Review Article

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ANATOMICAL ASPECT OF SIRAJA-GRANTHI WITH SPECIAL REFERENCE TO VARICOSE VEINS: A REVIEW

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ABSTRACT

Varicose vein is a very common condition in surgical practice in which vein become dilated, elongated and tortuous. The changing lifestyle, occupational pattern, pregnancy, obesity are noteworthy contributing factors for the varicose veins. This condition affects lower limbs especially saphenous vein and their tributaries. In Ayurveda varicose veins can be correlated to Siraja granthi. In Siraja granthi vitiated Vata dosha enters in sira and constrict them, make them tortuous. Also decreases pulsation in the sira. In this article we have tried to evaluate the anatomical and physiological changes in Siraja granthi (Varicose veins).

Keywords: Siraja granthi, Varicose veins, Great saphenous vein, Short saphenous vein, One-way valve.

INTRODUCTION

In present era, due to changing lifestyle and working pattern various diseases are occurring. Varicose vein is one of them. It is very common condition in surgical practice, in which saphenous veins and their tributaries become tortuous, elongated and dilated. It affects up to 25% of women and 15% of men. Varicose veins affect up to 3 in 10 adults.[1]

The lifestyle changes, pregnancy, occupations involving prolong standing are major contributing factors for the varicose veins. It is more common in females than males and can occur in any age group.[2] It can be very much correlated to Siraja granthi.

According to Sushruta Samhita Siraja granthi is condition in which etiological factors like excessive exertion by weak person (Abalasya Vyayamjaate), immersing lower limb in cold water just after walking long distance (Padatte sahasaambho avgahana) vitiates Vata dosha. This vitiated Vata dosha enters in sira and causes Aakshep, Samkochana and Vishoshana and in turn produces granthi.[3] According to Acharya Vagbhata Vata dosha plays major role and exerts its influence on sira and Rakta dhatu. Further creates Samkochana (constriction), Vakreekaran (Tortuosity), Vishoshana in sira and finally causes Siraja granthi.[4]

In normal condition factors responsible for venous return of lower limb are negative intra thoracic pressure, arterial pulsation pressure on venae comitantes, unidirectional flow of blood due to valve, pressure of muscular contraction on veins.[5]

As per modern medicine varicose veins occurs when valve of the veins become incompetent. Due to valve incompetency blood becomes stagnated in the superficial veins and veins becomes tortuous, elongated and dilated.[6]

ANATOMY OF VEINS

- Veins are thin walled than arteries and have larger lumen than accompanying arteries.
- Veins have valves which maintain the unidirectional flow of blood even against gravity. (Venous pressure is low as compare to Arteries so valves have utmost value in the veins).
- The muscular and elastic tissue content of the venous walls is much less than that of arteries.
- Large veins have dead space around them for their dilatation.
- Venae comitantes are a pair of veins on the side of the artery in the forearm or leg region. Pulsation in the arteries are transmitted to veins in the venae comitantes & helps in return of blood towards heart.[7]

PHYSIOLOGY OF VENOUS RETURN

- Negative intra thoracic pressure sucks the blood into heart from all over the body.
- Venous valves prevent any regurgitation of the blood.
- Arterial pulsation press on the venae comitantes intermittently and helps in draining blood towards the heart
- Muscular contractions (Muscle pump) press on the veins and helps for the venous return.[8]

ANATOMY OF VEINS IN THE LOWER LIMB

Lower limb consists of three types of veins that are –
Superficial veins,
Deep veins and
Perforator veins[9]

Superficial veins of the leg

It consists of two main veins the long and short saphenous veins and their tributaries. The word *Saphena* means easily visible. These veins are subcutaneous hence easily accessible and visible.

Long Saphenous vein
It is formed by the union of the medial dorsal vein and veins from the medial side of the sole of the foot. It originates in the medial side of the leg, then runs posterior to epicondyle of the Femur and finally enters in the anterior thigh for draining into femoral vein. From its starting point to posteromedial thigh region this vein is subcutaneous but in anterior thigh region it has to pass deep for draining into deeper veins. In anterior thigh it pierces cribriform fascia then passes from fossa ovalis (Opening in fascia Lata) and finally enters in femoral sheath and drains into femoral vein. This saphenofemoral junction is 2.5 cm below inguinal ligament and 4 cm inferolateral to pubic tubercle. Great Saphenous vein have near about 20 valves in order to prevent backflow of the blood.

Short Saphenous vein
The short saphenous vein begins at the lateral border of the foot behind the lateral malleolus as a continuation of the dorsal venous arch. It continues laterally into leg then passes posteriorly to the calf and drains into popliteal vein by piercing the roof of the popliteal fossa. It enters the popliteal vein in-between two heads of the gastrocnemius muscle. There are a number of connections between long and short saphenous vein in the knee region. Short Saphenous vein have 13 valves approximately in order to prevent backflow of blood.

Deep veins of the leg

Anterior tibial vein, Posterior tibial vein, Peroneal vein, Popliteal vein, Femoral vein, Profonde/Deep femoral vein, external iliac vein are the deep veins of the leg. Medial and lateral plantar veins of the plantar venous arch join to form posterior tibial vein which is located just posterior to the medial malleolus. Peroneal vein runs laterally and joins to posterior tibial vein. Anterior tibial vein joins to Posterior tibial, peroneal vein and forms popliteal vein. This Popliteal vein crosses through adductor hiatus and forms femoral vein in the Adductor canal. From Adductor canal femoral vein reaches to femoral triangle. Here Profonde femoral vein joins to Femoral vein and passes deep to inguinal ligament to continue as external iliac vein. External iliac vein joins to internal iliac vein to form common iliac vein. Finally, right and left common iliac veins joins to form inferior vena cava.

Perforator veins

These are the communications in-between superficial and deep veins of the leg for draining blood from superficial to deep veins. There are near about 200 perforators in the leg out of which 4 are very important that are Cockett perforators's, Boyd's perforators, Dodd's perforators, Hunterian perforators.

Cockett's perforators
Present at the inferior 2/3 of the leg usually 3 in number- Superior, medium, inferior. All three Cockett's perforators merge with each other and forms posterior arch vein. Greater Saphenous vein pours blood into posterior arch vein which finally drains to posterior tibial vein.

Boyd's perforators
Situated below the knee & drains greater saphenous vein into posterior tibial vein, Popliteal vein.

Dodd's & Hunterian perforators
Situated above the knee & drains greater saphenous vein into femoral vein.

SIRAJA-GRANTHI

According to Acharya Sushruta- In person who are weak and perform more physical exercise vata dosha gets vitiated, invades the veins network and squeezes, dries, constricts them and finally gives rise to an elevated, round swelling of the veins called as Siraja Granthi. According to Acharya Vagbhata- If person exhausted due to exertion immerses himself in water then vata dosha along with Rakta gets vitiated and invades sira causing constriction, dryness, distortion in them, gives rise to granthi which is painless and non pulsating called Siraja granthi.

VARICOSE VEINS

Siraja Granthi can be very well correlated to varicose veins. Varicose vein is a very common condition in surgical practice in which vein become dilated, elongated and tortuous. This condition affects lower limbs especially saphenous vein and their tributaries.

Patho-anatomy of varicose veins

The veins have one directional valve to prevent backflow of blood. The functioning of the venous system depends upon a series of the valves present in the superficial, deep and perforator veins. Varicose veins in the legs are caused due to weakening of veins and incompetency of valves in the great saphenous vein/small saphenous vein. Due to incompetency of valves, blood begins to collect in the legs which results in building up of pressure. Due to this pressure veins become enlarged, tortuous & are visible near the skin surface known as varicose veins. Major valves responsible for formation of varicose veins are valves present in saphenofemoral junction & saphenous popliteal junction.[10]

Pathophysiology of varicose veins

In healthy veins, venous blood flows from superficial veins to deep veins through perforator veins and then from deep veins blood reaches to the heart. One-way venous valves are found in superficial, deep and perforator veins. Incompetency in any of these series of valves leads to disturbances in unidirectional flow of blood towards the heart. Incompetency in the superficial venous system alone commonly results from incompetency of valves located at saphenofemoral junction (SFJ) and saphenous popliteal junction (SPJ). The gravitational weight of the blood column throughout the length of the vein creates hydrostatic pressure which is more harmful for the distal aspect of the vein.

If valves in the perforator veins fail then, the pressure generated in the deep venous system due to calf muscle pump is transmitted to superficial system through incompetent perforator veins and pool of blood is formed in the superficial venous system leading to venous dilatation which then causes greater valvular insufficiency. Afterwards due to more local dilatation other valve sequentially fails then a series of valves fails finally entire superficial venous system become incompetent. Once superficial venous system become incompetent, subsequently perforator and deep venous valvular dysfunction occurs.[11]

Risk factors for varicose veins: Obesity, Age- above 40, Pregnancy, prolong standing and family history of varicose veins.

Symptoms of varicose veins: Aches and pains, cramps, superficial thrombophlebitis, eczema, ulceration.

AYURVEDIC MANAGEMENT OF VARICOSE VEINS

Shodhana Karma

Basti karma
Basti is best treatment for vata dosha & Siraja granthi is the condition of vata dosha dominance.

Siravedh/Jalaukavcharan
According to Acharya Vagbhata, Siraja granthi is vata and rakta dominant disease so Siravedh or Jalaukavcharan are best treatment for Raktadushti

Shaman chikitsa

Sahacharadi tailpan
For vata dosha shaman

Upnaha
Vataghna dravya

Vatashamaka and Raktaprasadak Aushadhis
For example Kaishor guggul, Kanchanar guggul etc.[12]

PREVENTIVE MEASURES FOR VARICOSE VEINS

Exercise
Calf muscle exercise such as plantar flexion and dorsiflexion should be done so that pressure will be created in soleus (Peripheral heart) venous sinuses and due to pressure blood will be pumped from lower limb to heart.

Keeping watch for weight
Valves inside the veins of the leg work hard for overcoming gravity to push blood through, increased weight makes it harder for valves to keep blood flowing through veins and ads to varicose veins.

Elevating legs
Elevating legs prevents pooling of blood in lower limbs & gives veins break by taking pressure off the veins.

Changing sitting or standing position regularly

Eating a high- fibre diet and low salt diet
Eating high fibre diet reduces chances of constipation which is one of the contributors for varicose veins. Sodium in salt causes body to retain water as a result blood volume and pressure is increased which in turn increases pressure on venous system.

Use of crepe bandage or stockings
These are used to support the venous system. They offer graduated compression. This compression when combined with the muscle pump effect of the calf muscle helps for venous return.[13]

CONCLUSION

Siraja granthi is the condition in which vitiated vata dosha enters in sira and causes Aakshep, Samkochana, Vishoshana and in turn produces granthi i.e. Siraja granthi, which can be very well correlated to varicose veins. Varicose vein is the condition in which veins become dilated, elongated and tortuous. It is caused due to weakening of veins and incompetency of the valve. Major contributing factors for varicose vein are occupation involving prolong standing, pregnancy, obesity etc. This condition commonly affects lower limb especially saphenous veins and their tributaries and its incidence is more common in females than males.

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