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Anatomy of the great saphenous vein and its clinical relevance

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The great saphenous vein (GSV) is probably the commonest sick vessel of man; for example, among 1031 Sicilians, only 330 (32 %) showed healthy GSVs. Despite of this clinical relevance, knowledge on this vessel is meagre.

This starts with the appropriate terminology of this vessel and its tributaries. The GSV passes through the saphenous hiatus and terminates in the common femoral vein (CFV). In this terminal section of the GSV, several major superficial tributary veins (MSTVs) may enter, the superficial epigastric vein (SEV; 78 %), the superficial external pudendal vein(s) (SEPV; 90 %), the superficial circumflex iliac vein (SCIV; 83 %), and the anterior accessory saphenous vein (AASV; 51 %). These MSTVs enter the GSV either separated or by forming common trunks at an average distance of 1 to 2 cm of the GSV's orifice. On the contrary, the posterior accessory saphenous vein (PASV; 68 %) enters the GSV at an average distance of 7 cm.

The saphenofemoral junction of the GSV is delimited by several valves. Within the CFV, there is a suprasaphenic (71 %) and an infrasaphenic valve (87 %). Within the GSV, a terminal valve, situated between the most proximal orifice of a MSTV and the GSV's termination, in 87 %, and a preterminal valve, situated distally to the MSTVs - but not the PASV, in 90 %. Valves do show a distinct closure cycle, but this cycle correlates neither with the heart nor the breathing rate.

The wall of a healthy GSV consists of three different layers: the tunica intima, media and externa. The intima-media limit is formed by the internal elastic lamina (IEL), whereas the media-externa limit is formed by the outermost circular muscle layer. The intima has a variable thickness and consists of endothelium, thin elastic fibres, collagen fibres, single smooth muscle cells and the IEL. The media is composed of an inner longitudinal media and an outer circular media. The externa consists of dense collagenous fibres, longitudinal, dense elastic fibres and longitudinal muscle bundles. At the venous valve the IEL runs along the luminal part of the vein wall, the agger and the vein cusps. The sinusal wall contains a much thinner IEL with no connection to the first one.

Key words

Great saphenous vein, major superficial tributary veins, venous valves, valve cycle, venous wall.