

## ANATOMICAL CONSIDERATIONS IN SURGICAL TREATMENT OF VARICOSE DISEASE

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### RESUME

*Un des plus grands problèmes que les pays développés ont été confrontés à dans les décennies passées a été la plus grande incidence des maladies cardio-vasculaires. La conclusion d'un traitement pour les maladies vasculaires peut s'avérer due extrêmement difficile aux périodes prolongées d'hospitalisation et ainsi à une inactivité prolongée. La matière par ceci du de papier a été choisie considérant le grand intérêt pour la fréquence de ce type de maladie, comme les nombreux aspects les présents variqueux de la maladie. La connaissance de l'anatomie normale, comme la variation de nombre et de position des veines superficielles et particulièrement de leurs informateurs et collatérales est essentielle pour le traitement chirurgical des varices des membres inférieurs. Omettre pour enlever toutes les branches collatérales ou communicantes a fréquemment comme conséquence la répétition des veines variqueuses, de ce fait exigeant que le procédé soit répété.*

**MOTS CLES:** *veines superficielles, varices des membres inférieurs, étude microscopique.*

### 1. Introduction

Varicose disease is a chronic venous affection characterized by permanent saccular widening standing at epifascial veins accompanied by parietal alterations and hemodynamic venous disorders [1,2]. Disease is very common, affecting 30-50% of the adult population. Frequency in women is up to 60%.

Venous return to the lower limb is accomplished by two main components: superficial venous system and deep venous system[3-6]. Superficial venous system, involved especially in varicose pathology, drains approximately 10% of the blood of lower limb and especially it has a role in the

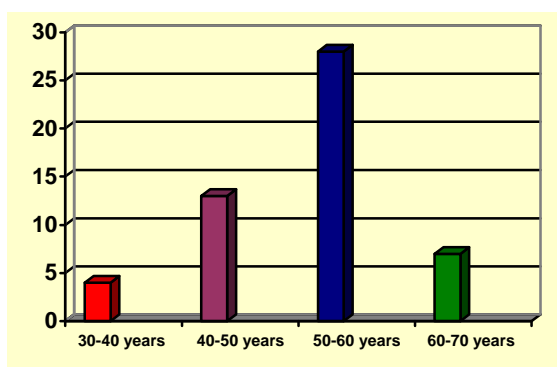
thermoregulation. Deep venous system is draining the remaining 90% of blood in lower limb. They have an important role in distribution of blood flow but also in varicose disease occurrence and post thrombosis disease[7].

The two venous systems of lower limb intercommunicate with each other through collateral veins, intercommunicating veins (perforating) and plunge veins. They have an important role in distribution and blood flow in varicose disease occurrence and post thrombosis disease[8].

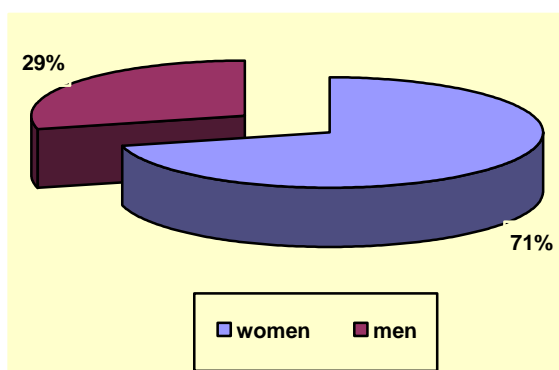
Superficial venous network focuses on the ante-medial side, forming the internal saphenous vein system (great) and the post-lateral side level forming external saphenous vein system (small)[9-11].

## 2. Material and method

The study presented is based on a number of 52 cases, hospitalized, investigated, diagnosed and surgically cured. The study was performed both clinically and evidence based microscopic and macroscopic, during June 2007- December 2008. Patients in the study group were aged between 32 and 68 years, predominantly female gender (graphic 1, 2))



**Graphic 1.** Patients distribution according of age



**Graphic 2.** The patients' gender distribution

The study was done by macroscopic inspection, palpation and examination of samples of venous circulation, with complementary phlebography. Highlighting key to chased track of superficial venous circulation of lower limbs, linking it with any changes of the deep venous circulation (studying perforating branches), and studying the

implications of anatomic- surgical over superficial saphenous and its main intercommunicable branches.

Microscopic study consisted in the removal of fragments of vein obtained after surgical stripping. The fragments were processed by histological techniques of fixation with 10% formalin and colored HE, RF and microscopic study.

## 3. Results and Discussion

Macroscopic was founded out the dilated veins, sinuous, cylindrical, depending on the lesions age issue having fusiform or sacciform shape and venous dilatations demarcation, obtaining the bulb shape or real venous aneurysm. Sectioning these veins was discovered the presence of confluent thrombi, bulb expansion with thick valves, some of which been sclerotic and whitish colour. Venous walls had different thicknesses being much thinned in bulb expansion area.

By means of phlebography and intra-operator we have found the following results on superficial veins and their connection with deep veins:

1. Saphenous vein receives many branches, of which the most important are:

-At calf: posterior arch vein (Leonardo Da Vinci vein) ante-exterior vein of calf (located just below the knee and collects blood from the front and exterior side of calf) and posterior intercommunicable vein situated in the upper third of the calf and which drains the medial side of this region. Intercommunicable branches from this level are represented by lower calf's group of Cockett consisted of two veins starting from the posterior arches vein (one premalleolar sapheno-tibial ante-internal and one submalleolar saphenopus-tibial post-internal) and the other two groups, one median and one higher represented by veins of Braun and Bozd which are found in the soleus triceps area and unites anterior, posterior internal saphenous with peroneal vein.

-At thigh: thigh post-medial vein and thigh ante-medial vein. At this level intercommunicating vessels are represented by perforated group veins which came from the Hunter channel (the largest, is headquartered in constant middle third vein and connects internal saphenous with femoral vein), other though sartorius muscle (between femoral and internal saphenous vein) and many others disposed on the internal posterior and external side of thigh. In the knee level there are saphenous-popliteal perforated and sapheno-femoral.

-At curve level, receives the next branches:

-Constant: superficial external pudental, inferior epigastric vein and superficial circumflex iliac vein.

-Inconstant: deep medial circumflex, deep exterior circumflex and retrosaphenous vein.

At the radix of the thigh though circumflex veins there are established connections with ischiatic veins and closure.

2. External saphenous vein receives the next branches: posterior medial vein from calf level, ante-exterior vein of the superficial of thigh and Giacomini vein (the most important) that connects external saphenous (from the popliteal space) with internal saphenous thigh side. In the popliteal veins flows also popliteal area veins and lower thigh (perforated Dodd veins).

-At the calf level can be found plugging Delater veins located on the base-internal of the calf, without any connection with the superficial venous system, placed perpendicular to the tegument surface which directly drains deep in venous system.

-All tributaries of two saphenous are arranged above superficial fascia and are much less surrounded by connective tissue compared with saphenous. Its disposition (situation) explains the appearance of varicosed package mainly at their level and then saphenous tract.

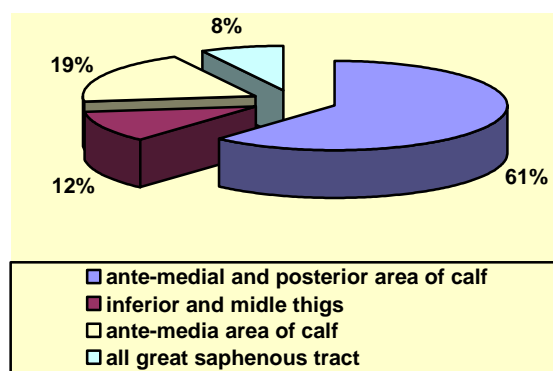
In terms of clinical forms and anatomical location were the following:

-In a number of 32 patients the varicose were isolated in the ante-medial or posterior of the calf, due to perforating Boyd incompetence (paratibial perforated). At these patients, in upper third of the calf, on the internal saphenous tract it is described varicose veins dilatations with varied appearance, varicose packages at calf level, dilated venous trunks, irregular, wriggly, fusiform dilatations, blubbing. Patients were presenting pains such as burning sensation and weight in the limb.

-At 4 patients varicose were located on tributary (branch) of the ante-medial thigh (which flows into great saphenous near fork between this and femoral vein) important dilatations on the internal side of the thigh and at calf level.

-At 6 patients were due to insufficient Dodd perforating (lower thigh) and Hunter (mid thigh), varicosity package being isolated in their level.

- In the remaining 10 cases were disposed varicose packages throughout the entire great saphenous veins tract (graphic 3).



**Graphic 3.** The distribution of the varicose concentrations considering their location

In a number of 7 (13.5%) patients was recorded trophic tegument changes localized in the malleolar region. Distinguish areas of thin integument, transparent areas which alternates with

callous areas, pigmentation or eczemas, with diminished pilosity. All these patients were aged over 50 years.

At 11 (21.1%) patients were present tromboflebitis phenomena, the most common location being at the calf and the thigh area, on the medial side.

For microscopic examination was used for fixing fragments 10% formalin and coloring with HE and Resorcin-Fuchsin. Were made sections on different levels of veins, taking into account their macroscopic appearance. Microscopic study of these fragments showed modifications of the 3 vascular tunics.

Intima of the vein apparently proliferates varicose process at the beginning through conjunctive young cell tissue which then bundles and sclerosis, in this way intima diminishes and even obliterates the vascular lumen, giving it an irregular pattern.

Venous average presents important changes in relation to age and varicosity form. At first the smooth muscle fibers hypertrophy and conjunctive interstitial tissue develops also and later sclerosis, reaching to dissociate smooth muscle that atrophies, or replace some parts of it, especially in dilated bulb areas. Elastic fibers are bold first, paused and tend to disappear in proportion as sclerosis forward, continuing as small scraps.

External tunic is also interesting in the sense that the web is multiply, reaching even to fibrosis, and its vessels, especially arteriole which has bold walls with incubation intima.

Venous valves are sinuous, many of them showing a process of diffuse sclerosis in different evolutionary stages, and some of them showing only minor modifications. From the bulb level we have noticed when they were in the initial appearance of tromboflebitis processes. In veins lumen, there are acceding thrombi on the walls of different ages, in different stages of organization, some rechanneled.

To note that these lesions are not uniform, is not interested on vein on the entire tract, interchanging with slightly parts changed or even without histological recast.

#### 4. Conclusions

The most frequent location of varicose veins remains in the external region or posterior side of the calf, due to perforating Boyd lack (paratibial perforated).

Trophic skin changes localized in the malleolar region occurring in a relatively high rate, 13.5%, with all aged over 50 years.

Thromboflebitis phenomena were found in a proportion of 21.1%, the most common location being on the calf and the thigh area, on medial side.

Intima of the vein apparently proliferates varicose process at the beginning through conjunctive young cell tissue which then bundles and sclerosis leading to vessels stenosis.

Smooth muscle fibers hypertrophy and conjunctive interstitial tissue develops also and further sclerosis and replacing flexible fibers.

Venous valves are sinuous, many of them showing a process of diffuse sclerosis in different evolutionary stages, and some of them showing only minor modifications.

Because histopathological changes occurred in vessel walls, we consider that the only treatment for varicose veins is the surgical one.

#### Bibliography

1. **Tennant WG, Ruckley CV.** Medico-legal action following treatment for varicose veins. *Br J Surg*, 1996; 83: 291-2
2. **Bradbury AW, Ruckley CV.** Varicose veins. Beard JD and Gains PA, eds. *Vascular and Endovascular Surgery* 1st edn. London; WB Saunders Company Ltd, 1998: 432-59
3. **Campbell WB, Ridler BM.** Varicose vein surgery and deep vein thrombosis. *Br J Surg* 1995; 82: 1494-7
4. **Sarin S, Scurr JH, Coleridge-Smith PD.** Stripping of the long saphenous vein in the treatment of primary varicose veins. *Br J Surg*, 1994; 81: 1455-8

**5. Stuart WP, Adam DJ, Allan PL, Ruckley CV, Bradbury AW.** Saphenous surgery does not correct perforator incompetence in the presence of deep venous reflux. *J Vasc Surg*, 1998; 28: 834-8

**6. Gloviczki P, Bergan JJ, Rhodes JM, Canton LG, Harmsen S, Ilustrup DM,** and the North American Study Group. Midterm results of endoscopic perforator vein interruption for chronic venous insufficiency: lessons learnt from the North American Sub-fascial Endoscopic Perforator Surgery Registrar. *J Vasc Surg*, 1999; 29: 489-502

**7. Stonebridge PA, Chalmers N, Beggs I, Bradbury AW, Ruckley CV.** Recurrent varicose veins: a varicographic analysis leading to a new practical classification. *Br J Surg*, 1995; 82: 60-2

**8. Sykres TCF, Brookes P, Hickey NC.** A prospective randomised controlled trial of tourniquet in varicose vein surgery. *Br J Surg*, 1999; 86: Suppl I: A44

**9. Earnshaw JJ, Davies B, Harradine K, Heather BP.** Preliminary results of PTFE patch sapheno-plasty to prevent neovascularisation leading to recurrent varicose veins. *Phlebology*, 1998; 13: 10-13

**10. Glass GM.** Prevention of recurrent sapheno-femoral incompetence after primary varicose veins. *Br J Surg*, 1989; 76: 1210

**11. Raraty MGT, Greanary MG, Blair SD.** There is no benefit from 6 weeks of compression after varicose vein surgery: a prospective randomised trial. *Br J Surg*, 1997; 84: a574

