THE ANATOMY OF THE VENOUS SYSTEM OF THE LOWER LIMB

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The venous system of the lower limb can be divided anatomi cally into the superficial venous system , which is located within the superficial tissues, and the deep venous system beneath the deep fascia of the leg, accompanying the arterial tree. The superficial veins drain into the deep system, either at junctions or via fascial perforating veins, and the deep veins then return blood to the right atrium of the heart. V enous anatomy is characteristically variable. The terminology used below is consistent with international consensus. The deep veins of the lower limb (Figure 62.1a) include three pairs of venae comitantes, which accompany the three crural arteries (anterior and posterior tibial and peroneal arter ies). These six veins intercommunicate and come together in the popliteal fossa to form the popliteal vein, which also receives the soleal and gastrocnemius veins. The popliteal vein passes up through the adductor hiatus to enter the subsartorial canal as the femoral vein, w hich receives the deep (profunda) femoral vein (or veins) in the femoral triangle before passing behind the inguinal ligament to become the external iliac vein. The internal iliac vein combines with the external iliac vein in the pelvis to form the common iliac vein. The left common iliac vein passes behind the right common iliac artery to join the right common iliac vein on the right side of the abdominal aorta to form the inferior vena cava, which goes on to the right atrium. Far more anatomical variations exist within the superficial veins of the lower limb, but there are almost always two trunks - or axes – the great and small saphenous veins (Figur e 62.1b,c). These lie superficial to the fascia lata (deep fascia) but deep to - the saphenous fascia, in the saphenous ‘envelope’. As the sole of the foot is often placed under significant pressure, the majority of the venous drainage of the foot is into the dorsal venous arch, running in the subcutaneous tissues over the metatarsal heads. T he medial end of this arch drains into the first axis: the great saphenous vein (GSV). This is the longest vein in the body and is the most frequently a ff ected by superficial incompetence. The GSV passes anterior to the - medial malleolus and ascends the leg accompanied by the saphenous nerve in the superficial tissues medial to the tibia, , looping posteriorly at the level of the medial condyle of the femur and continuing in the medial thigh. In the groin, it unites with tributaries corresponding to the arterial branches of the common femoral artery , before piercing the cribriform fascia covering the saphenous opening (approximately 2.5 /uni00A0 cm below and lateral to the pubic tubercle, but often somewhat higher) and terminates by draining into the common femoral vein (CFV) at the saphenofemoral junction (SFJ). Throughout its course the GSV unites variably with other superficial - tributaries. /uni00A0 The anterior accessory of the great saphenous vein (AAGSV) is one of the

most common. This is often seen originating around the lateral border of the knee, although it sometimes originates as low as the lateral end of the dorsal venous arch. Occasionally , this vein may also course up the medial aspect of the thigh, anterolateral to the GSV and

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following its course. In this instance, its origin is typically a confluence of small tributaries around the knee. There is usually an in-line GSV axis passing uninterrupted from the foot (in some cases this may be hypoplastic), but this pattern of AAGSV is commonly mistaken for the GSV itself (some surgeons will call this a duplex GSV; a true duplex GSV is rare). The AAGSV may drain into the GSV in the thigh, but is typically at or near the junction itself. The small saphenous vein (SSV) originates from the lateral side of the dorsal venous arch and accompanies the sural nerve as it passes posterior to the lateral malleolus, then upwards in the posterior midline of the leg. In the proximal calf it is usually found sitting in the groove between the two muscular heads of gastrocnemius. Its termination commonly occurs by piercing the fascia of the popliteal fossa to drain into the popliteal vein at the saphenopopliteal junction (SPJ). However, this junction is highly variable and the vein may terminate as low as the mid-calf. The SSV may extend cranially beyond the SPJ, in which case it is known as either a cranial extension of the SSV , which terminates by piercing the fascia in the posterior thigh to drain into the deep system, or the Giacomini vein, which communicates with the GSV system occasionally joining the GSV at or about the SFJ. In some cases, the SSV does not terminate at or below the popliteal fossa at all, but continues on as described above. In the calf and thigh there are a number of valved perforat ing (communicating) veins that join the superficial to the deep veins at inconstant sites and which allow blood to flow from the superficial to the deep venous system. The most important of these are the direct perforating veins of the medial and la calf and the communicating veins around the knee and in the mid-thigh. Carlo Giacomini , 1840–1898, anatomist, Turin, Italy . On his death he left his skeleton to the Anatomical Museum in Turin. Ernest Henry Starling , 1866–1927, physiologist, University College, London, UK.

femoral vein Saphenofemoral junction Super /f_i cial Profunda femoral femoral vein vein Popliteal vein Anterior tibial veins Posterior tibial veins (usually paired) (usually paired) Peroneal veins

(usually paired) Figure 62.1 (a) Anatomy of the deep veins of the lower limb; (b) omy of the super /f_i cial veins of the lower limb (great saphenous axis); (c) anatomy of the super /f_i cial veins of the lower limb (small saphenous axis). Great saphenous vein Posteromedial thigh Anterior accessory tributary of the great saphenous vein Anterior tributary of the leg anat

(c) Cranial extension of small saphenous (Giacomini) vein Saphenopopliteal junction Small saphenous vein

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