9.1. Primary varicose veins are widespread, affecting 10-20% of people in Western countries. In Eastern countries, the prevalence is lower. In India and Africa particularly in those countries where the way of life is more traditional, it is very much lower. The reasons for these wide differences are unclear, but **diet** is thought to be one factor and **physical stature** another. A comparative study showed that German soldiers were six times more likely to have varicose veins than their Japanese counterparts. On the other hand, there is a very low incidence in Zulus who are a very tall race.
 - 9.2. Primary varicose veins may occur at any **age** from adolescence onwards. Sophisticated studies (e.g. by duplex scanning) have detected symptomless venous reflux in cohorts of children as young as 10-12 years of age. 8% of these children had obvious varicosities by the age of 20. The prevalence of varicose veins rises to about 50% in the over-50's, although many cases are mild and need no treatment. Incidence peaks between the ages of 50 and 60 years, falling in old age.
 - 9.3. There is a definite **hereditary factor**. Different surveys have elicited a parental or family incidence of varicose veins in proportions of the cases surveyed varying from 43% to almost 90%. 80% of patients seeking treatment for varicose veins report a family history. Several members of a family in successive generations may not only suffer from varicosity but not infrequently the same portion of the same vein is found to be involved. The pattern of heredity is believed to be polygenic rather than one of simple dominance. Unfortunately, no twin study is available.

- 9.4. The **hereditary weakness** causing varicosities was originally believed to be confined to the valves themselves, and indeed the valves may be irregularly arranged, deformed, fewer than normal in number, or otherwise deficient. Evidence to the contrary came from studies which showed that that dilatation often begins proximal (referring to direction of flow) to valves. It is known that dilatation is eccentric, while valves are concentric. It is now generally accepted that the abnormality is a more generalised weakness of the walls of the veins. Varicose veins contain relatively more muscle and elastin, but less collagen than normal veins. Further support for this view is in the behaviour of vein grafts and patches in arteries. Sections of normal saphenous vein withstand arterial pressure, whereas sections of varicose vein dilate or develop aneurysms.
- 9.5. **Gender** is a significant factor. Men are affected less frequently than women and this difference is independent of the increased incidence associated with parity. Women with neither parent having varicose veins have a 10% risk of developing varices, but 80% when both parents are affected.
- 9.6. **Parity** increases the risk of developing varicose veins. In a study of over 400 women with varices, 13% were primiparous, 30% secundiparous and 57% multiparous. It is believed that hormonal changes, particularly increased oestrogen, is the responsible factor. Uterine pressure on the iliac veins in advanced pregnancy may contribute. However, although the left common iliac vein is more vulnerable to compression, varicosities are not more likely to appear in the left leg than in the right.
- 9.7. Many observers believe that an important factor in the production of varicosities in those with the hereditary endowment is the increase in venous pressure which results from the human being's **erect posture**. In support of this view is the fact that varicose veins are exceedingly rare in the upper limbs, commoner in taller people and not seen in quadrupeds.
- 9.8. **Occupation** Evidence on the relation between occupation - particularly the time spent standing still, and risk of varicose veins is limited. Published studies are old and outcome conflicting. The suggested association of standing at work and risk of varicose veins is confined to women and in particular western Europeans and Americans. No such increase was found in Egyptian female cotton workers, more of whom stood at work and for longer periods than English equivalents. It has been suggested that the different risks may relate to attitudes to corsetry in the different communities.
- 9.9. The existence of a haemodynamic abnormality as a factor in the causation of primary varicose veins has been postulated but, so far, not proven.
10. **Secondary varicose veins** result from damage to the valves of the veins or, less frequently, obstruction of the venous flow. The commonest causes are:
 - 10.1. Phlebothrombosis (deep vein thrombosis)
 - 10.2. Thrombophlebitis
 - 10.3. Increased intra-abdominal pressure, such as in pregnancy (but see paragraph 9.5 above), ascites, abdominal tumour or aneurysm.

10.4. Arterio-venous aneurysm.

10.5. Obesity is said to predispose to both venous thrombosis and varicose veins and it may be that increased pressure is exercised on the main intra-abdominal veins, impeding the blood flow from the lower limbs.

11. **Physical activity and strain**

11.1. Activities such as walking, marching, running, jumping, climbing or physical strain generally aid the return of the blood to the heart and therefore can never be the cause of varicose veins. However, these factors, especially when operating over a prolonged period may aggravate varicose veins which are already established.

11.2. The wearing of heavy boots, anklets or gaiters does not impede the return of venous blood to the heart and plays no part in the development or progress of varicose veins.

11.3. Sedentary occupations carry no risk for the development or progress of varicose veins.

CONCLUSION

12. **Primary varicose veins** are the most common type of varicose veins and arise spontaneously as a result of inherited structural defects in the walls of the veins. Predisposing factors include age, female gender, parity, and race.

13. The aetiology of **secondary varicose veins** is that of the underlying condition causing the varicosities. Both types may be aggravated by certain activities.

REFERENCES

Browse N L, Burnand K G, Irvine A T and Wilson N M. Diseases of the Veins. 2nd Ed. 1999. London. Arnold. p145-169.

Lake M et al. Arteriosclerosis and varicose veins: Occupational activities and other factors. JAMA 1943;119:696-701

Mekky S et al. Varicose veins in women cotton workers. An epidemiological study in England and Egypt. BMJ 1969;2:591-595

Russel R C G, Williams N S and Bulstrode C J K (Eds). Bailey and Love's Short Practice of Surgery. 23rd Ed. 2000. London. Arnold. p237-240.

June 2002