Varicose veins and their management

Roshan Bootun
Sarah Onida
Tristan RA Lane
Alun H Davies

Abstract

Varicose veins are a common condition, affecting up to a quarter of the UK population. They have been shown to negatively impact on patients' quality of life and are an important cause of morbidity. The treatment of varicose veins has, in turn, been shown to improve the quality of life of patients. Traditional techniques of saphenofemoral and saphenopopliteal junction ligation with or without vein stripping have been the mainstay of treatment for a long time. However, over the past 15 years, day-case minimally invasive endovascular interventions carried out under local anaesthetic have gradually replaced surgical methods. Nowadays, the majority of procedures are carried out using one of the endothermal ablation techniques (radiofrequency ablation [RFA] or endovenous laser ablation [EVLA]). However, these endothermal methods are often associated with discomfort as well as complications due to the use of heat energy. Recently, newer non-thermal, non-tumescent (NTNT) ablation techniques have been launched with the promise of similar effectiveness, but with less pain. This article discusses epidemiology, diagnosis and management of varicose veins, including the latest endovascular and targeted open surgical techniques.

Keywords Ablation; cyanoacrylate; endovenous; haemodynamic; laser; mechano-chemical; radiofrequency; sclerotherapy; surgery; varicose veins

Definition

Varicose veins are common and affect 20–64% of the population.[1] They are a manifestation of chronic venous disease (CVD) and are characterized by tortuous, dilated superficial veins >3 mm in diameter. The condition can occur anywhere in the body where there is poor venous return, but it is most often associated with the lower limb. Along with causing significant physical and physiological morbidity, varicose veins are known to have a negative impact on patients' quality of life.[2]

Epidemiology

Venous disease is extremely common, with similar incidences reported across the world. Spider veins (fine, dilated intradermal venules approximately 1 mm in diameter) affect up to 80% of the population[1] while the reported incidence of varicose veins is variable, ranging from 20% to 64%.

The main risk factors for the development of venous disease include family history, age, pregnancy, previous deep venous thrombosis (DVT) and congenital conditions such as Klippel–Trenaunay syndrome. Female gender is also considered to be a predisposing factor, although studies have shown similarly high prevalence in both males and females. There is currently insufficient evidence to implicate obesity, standing posture at work and physical activity in the aetiology of varicose veins.

Although highly prevalent, varicose veins are rarely life-threatening. However, despite their benign nature, they cause significant quality of life impairments.[3] They are also expensive, their treatment accounting for approximately £40 million of NHS expenditure in 2005–6. Progression of venous disease to venous ulceration leads to vast costs – it is estimated that 2% of the NHS budget is spent on venous disease and venous leg ulcers.[4]

Varicose veins occur because of impairment of venous return secondary to reflux, obstruction or calf muscle-pump failure. The exact aetiology is unclear. What is known is that there is an increase in distal venous pressures, leading to the cutaneous changes typical of the disease.

Primary varicosities are due to incompetence in the superficial veins, often located at connections between the deep and superficial systems (saphenofemoral junction [SFJ], saphenopopliteal junction [SPJ] or perforating veins). This leads to enlarged, thin-walled veins with incompetent valves. It is still unclear whether the triggering event is valvular incompetence leading to vein wall stretching or a primary vein wall failure leading to valve leaflet separation and the resulting venous incompetence. Numerous research efforts are being concentrated to answer this question. Varicose veins most commonly occur in the great (GSV) and/or small saphenous vein (SSV) distribution (Figure 1). Surface examination can, however, be misleading.

Secondary varicosities arise as a result of pathology (often in the deep venous system) that has led to venous hypertension in the superficial system. Examples are DVT, deep venous incompetence or pressure on the pelvic veins from an intra-abdominal mass. The underlying pathology is best investigated by venous duplex and ultrasound abdomen/pelvis.

Diagnosis

Varicose veins are a significant cause of morbidity, affecting patients' quality of life.[2] Common symptoms include pain, achiness, heaviness, swelling, restless legs, cramps and itching. These correlate well with clinical disease severity.[2] On the other hand, there does not seem to be any correlation between varicose vein diameter and symptoms and quality of life.

Roshan Bootun ***BSc MBBS MRCS*** *is a Clinical Research Fellow in Vascular Surgery at Imperial College London, United Kingdom. Conflicts of interest: none.*

Sarah Onida ***BSc MBBS MRCS*** *is a Clinical Research Fellow in Vascular Surgery at Imperial College London and Vascular Surgery Training Registrar in the Yorkshire Deanery, United Kingdom. Conflicts of interest: none.*

Tristan R A Lane ***MBBS BSc MRCS PhD*** *is a Honorary Clinical Research Fellow in Vascular Surgery at Imperial College London and Vascular Surgery Training Registrar in the London Deanery, United Kingdom. Conflicts of interest: none.*

Alun H Davies ***MA DM FRCS*** *is Professor of Vascular Surgery at Imperial College London and Honorary Consultant Vascular Surgeon at Imperial College Healthcare NHS Trust, London, United Kingdom. Conflicts of interest: none.*

Figure 1 Varicose veins in the (**a**) long saphenous and (**b**) short saphenous vein distribution.

Symptoms are exacerbated by standing stationary or long sedentary periods and may be worse towards the end of the day. Leg elevation helps reduce the associated swelling, whilst walking significantly improves the symptoms, due to calf-pump action reducing the venous pressure.

When assessing these patients, it is important to rule out other diagnoses that may account for similar symptoms, including arterial, neurological and musculoskeletal disease. A history of DVT, previous leg trauma, venous surgery and a family history of DVT and hypercoagulable states are important.

Examination

When examining the patient with varicose veins, it is important to assess for significant complications of this disease process, such as progressive skin changes, superficial thrombophlebitis and bleeding varicosities.

Skin changes consist of venous eczema, lipodermatosclerosis, haemosiderin deposition, ulceration and atrophie blanche (scarring at sites of previous ulceration) (Figure 2). These are most commonly found around the malleolar, or gaiter, area.

Superficial thrombophlebitis is inflammation of the vein, which thromboses, becoming tender and erythematous. This is commonly treated with non-steroidal anti-inflammatory drugs and compression. Recently, however, anticoagulants (e.g. low molecular weight heparins) are commonly used to treat superficial thrombophlebitis close to the saphenofemoral and saphenopopliteal junctions.

Large, prominent varicosities may be prone to bleeding, either spontaneously or as a result of trauma. This is an indication for urgent treatment of varicose veins.

The patient should be assessed initially standing, allowing the veins to fill. A full neurovascular examination should be performed, paying particular attention to the assessment of the arterial vascular system. Hand-held Doppler (HHD) may be used as an adjunct in the clinical examination, to assess for the presence and level of incompetence. However, it is not an accurate tool and cannot be depended upon—at the SFJ and SPJ the reported sensitivity has been as low as 56% and 23%, respectively.

Classification and outcome measurement

The CEAP (Clinical, Etiology, Anatomy, Pathophysiology) classification was developed in 1994 to describe the severity and aetiology of lower limb venous disease. The adoption of this system has allowed a standardized approach, enabling correlation between different studies and units (Box 1). This classification is, however, not useful as an outcome measure following treatment of varicose vein disease as the CEAP classification is rather static (e.g. a patient with skin changes will still be at CEAP clinical class 4 after treatment).

Figure 2 Venous ulceration over the medial malleolus (gaiter area).