The superficial veins of the leg

Introduction

The superficial veins of the leg – the great (long) and small (short) saphenous veins and their tributaries – are of great clinical importance. They are used as vascular conduits and patches (in both instances the great saphenous is more commonly used), and, of course, they are both subject to the development of varicosities (varicose veins). They come to our attention in the diagnosis and management of this all too common condition.

The great saphenous vein

Because of its use as a vascular conduit, as a site for venous access and, most commonly, in varicose vein surgery, the anatomy of the great (or long) saphenous vein (*Figure 1*) is of considerable importance.

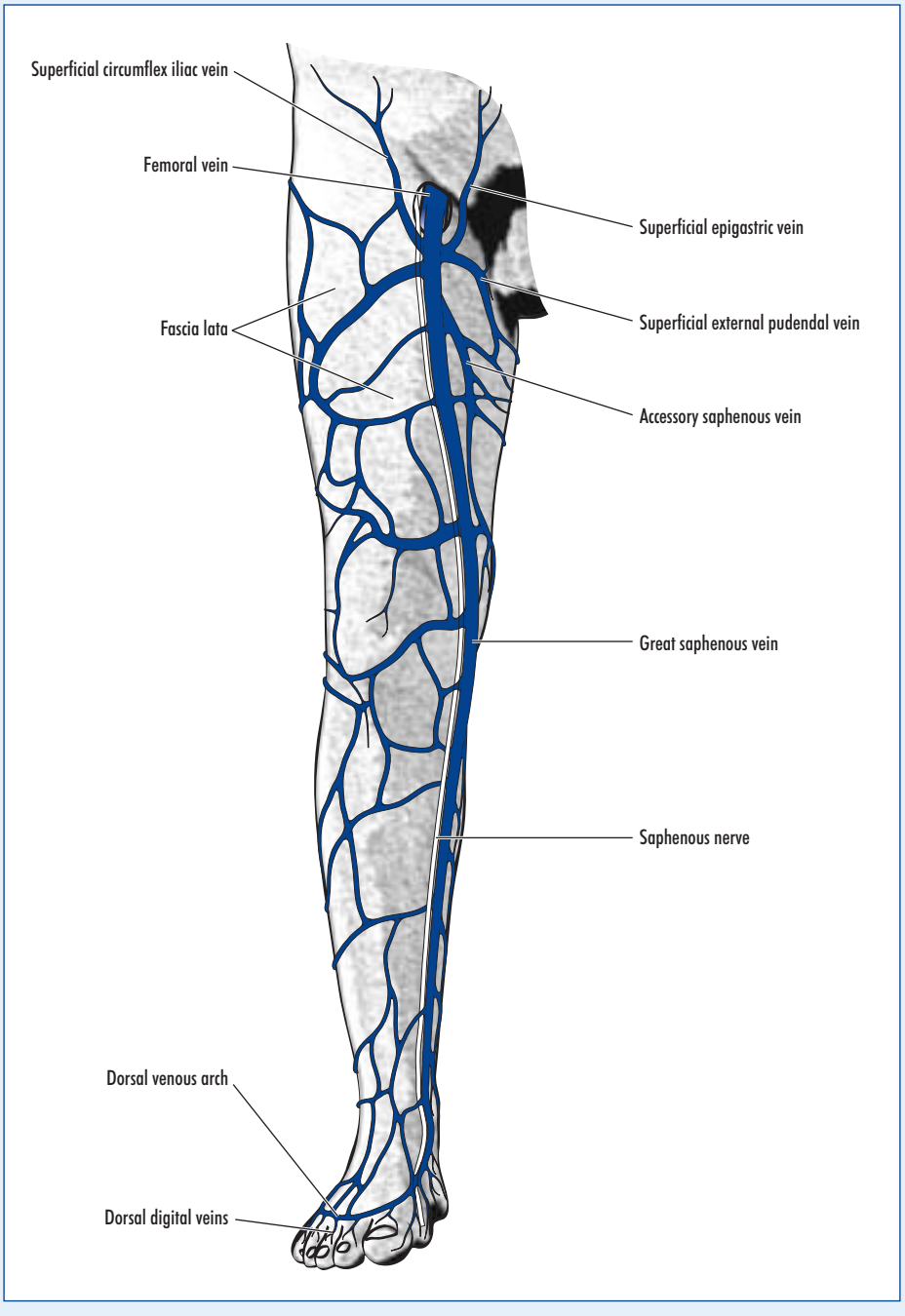
It commences as the upward extension of the medial marginal vein of the dorsal venous plexus of the foot and passes constantly (an unusual adverb for any vein) in front of the medial malleolus of the ankle, where it is easily visible in the standing position. This is a constant, and useful, site for a venous cut-down. It is closely related to the saphenous nerve, a cutaneous sensory branch of the femoral nerve, which runs either in front or behind the vein. This nerve is all too often injured in performing a cut-down on the vein at the ankle, with resultant pain, numbness and/or paraesthesiae along the medial side of the foot, so do not cut or clamp any white strand adjacent to the vein.

The vein then passes up the medial side of the leg, lies a hand's breadth behind the medial border of the patella, spirals round to the medial aspect of the thigh, then pierces the fascia lata at the groin to enter the common femoral vein just distal to the inguinal ligament. The surface marking of the great saphenous vein at the groin is important, since it is exposed here in performing its high ligation in varicose vein surgery. The femoral artery pulse is located; this lies halfway between the anterior superior iliac spine and the pubic symphysis, i.e. the mid line. The finger tip is placed on the pulse and the adjacent finger placed along its medial side; this lies immediately over the proximal end of the femoral vein and therefore immediately over the termination of the great saphenous vein – nothing could be simpler.

Avoiding inadvertent injury

Sadly, all too often we hear of inadvertent injury to the femoral vein in varicose vein surgery, where it has been mistaken for the termination of the great saphenous vein. This is avoided if two simple anatomical facts are kept in mind. First, the great saphenous vein and its tributaries lie in the superficial fascia, i.e. the subcutaneous fat. The femoral vein lies deep to the deep fascia

Figure 1. The great saphenous vein and its tributaries.



Professor Harold Ellis *is Clinical Anatomist, Guy's, King's and St Thomas' School of Biomedical Science, London SE1 1UL*

of the thigh, quite a tough membraneous sheet (the fascia lata), which the great saphenous vein has to traverse at the saphenous opening. Second, it is the termination of the great saphenous vein that receives the tributaries, described in the next paragraph, while the femoral vein only receives the termination of the great saphenous itself.

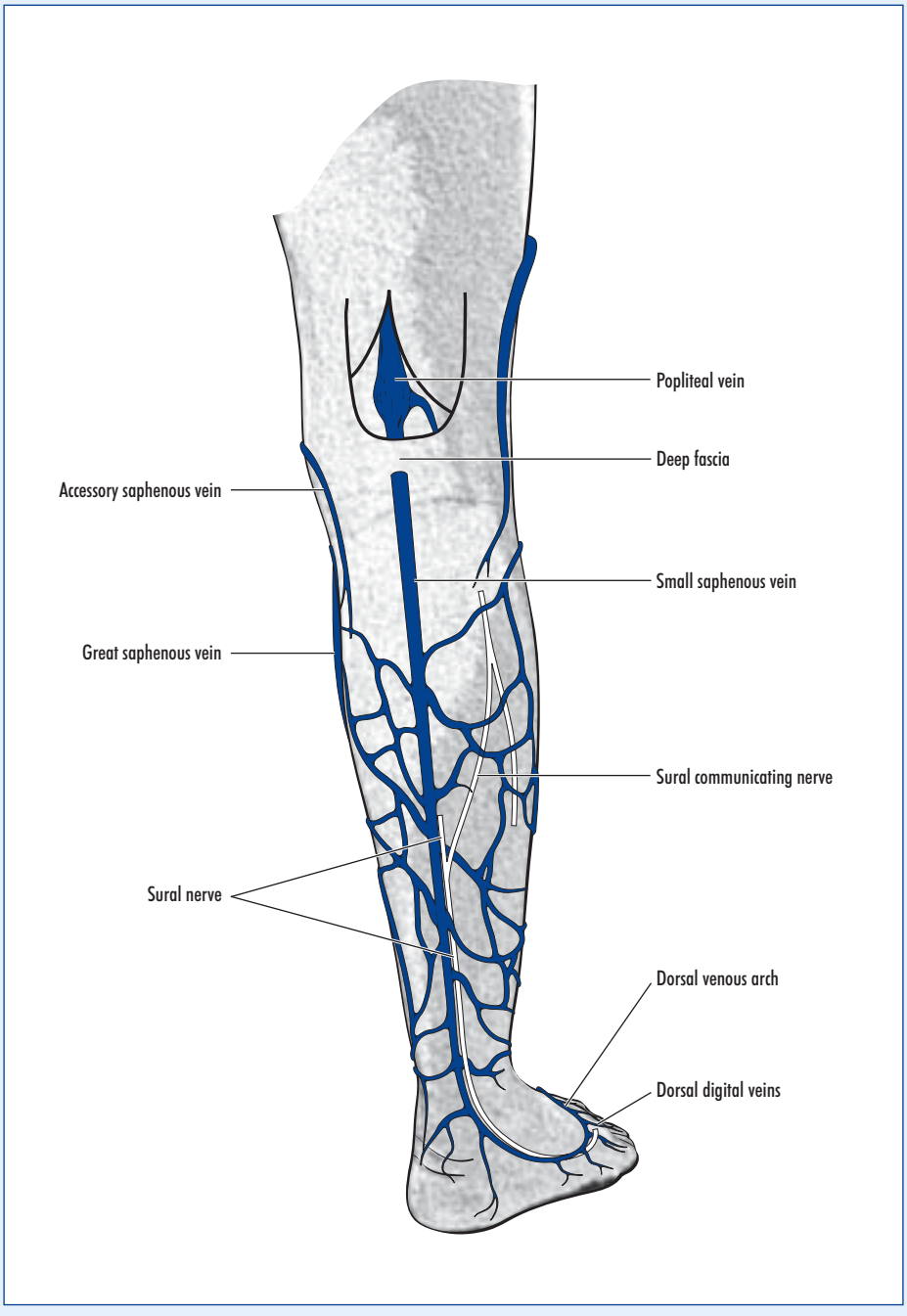
Tributaries and perforating veins

The tributaries of the vein are variable. There are usually three at the groin, the superficial inferior epigastric, the superficial external pudendal and the superficial circumflex iliac. However, these may join together to form one or two tributaries, or there may be up to seven branches to be found.

Perforating veins, guarded by valves, which drain into the deep system of veins, pierce the deep fascia along the course of the vein. One fairly constant one is at the mid-thigh, and a number lie along the medial border of the tibia – the calf perforators.

Variations are common; the vein may be duplicated, especially distal to the knee, while in the thigh there may be one or more large anteromedial and posteromedial tributaries, the latter sometimes named the accessory saphenous vein. A high communication of this with the main vein may result in what is in effect a duplication of the great saphenous vein right up to its termination.

Figure 2. The small saphenous vein and its tributaries.



The small saphenous vein

The small (short) saphenous vein (*Figure 2*) commences as the termination of the lateral side of the dorsal venous arch of the foot and ascends, in company with the (cutaneous) sural nerve from behind the lateral malleolus along the middle of the calf. Of course, this close relationship puts the nerve at danger of injury in operations on the vein. The vein pierces the deep fascia anywhere from the mid-calf to the popliteal fossa to enter the popliteal vein behind the knee. It communicates by several channels with the great saphenous vein.

Note that both the great and small veins relate to cutaneous nerves – the saphenous nerve at the ankle and calf and the sural nerve in the calf. Both are at risk of injury in vein surgery, with numbness, pain and paraesthesiae and a dissatisfied patient. This complication is avoided by careful dissection and ensuring that the vein, and only the vein, is picked up at operation, and the 'white strand' alongside it is carefully avoided. BJHM

Conflict of interest: none.

KEY POINTS

- The superficial veins of the leg comprise the great (long) saphenous and the small (short) saphenous vein, which lie in the superficial fascia.
- They connect to the deep veins of the leg by piercing the deep fascia at the groin and popliteal fossa respectively, as well as having other perforator connections.
- Both are accompanied by a cutaneous sensory nerve – the saphenous and sural nerve respectively. These may be damaged in surgery on the veins.
- The exact anatomy of the superficial veins is important in varicose vein surgery, in performing a cut-down for transfusion and in vein harvesting for vascular conduits.