Introduction

The vascular anatomy of the leg is unique in that superficial vessels are interconnected with deep reticular veins ***(Jeanneret and Karatolios, 2011).***

Approximately 40% of women and 15% of men complain of cosmetically unacceptable leg veins. Up to 50% of these may become symptomatic ***(Ruckley et al., 2008).***

Leg telangiectasias are more difficult to treat than facial telangiectasias because the lesions are deeper, located at different depths and larger than those of facial telangiectasias ***(Ferrara and Ferrara, 2013).***

Sclerotherapy (intravascular injection of sclerosing material) is a well tolerated and highly efficacious treatment for varicose and telangiectatic leg veins. Sclerosing solutions act by inducing endothelial damage, which eventually leads to endofibrosis of the treated vessels ***(Subbargo et al., 2013).***

Sclerosing solutions can be placed into three broad categories based on their machanisms for producing endothelial injury, namely, hyperosmotic (hypertonic saline), detergent (polidocanol, sodium tetradecyl sulfate), or corrosive (glycerin) ***(Palm, 2010).***

The other treatment method is radiofrequency device which uses electromagnetic energy to induce thermal damage by causing dehydration and coagulation necrosis of the tissue proteins ***(Kuhlmann et al., 2013).***

Aim of the Work

The aim of this study is to review and compare the use of sclerotherapy and radiofrequency device in treating telangiectatic leg veins.

Definitions and Classifications

Lower Extremity Telangiectasias

Lower extremity telangiectasias (LETs) are visible dilated intradermal veins measuring 1 mm in diameter or less. They may be localized or diffuse and may be red, purplish, or blue. They are localized most commonly in the thighs but may affect any other area of the extremity. They are often present in limbs suffering concomitantly from other types of varicose veins such as reticular or truncal varicosities ***(Ferrara and Ferrara, 2013).***

Initially, telangiectasias appear as faint erythematous lines, but with time they become progressively more dilated, tortuous and elevated above the skin surface and turn blue. The term *"**Venulectasia**"* is used to describe larger blue telangiectasia measuring 1 to 2 mm in diameter ***(Raymond-Martimbeau, 2012)***

Reticular Veins

Dilated bluish subdermal veins usually from 1 mm in diameter to less than 3 mm in diameter. They usually are tortuous usually called "feeder veins" ***(Goldman, 2010).***

Corona Phlebectatica

A fan-shaped pattern of numerous small intradermal veins on the medial or lateral aspects of the ankle and foot. This commonly is thought to be an early sign of advanced venous

disease. Synonyms include malleolar flare and ankle flare ***(Raymond-Martimbeau, 2012).***

Based on these clinical definitions the telangiectasias, venulectasia and reticular veins are classified as types I, II and III, respectively, in the classification of veins ***(Weiss and Weiss, 1994)*.**

Table (1): Classification of veins ***(Weiss and Weiss, 1994).***

Type I	Telangiectasia (spider veins) 0.1-1 mm in diameter IA telangiectatic matting (red network)
Type II	Venulectasia 1-2 mm diameter, violaceous IIA: venulectatic matting (violaceous network)
Type III	Reticular varicosities (feeder veins) 2-4 mm in diameter, cyanotic blue to blue green
Type IV	Varicosities (secondary saphenous branch or perforator related) 3-8 mm. blue to blue green or colorless if deeper
Type V	Saphenous varicosities (truncal or axial varicosities including main saphenous trunks and first generation branch varicosities) 5 mm or greater, blue to blue green. Colorless if deeper, may be palpable and not visible

Widmer's classification of venous disease is still commonly used in German-speaking countries ***(Widmer et al., 1981).*** This classification system differentiates clearly between uncomplicated varicose veins and chronic venous insufficiency ***(Mayer et al., 1999).***

Table (2): Widmer's classification ***(Widmer et al., 1981).***

Varicose veins	
Class 1	Telangiectatic veins
Class 2	Reticular varicose veins
Class 3	Truncular varicosities: long or short saphenous vein and their branches
Chronic venous insufficiency	
Grade I	Telangiectasias beyond the inner ankle, 'corona phlebectatica'
Grade II	Indurated edema, eczema, dermatoliposclerosis, hyperpigmentation
Grade III	Active or healed ulcer

A similar classification system is Porter's classification, published as part of a document on reporting standards of venous disease and shown in **Table (3)** ***(Porter and Moneta 1995; Mayer et al., 1999).***

Table (3): Porter classification ***(Porter and Moneta 1995; Mayer et al., 1999).***

Classification	**Clinical signs**
Class 0	Asymptomatic
Class 1	Mild swelling and discomfort; superficial veins involved
Class 2	Hyperpigmentation in the gaiter area; subcutaneous fibrosis
Class 3	Ulcerative or pre-ulcerative skin changes; eczema

Many classifications of veins have been employed. In the last years and for better understanding of the term “chronic venous insufficiency”, a new classification has been established to cover many aspects including clinical manifestation (C), etiologic factors (E), anatomic distribution of the involvement (A) and underlying pathophysiologic findings (P). It was named CEAP classification ***(Eklof et al., 2008).***

According to CEAP classification telangiectasias and/or reticular veins are considered C_1 of clinical classes of chronic venous insufficiency ***(Eklof et al., 2008).***

Table (4): Clinical classes of the CEAP classification ***(Eklof et al., 2008).***

Clinical Classification	
C0	No visible or palpable signs of venous disease
C1	Telangiectases or reticular veins
C2	Varicose veins: distinguished from reticular veins by a diameter of 3mm or more
C3	Edema
C4	Changes in skin and subcutaneous tissue secondary to venous disease
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis or atrophie blanche
C5	Healed venous ulcer
C6	Active venous ulcer
Etiologic Classification	
Ec	Congenital
Ep	Primary
Es	Secondary
En	No venous cause identified
Anatomic Classification	
As	Superficial veins
Ap	Obstruction
Ad	Deep veins
An	No venous location identified
Pathophysiologic Classification	
Pr	Reflux
Po	Obstruction
Pr,o	Reflux and obstruction
Pn	No venous pathophysiology identifiable

After CEAP classification has been established, refinement has been made in clinical definition of venous dilation, and telangiectasias have been defined as confluence of permanently dilated intradermal venules of less than 1 mm in caliber and reticular veins as permanently dilated bluish intradermal veins usually >1 mm in diameter and <3 mm in diameter while subcutaneous veins >3 mm have been considered as varicose veins ***(Ferrara and Ferrara, 2013).***

According to clinical appearance, telangiectasias have been divided into four types **(Fig.1)** simple or linear, arborizing, spider and papular types ***(Goldman, 2010).***

1. ***Simple or linear telangiectasia:*** red linear telangiectasias are very common on the face while blue ones are more frequent on the legs.

2. ***Arborizing telagiectasia:*** Red arborizing telangiectasias are seen on the face, while blue ones are common on legs.

3. ***Spider telangiectasia:*** Represent telangiectasia with a central feeding arteriole. They typically appear in preschool and school age children.

4. ***Papular telangiectasia:*** They are frequently part of genetic syndromes, such as Osler-Weber Rendu disease, and also seen in collagen vascular disease.

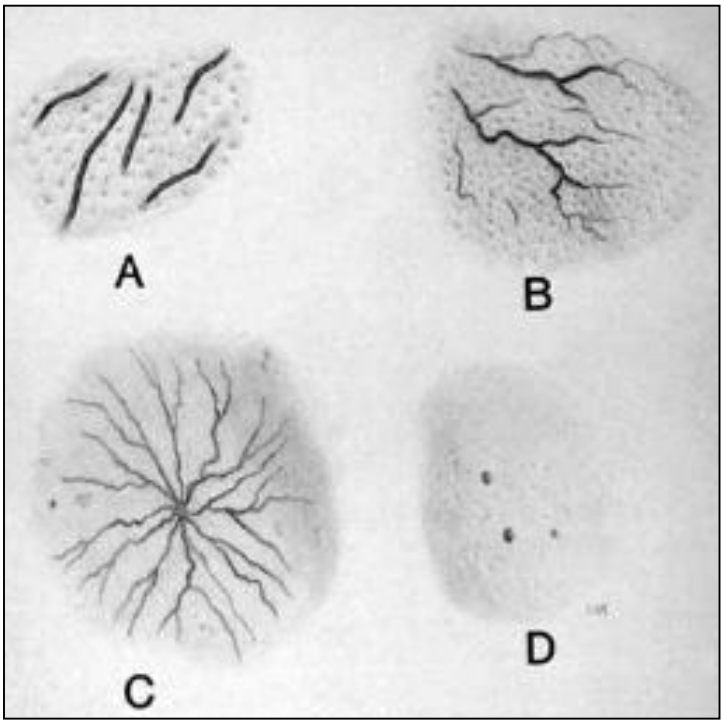

Figure (1): Four types of telangiectasia **(A)** simple **(B)** arborized; **(C)** spider; and **(D)** papular ***(Goldman, 2010).***

Epidemiology and Risk Factors

- ***Epidemiology:***

Determining the prevalence of chronic venous disease with its different classes is difficult. Many studies have been published, but they vary in definitions of venous dilatation and methods of diagnosis ***(Michael et al., 2006).*** However, Most studies have suggested varicose veins are more common in women, with a prevalence of 1% in men versus 10% in women under 30 years of age compared with 57% and 77% in men and women over the age of 70 years, respectively ***(Joseph and Glenn, 2007).***

- ***Risk factors:***

Risk factors for chronic venous disease include heredity, age, female sex, obesity (especially in women), pregnancy, prolonged standing, and greater height ***(Criqui et al., 2007).***

- **Heredity:** There is a widely held belief of a familial tendency to varicose veins ***(Robertson et al., 2008).*** Who studied the clinical characteristics of 500 patients with spider veins found that 72% of patients had reported a family history of varicose or spider veins in the first degree relatives.

- **Age and sex:** Various studies have shown that the prevalence of chronic venous disease with its different

classes increases with age. Also most of the studies found a higher prevalence of telangiectasias, reticular veins and varicose veins in women than men ***(Ruckley et al., 2008).***

- **Obesity and pregnancy:** The development of chronic venous disease in patients already susceptible to the condition may be accentuated by obesity or pregnancy ***(Robertson et al., 2008*)** found that 67% of females, who had a history of previous pregnancy, had reported the appearance or worsening of their spider veins after pregnancy.

- **Occupation and lifestyle factors:** There have been reports of increased prevalence among those with occupations which involve prolonged standing ***(Michael et al., 2006).*** However, this relation between life style and occurrence of venous problems is not conclusive and the Edinburgh Vein Study failed to show any consistent relationship with lifestyle factors ***(Ruckley et al., 2008).***

Anatomical Aspects

Applied Anatomy of the Lower Limb Venous System

The venous system of the legs is divided into two channels, superficial and deep, separated by the fascia surrounding the calf and thigh muscles. The deep venous system consists of veins that lie deep to the fascia and it drains blood from the deep compartment (the compartment which includes all tissues deep to the fascia). The superficial venous system is distributed within the superficial compartment which consists of the subcutaneous tissues between the skin and the muscular fascia and it drains blood from the superficial compartment. The superficial and deep venous systems are connected by perforating veins that are short veins piercing the fascia and running between the superficial and deep systems ***(Depairon, 2006).***

☒ *The Superficial Venous System:*

The superficial venous system is a complicated variable network of inter-connecting veins, most of which are unnamed **(Fig.2)**. The larger truncal superficial veins are fairly constant in location. The principal named superficial veins of the lower limb are the lesser saphenous vein (LSV), which runs from the ankle to the knee and the greater saphenous vein (GSV), which runs from the ankle to groin The GSV terminates in the

common femoral vein at the saphenofemoral junction. The GSV and its important tributaries are shown below ***(Jeanneret and Karatolios, 2011).*** The LSV terminates in the popliteal vein at the saphenopopliteal junction ***(Kachlik et al., 2010).***

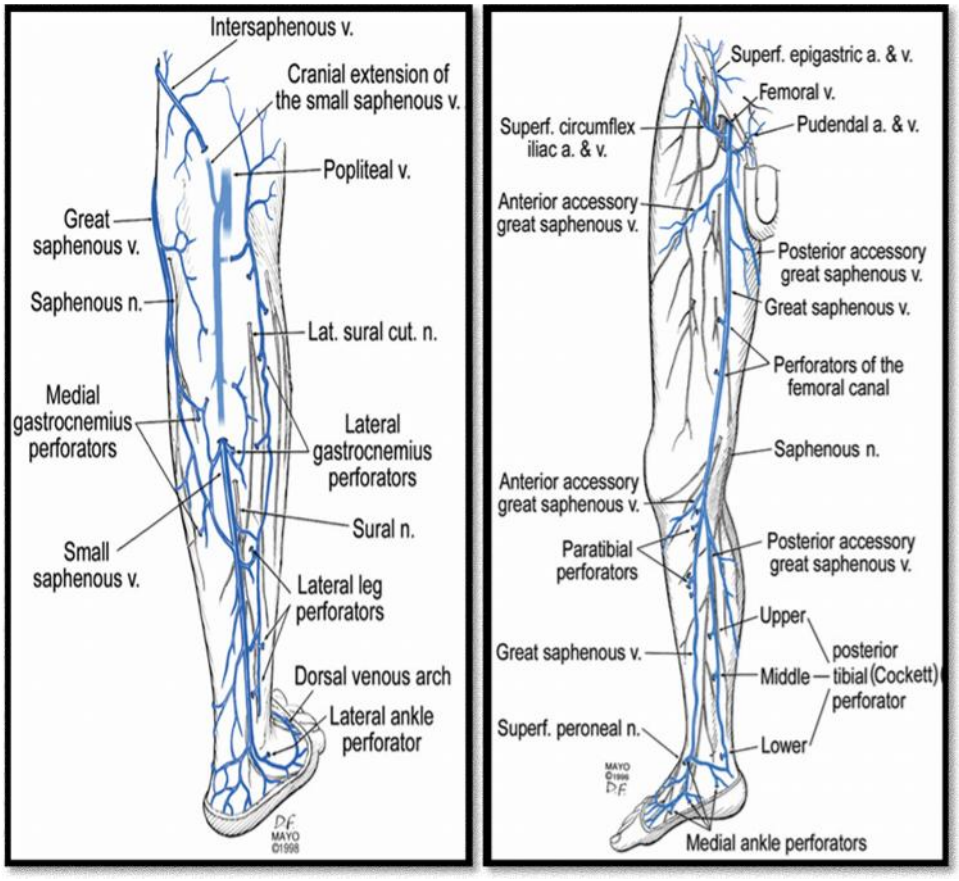

Figure (2): Great and small saphenous veins and its tributaries ***(Depairon, 2006).***

The Deep Venous System:

It is estimated that 90% of the blood returning from the lower extremity is carried by veins of the deep venous system **(Fig.3)**. In the legs the main deep veins are three paired veins that are named after the corresponding arteries along which they course: anterior tibial, posterior tibial and peroneal veins. Around the level of the knee, these three paired veins are joined into a single popliteal vein. Within the thigh the popliteal vein becomes the femoral vein and it join the deep femoral vein which is also called the profunda femoris, to form the common femoral vein ***(Kantarovsky and Minerbi, 2011).***

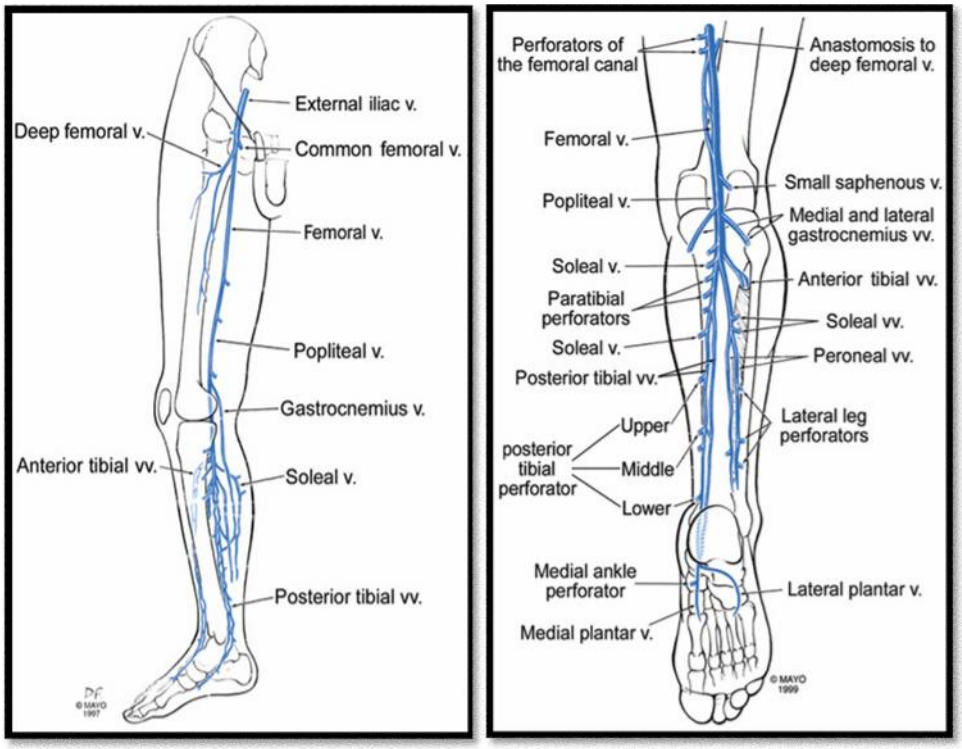

Figure (3): Deep venous system of lower limb ***(Depairon, 2006).***