

AIN SHAMS UNIVERSITY

Faculty of Medicine



# CHRONIC LEG ULCERS

## THESIS

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# REVIEW OF LITERATURE

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## VENOUS DRAINAGE OF THE LEG

Before the study of the pathogenesis of chronic leg ulcers, it is important to study the venous drainage of the leg as it contributes in the development of leg ulceration in most cases of chronic leg ulcers.

### . Functional and surgical anatomy of leg veins:-

There are three anatomically and functionally distinct sets of veins draining the lower extremities:

A- superficial veins.

B- Deep veins.

C- Communicating veins.

#### A- Superficial veins

They are subcutaneous and superficial to the deep fascia and consist of:-

1- The Greater Saphenous vein:- presents on the antero-medial aspect of the leg and originates on the medial margin of the foot and passes upward in front of the medial malleolus and the medial side of the leg, gradually inclining posteriorly and passing behind the medial condyles of the tibia and femur. During its course in the leg, it is accompanied by the saphenous branch of the femoral nerve.

It then ascends up to the saphenous opening more anteriorly to end in the femoral vein.

#### Tributaries of the greater saphenous vein:-

The greater saphenous vein receives three tributaries

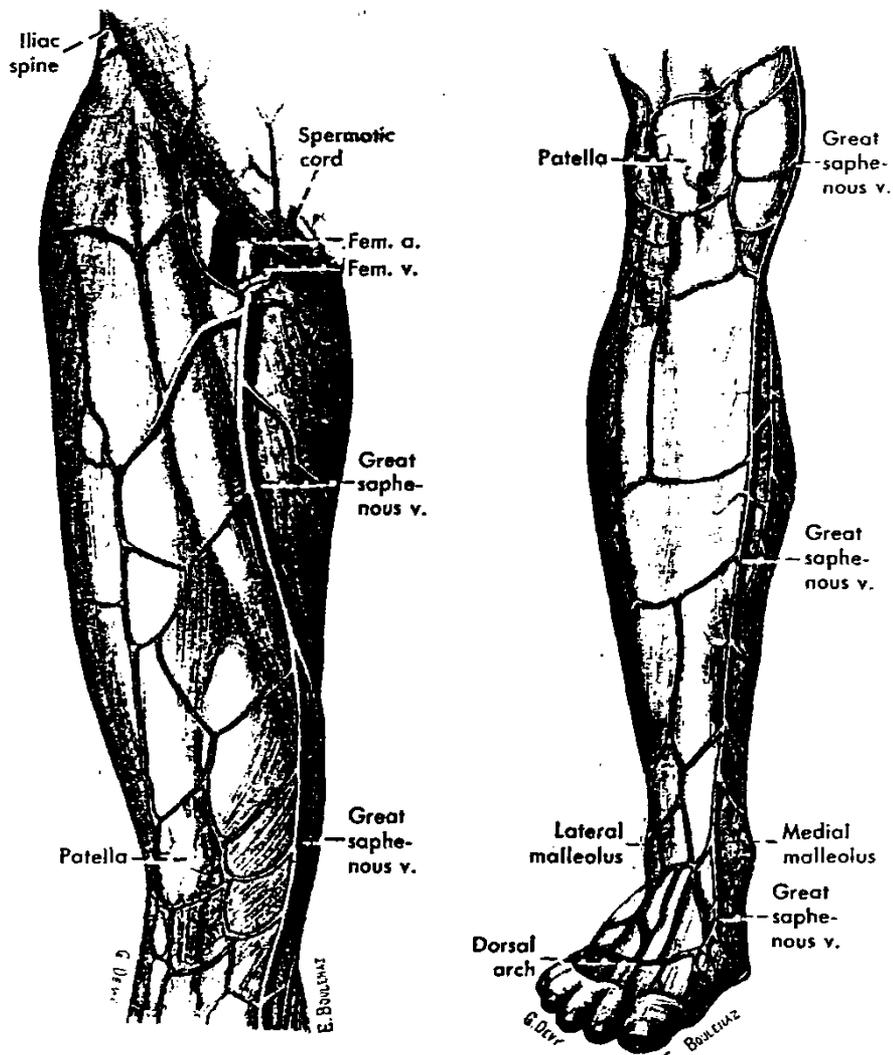


Fig. 1: Anterior views of the veins of the lower limb showing the great saphenous vein .

at the level of the knee:-

i- The anterior vein of the leg:- which arises from the distal part of the dorsal venous arch of the foot and runs up the anterior aspect of the leg then crosses to the medial side at variable level in the upper half of the leg to join the greater saphenous below the knee.

ii- The posterior arch vein, it begins behind the medial malleolus and runs upwards along the inner aspect of the calf to join the greater saphenous vein just below the knee.

iii- The posterior veins:- arise from the short saphenous vein in the posterior aspect of the calf and runs upward and medially to join the long saphenous and the posterior arch vein just below the knee.

These veins may occasionally replace the short saphenous vein (Cockett, 1956).

At the sapheno-femoral junction, there are usually five tributaries:-

- a- lateral accessory saphenous vein.
- b- Medial accessory saphenous vein.
- c- superficial circumflex iliac vein.
- d- superficial external pubic vein.
- e- superficial epigastric vein.

There are several valves in the interior of the great saphenous vein which help to divide the column of the blood into

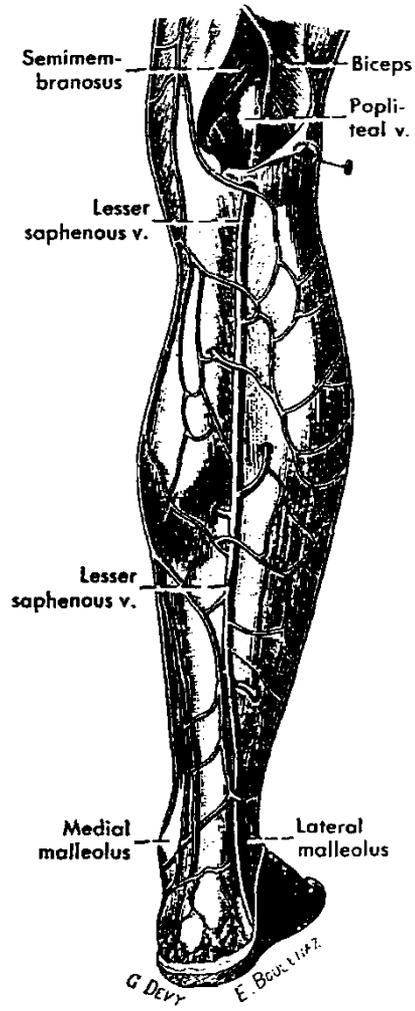


Fig. 2: The lesser saphenous vein.

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In the course of it, it receive number of tributaries:

- From the calf, some of which connected also with the great saphenous. Kasinski (1926) found from 2 to 4 direct connections between the lesser and great saphenous veins usually toward the middle of the leg and emphasized that the valves in these are so arranged that they always drain from the lesser in to the great saphenous.

- Another connection arises from the lesser saphenous to great saphenous just before its penetration the deep fascia to end in the popliteal vein and join the great saphenous directly or run up the medial side of the thigh behind the latter to join it close to its upper end forming the lower end of the medial accessory saphenous vein. The lesser saphenous has connection with the deep veins of the foot and leg.

B- The deep veins of the leg:

These are the intra and intermuscular veins which accompany the named arteries within the musculo-fascial compartments of the lower extremity and usually are given the same names and they supported by thick connective tissue and the surrounding muscle masses, so they are not easily dilated.

They often run as paired venae comitantes below the knee (anterior and posterior and peroneal). The veins draining the muscles are valved with exception those in the soleus.

About 90% of the venous return from the lower extremities normally flows in these veins.

C- The communicating veins (The perforators)

They perforate the deep muscular fascia to connect the superficial and deep venous systems, the valves in them direct the blood flow from the superficial to the deep veins.

The communicating veins are:-

- (1) Ankle perforators veins; they are three in number and join the posterior tibial vein with the posterior arch vein:-
  - i- The upper one is found at the junction of the middle and lower third of the leg at the posteromedial border of the tibia.
  - ii- The middle perforator is about four inches above the tip of the medial malleolus and just behind the tibial margin and this is the largest one of ankle perforators.
  - iii- The lowest perforator is found behind and below the medial malleolus.
- (2) Below the knee connecting the posterior arch vein or saphenous to the posterior tibial vein.
- (3) In the lower part of the adductor canal, fewer than those of the leg and less important clinically, Sherman (49) reported incompetent perforators in the thigh in only 9% of 904 operations for varicose veins (Anatomy for surgeons, 1958).

- (4) In the middle of the calf: Sherman (1949) described the perforators of the calf, he found a connection between the tributaries of both the lesser and greater saphenous veins and between the muscular veins of gastrocnemius and soleus muscles also.
- (5) Inconstant perforating veins are present on the lateral aspect of the ankle.

## LYMPHATIC DRAINAGE OF THE LOWER LIMB

The lymphatic system commences peripherally as mesh-work of delicate vessels (lymph capillaries) which drain the tissue spaces.

This is a one way system, the lymph within it moving toward the great veins.

By confluence of small vessels, longer ones are formed which receiving tributaries along their courses.

The lymphatic system is a closed one, its vessels possessing complete walls formed of endothelial cells. Small nodes (lymph glands) are interposed in the course of larger lymph channels.

The lymph vessels and lymph nodes of lower limb as in other parts of the body are divided into:-

- (1) Superficial lymph vessels and nodes
- (2) Deep lymph vessels and nodes.

- 1- The superficial lymph nodes are the superficial inguinal lymph nodes and arranged in to two groups:
  - a- Upper group close to the inguinal ligament.
  - b- Lower group placed along both sides of the upper part of the great saphenous vein.

The superficial lymph vessels are numerous than the deep vessels and collect the lymph from skin and subcutaneous tissues. They form a plexus in the sole of the foot-from the

planter plexus many vessels come to the dorsum of the foot and ascend in the front of ankle joint.

These vessels and other vessels from the leg and thigh follow the course of the great saphenous vein to end in the superficial inguinal lymph nodes and a few number of vessels follow the short saphenous to end in the popliteal lymph node (these are the vessels which arise from the lateral border of the foot, the heel and the intermediate part of the back of the leg).

2- The deep lymph nodes are related to the main blood vessels and they are:-

- a- Deep inguinal lymph nodes:- they lie close to the upper part of the femoral vein and receive afferent from the superficial inguinal lymph nodes and receive also the deep lymph vessels and send efferent to the external iliac lymph nodes:
- b- Popliteal lymph nodes:- lie on the side of the popliteal vessels and receive the lymphatics that pass along the short saphenous vein.
- c- A single anterior tibial node which lies close to the anterior tibial artery in the upper part of the front of the leg.

The deep vessels drain all structures that lie deep to the deep fascia and run along the main blood vessels and most of them end in the deep inguinal nodes.

Physiological character of venous drainage of the leg:

The general histological character of veins are:-

- 1- Thin and weak muscular coat.
- 2- No elastic laminae.
- 3- Has semilunar valves and wide lumen.
- 4- Slow flow of venous blood.

The veins have vasoconstrictor supply from the sympathetic fibres and vasodilator supply not sure as dilatation of veins may results from inhibition of sympathetic vasoconstrictor tone or passively by force of blood.

The basic cause of flow in the venous system is the vis a tergo (the force from behind) of the heart. When a man is up right, his vascular system may be depicted as a U-tube with the arteries forming the descending limb, the veins the ascending limb and the capillaries the bottom of the tube.

It is easy to see that little pressure is required to force the venous blood to return to the heart against gravity.

The factors affecting venous drainage of the leg:

1- The gravity: in recumbent position, the venous return from the lower limb is increased, but in standing or sitting position elevates the venous pressure in the veins of the lower limb which is equal to the height of a column of blood to heart in erect position. If the increased venous pressure is accompanied by damaged valves, it will lead to varicosities