18 Management of Venous Insufficiency

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18.1 Introduction

Venous insufficiency is perhaps the commonest chronic disorder in the Western world affecting an estimated 32% of women and 40% of men (Evans et al. 1999). Its effects range from mild cosmetic disturbances to painful and infected ulcers and in extreme cases even death from haemorrhage (Morrow et al. 1994). It is a much neglected and often misunderstood health problem and studies have shown patients to be very dissatisfied with existing treatment options (Davies et al. 1995). Chronic ulceration in particular is a considerable problem with a prevalence of 0.5%–1.5% and a source of great pain and distress to this large group of patients (Callam 1994).

18.2 Anatomy and Physiology of the Venous System

The venous system serves two functions; first to carry deoxygenated blood back to the heart and secondly to act as a reservoir of blood which can be utilised in the event of sudden volume loss. In the leg, there are two main sets of veins, superficial and deep. Superficial veins lie near the surface enclosed between layers of superficial fascia. The two main superficial veins are the greater saphenous vein (GSV) and the small saphenous vein (SSV). Deep veins lie between the muscle groups of the leg, and these muscles in turn are surrounded by the deep fascia. The main deep veins are the posterior tibial vein, anterior tibial vein, peroneal vein (all these three are usually paired making six in all), gastrocnemius vein, popliteal vein, deep femoral vein, femoral vein and the common femoral vein. [Note that the vein which accompanies the superficial femoral artery is called the femoral vein rather than the superficial vein to avoid confusing deep venous thrombosis (DVT) for superficial thrombophlebitis]. In addition to these main trunks, there are numerous other veins of great importance in the genesis and explanation of venous insufficiency. There are innumerable perforating veins, which connect the deep and superficial systems together through
natural defects in the deep fascia. Some common ones have names: Hunterian, mid/upper thigh; Dodd, just above the knee; Boyd, just below the knee; Cockett, just above the ankle. Tributaries to the saphenous veins lie above the superficial fascia. Communicating veins join veins which lie within the same fascial plane. Finally there is an important plexus of small superficial veins on the outside of the thigh; the lateral subdermic venous system (LSVS).

Within the main truncal veins, both deep and superficial, lie bicuspid valves, which allow flow only in a proximal direction. Similar valves lie in the perforators which allow flow only from the superficial to the deep veins. The mechanisms by which the peripheral veins perform their dual functions are described below.

The reservoir function is quite simple to understand. In the erect position blood tends to pool under the effect of gravity and the veins distend accommodating considerable quantities of blood (Buckley et al. 1988).

At times of crisis when extra blood is required these veins can be emptied. For example, when there is significant blood loss due to haemorrhage venoconstriction will occur. In addition, the casualty is placed in the supine position with the legs raised.

The most important function of the veins, however, is to carry blood back to the heart. In the erect position this is accomplished by the action of what is sometimes referred to as the peripheral heart (Bouissou et al. 1988) or muscle pump. This comprises the muscles of the leg (especially the calf muscles) and the superficial and deep veins with their valves. Much of the deoxygenated blood from the legs is initially collected in the superficial veins. The cycle starts with the muscles relaxed and the superficial and deep veins full of blood. Contractions of the muscles compress the deep veins. The valves in the veins prevent the blood within them travelling peripherally to any significant degree and most of the blood is therefore forced upwards towards the heart. The valves in the perforating veins also prevent the blood being pushed out into the superficial veins. On relaxation of the calf muscles, the pressure within the veins surrounded by the muscle reduces and the valves above the muscles close. The valves below and in any associated perforating veins open and blood is allowed into the deep veins. The cycle is then repeated. Normally this mechanism maintains leg venous pressure at low levels and balances leg blood inflow and outflow.

18.3 Venous Insufficiency

Venous insufficiency results when the mechanism described above fails. This can occur for several reasons:
1. Reduced contraction of calf muscles
2. Valve failure
3. Deep vein obstruction

Valve failure and deep venous obstruction are the relevant causes from the perspective of this chapter.

18.3.1 Valve Failure

By far the most common cause for this is a familial predisposition. Other causes include damage from previous thrombosis, primary agenesis of deep vein valves, high pressure transmitted through incompetent perforators into the superficial veins which then distend and prevent the valve cusps closing together and hormonal effects such as in pregnancy, causing the veins and valves to soften and distend.

18.3.2 Deep Vein Obstruction

Deep venous obstruction occurs most commonly as a result of deep venous thrombosis (DVT). This may be precipitated by factors such as surgery, prolonged immobilisation, pregnancy and pelvic tumours. In addition, there are uncommon congenital causes of deep venous obstruction which will not be addressed further.

18.3.3 The Effects of Venous Insufficiency

The most common manifestation is varicose veins. These are superficial veins which are contained only by loose subcutaneous tissues and have been distended as a result of prolonged high pressure. They become enlarged, tortuous and highly visible (except if covered by excessive body fat).

Even more commonly encountered but less distressing are telangiectasias or thread veins. Both varicose veins and telangiectasias are often associated with symptoms which are poorly related to the