

Comparative Study between Recent Modalities of Treatment of Varicose Veins

Essay

*Submitted for Partial Fulfillment of Master Degree
In General Surgery*

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2015

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Acknowledgement

Thank to GOD who fulfilled this work through me and arranged me to encounter those fatherly supervisor professors.

Prof Dr. Ali Lashin, the figure which corresponds to paternity, charity, scientific attitude. Really I am very proud of working under his leadership.

Dr. Ramez Mounir, who is the example of coordination between guidance, supervision, extreme of donation, kindness. This work could not be presented without his help and guidance.

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List of Abbreviations

API	:	Active Pharmaceutical Ingredient
AVF	:	American Venous Forum
CFV	:	Common femoral Vein
DVT	:	Deep Venous Thrombosis
EVLA	:	Endovenous Laser Ablation
EVLT	:	Endovenous Laser Therapy
FDA	:	Food and Drug Administration
GSV	:	Great Saphenous Vein
IVC	:	Inferior Vena Cava
LSV	:	Long Saphenous Vein
LSVS	:	Lateral Subdermic Venous System
PE	:	Pulmonary Embolism
RFA	:	Radiofrequency Ablation
SFJ	:	Saphenofemoral Junction
SPJ	:	Saphenopopliteal Junction
SSV	:	Small Saphenous Vein
STS	:	Sodium Tetradecyl Sulfate
USGS	:	Ultrasound Guided Sclerotherapy

Introduction

Chronic venous disorders encompass a spectrum of venous diseases from simple telangiectases (spider veins) and reticular veins, varicose veins, leg edema from dysfunctional venous tone with valve incompetence and abnormal calf muscle pump function, to more severe and advanced forms of venous disorders, including hyperpigmented skin changes, dermalsclerosis, and ulcer formation. Part of the spectrum of chronic venous disorders includes varicose veins, edema, and skin changes and ulcers affecting the lower limb, which are categorized as chronic venous disease (CVD). CVD is a very common problem, with varicose veins affecting more than 25 million adults in the United States, with more than 6 million having more advanced venous disease **(Beebe-Dimmer JL, et al., 2005.)**

The standard treatment of varicose veins for many years has been surgical ligation and stripping of the affected vein. Although outcomes have improved in recent years because of enhanced understanding of lower extremity venous anatomy, the failure rate with this approach is

frequently reported to be between 20% and 30%. (**Kostas TT et al.,2007**)

In addition, surgical ligation and stripping are invasive, usually requiring general anesthesia and several weeks' recovery before return to normal activities. In response to the need for a less invasive approach, numerous endovenous treatments have emerged over the past several years.

The most notable endovenous advancements are the now widespread techniques of radiofrequency ablation (RFA) and endovenous laser ablation (ELA). These methods have demonstrated clinical superiority to stripping and surgical ligation as well as significantly less postoperative pain and recovery time.

(Rautio T, et al.,2002.)

Ultrasound guided foam sclerotherapy (UGFS) is a popular treatment option for varicose veins. A recent survey of members of The Vascular Society of Great Britain and Ireland and the Venous Forum of the Royal Society of Medicine revealed that UGFS was offered to National Health

Service (NHS) patients by 27% of surgeons. (**Winterborn RJ, Corbett CR. Engl 2008**)

Sclerotherapy is best defined as the introduction of a chemical into the lumen of a vein to induce endothelial damage that results in thrombosis and eventually fibrosis.

Considered the most versatile treatment option for venous ablation, sclerotherapy can be used to treat a large range of vein sizes from telangiectasias to large varicose veins.

With the advent of the radiofrequency and endovenous laser procedures, the primary intent of sclerotherapy is to effectively eliminate the target vein after the highest point of reflux is treated. (**Thibault P: *The vein book* 2007**)

Anatomy of the Venous System

The venous system is, in many respects, more complex than the arterial system and a thorough understanding of venous anatomy, pathophysiology, and available diagnostic tests is required in the management of acute and chronic venous disorders **(Beebe Dimmer et al., 2005)**.

The nomenclature of the lower extremity veins has been recently updated, clarifying many definitions and eliminating most eponyms **(Caggiati et al., 2002)**.

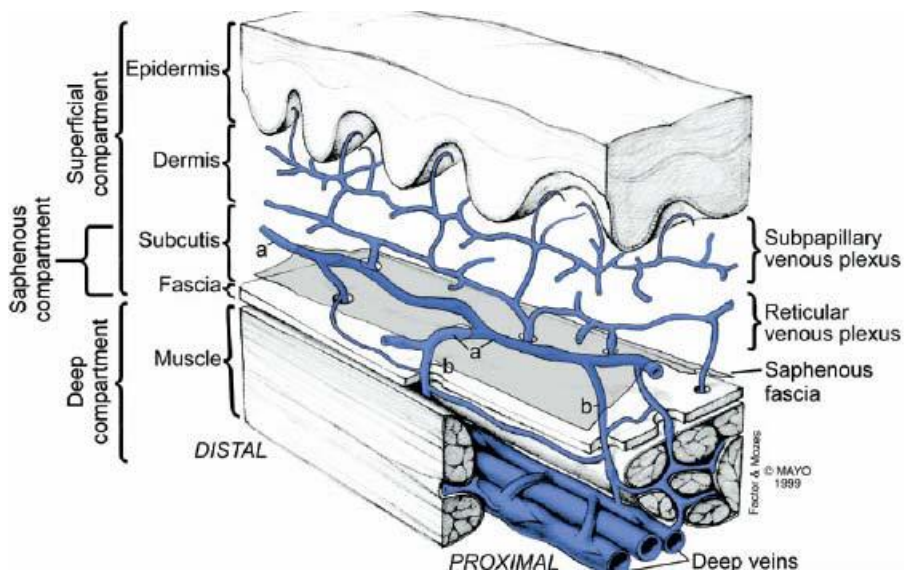
The venous system of the lower extremities includes the deep veins, which lie beneath the muscular fascia and drain the lower extremity muscles; the superficial veins, which are above the deep fascia and drain the cutaneous microcirculation; and the perforating veins that penetrate the muscular fascia and connect the superficial and deep veins. Communicating veins connect veins within the same compartment **(Caggiati et al., 2002)**.

Components of venous system of the lower limbs:

The superficial, deep, and most perforating veins (fig1.1) contain bicuspid valves that assure unidirectional flow in the normal venous system.

Superficial veins:

The principle veins of the medial superficial system are the great saphenous vein and the anterior and posterior accessory great saphenous veins (fig 1.2). Duplex scanning has resulted in recognition of a saphenous subcompartment and saphenous fascia (**Caggiati & Bergan; 2002**).

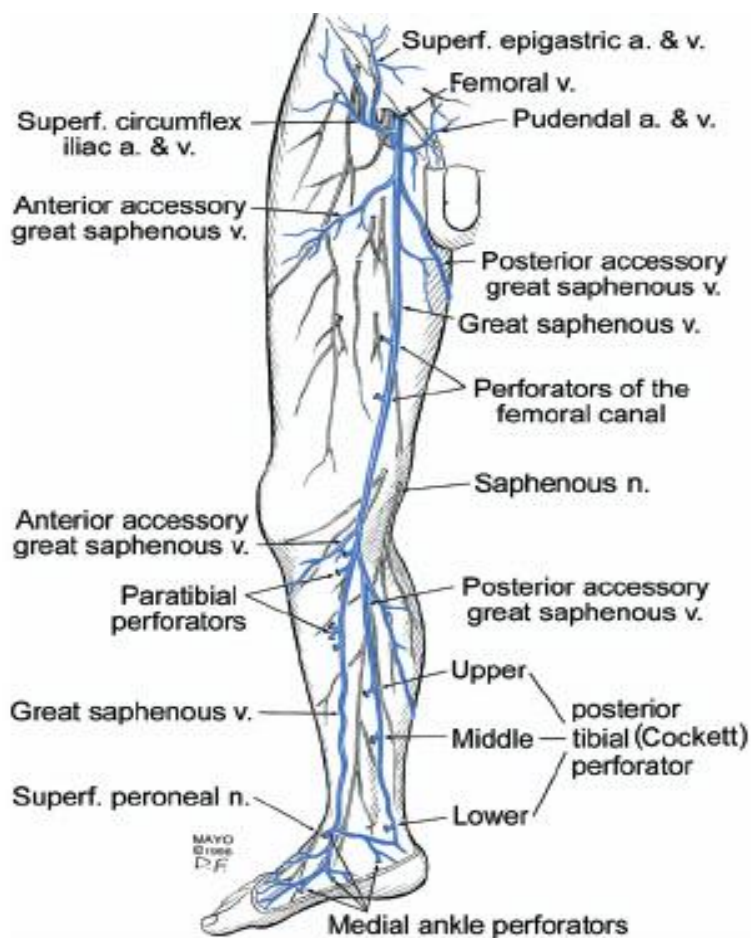


(Fig1.1) Components of venous system (Mozes & Gloviczki; 2004)

The saphenous fascia covers the saphenous subcompartment and separates the great saphenous vein (GSV) from other veins in the superficial compartment. The term great saphenous vein (GSV) is preferred over the previously used terms of greater or long saphenous vein (Mozes et al.,1996).

This avoids confusion when an abbreviation is used (ie, LSV, the acronym of long saphenous vein, could be easily confused with lesser saphenous vein (old terminology). The saphenofemoral junction, formed by the GSV, the superficial circumflex iliac, superficial epigastric,

and the external pudendal veins, is now properly called the confluence of superficial inguinal veins (**Mozes et al., 1996**).



(Fig1.2) Superficial and perforating veins of the leg (Mozes & Gloviczki; 2004)

The lesser or short saphenous vein should now be called the small saphenous vein (SSV). The SSV is the most important posterior superficial vein of the leg. It originates

from the lateral side of the foot and drains into the popliteal vein, most commonly joining it just proximal to the knee crease.

The intersaphenous vein (previously termed the vein of Giacomini) connects the small and great saphenous veins.

Perforating veins:

By definition, the perforating veins pass through the deep fascia separating the superficial and deep compartments. Direct perforators connect superficial to deep axial veins while indirect perforators join other veins in the muscles to drain blood from the superficial venous system **(Mozes et al., 1998).**

While unidirectional flow in these veins assures superficial to deep flow in the calf and thigh, perforating vein valvular incompetence may contribute to venous congestion, varicosities, and chronic skin changes including ulceration. **(Mozes et al., 1998).**

The most important perforating veins of the lower extremity are the medial calf perforators. There are two main groups of medial calf perforators, the posterior tibial and the

more proximal paratibial perforating veins. **(Mozes et al., 1998).**

The posterior tibial perforating veins (Cockett perforators) connect the posterior accessory GSV with the posterior tibial veins and form three groups (lower, middle, and upper). The lower and middle group veins are frequently located either within a fascial duplication or the deep posterior compartment. **(Mozes et al., 1998).**

Paratibial perforators connect the main GSV trunk with the posterior tibial veins. Other perforators of the leg are classified according to their topography: anterior, lateral, medial and lateral gastrocnemius, intergemellar, and Achillean perforating veins. Perforators around the knee include the infra and suprapatellar, medial, lateral, and popliteal fossa perforating veins. The perforators of the femoral canal connect the GSV to the femoral vein in the distal thigh . **(Mozes et al., 1998).**

Deep veins:

The most important terminology change of the leg veins is that the superficial femoral vein (a deep vein) is now called the femoral vein. It connects the popliteal vein to the common femoral vein. Paired femoral or popliteal veins are