



## CRITICAL ANALYSIS OF JALAUKA VACHARANA AND ITS EFFECT IN THE MANAGEMENT OF VARICOSE VEINS

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### ABSTRACT

Varicose veins though painless initially may also lead to serious complications including pain, leg cramps, ulceration, poor quality of life discomfort, even loss of life and absenteeism. It is of two types as primary and secondary varicose veins. Pregnancy, obesity, old age, prolonged standing, chronic rise in intra-abdominal pressure, and athletics are some of the various predisposing factors of varicose veins. Primary varicose veins are the one with the defect in the valves of the perforating veins or the superficial venous system. One that occurs due to the obstruction in venous flow such as deep vein thrombosis DVT is called as Secondary varicose veins. *Jalaukavacharana*, also called as Leech therapy is one of the important parasurgical procedure of *Ayurvedic* science that comes under the branch of *Ayurvedic* Surgery. There are number of studies showing the effectiveness of *Jalaukavacharana* in *Vranas* and *Twak vikaras* and least studies showing the effect of *Jalaukavacharana* in the varicose veins though it is very effective in relieving the complaints of the varicose veins and its complications. Present study focuses on the *Jalaukavacharana*, its role and its importance in the management of Varicose veins, which is one of commonest problem affecting the obese people and the ones who stand for longer period. Leech therapy is one of the effective procedures that is affordable, can be administered in day to day practice and even at the OPD level and with no adverse effects. It has shown effective changes both in the management of varicose veins and in reducing its complications after administering the leech therapy with proper examination. More and more number of randomized clinical studies with large sample sizes are required to authenticate the effectiveness of *Jalaukavacharana*.

**Keywords:** Varicose veins, *Jalaukavacharana*, Leech therapy, Primary, Secondary

**INTRODUCTION:** With a prevalence of 20 to 60% worldwide, varicose veins is one the common chronic venous disorder affecting the adults.<sup>[1]</sup> Though painless initially, they may also lead to serious complications including pain, leg cramps, ulceration, poor quality of life discomfort, even loss of life and absenteeism<sup>[1]</sup>

Women are more prone having double the risk of varicose veins compared to men.<sup>[1, 2]</sup> With 10% and 30% worldwide prevalence, lower-limb varicose veins (VVs) are relatively common.<sup>[3,4]</sup> One of the largest studies on UK population has shown prevalence in both men and women 40% in men and 32% in women.<sup>[5]</sup>

Varicose veins are defined as the tortuous, dilated, subcutaneous veins which is more than ( $\geq$ ) 3 mm in diameter.<sup>[6]</sup> Varicose veins are not life threatening but causes a considerable demand on medical care and is disabling.<sup>[7]</sup> This has led to a significant financial burden on the health-care system and loss of precious work hours. It is also said the result of our erect posture. In India, it is 5% and 10–20% of population in the Western world.<sup>[8]</sup>

Primary varicose veins are the one with the defect in the valves of the perforating veins or the superficial venous system. One that occurs due to the obstruction in venous flow such as deep vein thrombosis (DVT), pregnancy, and tumor are called as Secondary varicose veins. Pregnancy, obesity, old age, prolonged standing, chronic rise in intra-abdominal pressure, and athletics are some of the various predisposing factors of varicose veins among which heredity also has its role.<sup>[9]</sup>

In varicose veins, examination should be done in the good light with patient standing and examined for the size and the extent of the varicose veins. Presence of other venous blemishes such as telangiectases should be looked for which may indicate the distribution of varicose veins along the short or long or saphenous venous system.<sup>[10]</sup> Sites of venous incompetence in the varicose veins are best diagnosed by duplex ultrasound scanning.<sup>[11]</sup> Duplex scanning is essential for assessing more complex cases as it displays both venous anatomy and blood flow.<sup>[12]</sup> Surgery has been the optimal treatment for patients with symptomatic veins and substantial venous incompetence for many years.<sup>[13, 14]</sup> Varicose veins may gradually have the recurrence even after surgery or may develop in any other especially legs

by a process of re-growth and enlargement of veins called neo-vascularisation.<sup>[15]</sup>

Conventional surgery includes the ligation of the long saphenous vein flush with the femoral vein which is also called as the saphenofemoral ligation with stripping of the long saphenous vein and phlebectomies.<sup>[15]</sup> Alternatives to stripping of the long saphenous vein are the radiofrequency and laser ablation. Radiofrequency and laser ablation techniques are done under the ultrasound guidance and then ablating the vein in sections that involves passing a probe up the long saphenous vein from knee level to the groin. This method may lead to less bruising and quicker recovery and thereby avoiding a groin incision. Small randomized studies have well documented the benefits of radiofrequency ablation.<sup>[16, 17]</sup> and also in large case series<sup>[18]</sup> but the range of advantages are uncertain.

*Jalauka* means leeches and *Avacharana* means application and therefore *Jalaukavacharana* means application of leeches for the therapeutic purpose. In Ayurvedic science, *Jalaukavacharana* is considered as one of the *Raktamokshana*, a blood-letting technique and a parasurgical procedure that helps to remove the vitiated blood from vitiated areas of the body.<sup>[19]</sup>

Bloodletting or the *Jalauka* is considered as an ancient art.<sup>[20]</sup> To expel out the vitiated blood safely and effectively. *Jalaukavacharana* is considered as the ideal method among the various methods for blood-letting.<sup>[21]</sup> *Sushruta Samhita*, the oldest *Samhitha* or the manual on surgery written by *Sushrutha*, father of both Modern and Ancient surgery has devoted an entire chapter on the description of *Jalaukas* including its types, geographical distribution and the procedure of

*Jalaukavacharana*. It is also claimed to be one of the supreme therapy among the parasurgical procedures because of its high efficacy and safety and in the management of disorders involving the vitiation of blood.<sup>[22]</sup> In this study, an attempt has been made to study the role of *Jalaukavacharana* in the management of varicose veins.

**AIM AND OBJECTIVES:** The aim of the study was to study in detail about the *Jalaukvacharana*, a parasurgical procedure that is explained in *Ayurvedic* School of surgery and Leech therapy and their application in the management of varicose veins and its complications. Sources such as PubMed, Google scholar, and other databases were searched including classical *Ayurvedic* granthas like *Sushrutha samhitha*, *Charaka Samhita*, *Astanga Hrudya* etc.

**JALAUKAVACHARANA:** As mentioned above, *Jalaukavacharana* is one of the methods of bloodletting which is described by *Acharya Sushrutha* and is claimed to be the prime therapy because of its high efficacy and safety and in the disorders involving the vitiation of blood.

**Classification of *Jalauka*:** *Jalauka* or the leech in *Ayurveda* has been classified into two types as *Savisha* and *Nirvisha Jalaukas*. *Savisha jalaukas* are the ones that are found in the ponds of stagnant and turbid water, gets originated in the decomposed urine and faecal matter of toads and poisonous fishes. *Nirvisha jalaukas* are the ones that are found in clear and clean water and these originates from the decomposed purified stems of the several aquatic plants known as *Padma*, *Utpala*, *Nalina*, *Kumuda*, *Pundarika* and vegetable matter.<sup>[23]</sup>

#### Geographical Distribution of *Jalauka*

During *Sushrutas* period, the *Nirvisha Jalauka* were available in *Yavana*, *Pandya*, *Sahya* and *Poutana* that can be taken as *Turky*, *Mathura* etc.<sup>[24]</sup> *Savisha Jalauka*'s are found in decayed dead bodies of poisonous fish, insects, worms and frogs and they live in dirty water.

**Collection of Leech:** *Acharya Sushruta* has described the procedure of collection of leeches in a very simple and easy manner. This should be carried out in the tanks, streams and the water places containing lotuses. Leeches are to be caught with a piece of wet leather, or by applying the fresh meat of dead animals, fish or milk on the thigh of an animal or the human being himself and keeping the applied part in water for some time. By this method, leeches get caught and are made to detach from the person with the application of *Saindhava lavana*. The leeches are slowly collected and stored.<sup>[25]</sup> As per *Acharya Dalhana*, *Sharad Rithu* (autumn) is the best time for collecting the leeches.

#### Preservation and feeding of *Jalauka*

Once the leeches are collected, they should be stored in a new wide earthen pot. The earthen port should be filled with pure water, lotus, *Shaivala* and powder of the stem of small plants and dry meat. Bed should be made out of grass and leaves of plants in the water pot. For food *Shalooka*, *Shaivala*, *Mrunala* (*Kamala Nala*), *Shringataka*, *Kasheruka*, *Mrutsna* (mud), *Pushkarabeeja* *Churna* etc should be placed inside the pot as the food to *Jalauka*. According to *Sushrutha*, water of the pot should be changed every third day and after seven days the pot should be changed. Whereas *Vaghbata* mentions that the pot should be changed once in every five days.<sup>[26]</sup>

#### Application of *Jalaukavacharana*

*Jalaukavacharana* should be administered in the moderate weather and should not be done when the atmosphere is either too cold or too hot. *Sushrutha* also advises to avoid the procedure on the days that is completely covered with clouds and day without the sun. *Rakta doshas* are said to aggravate during the *Sharat Ritu* (autumn) and even the *Raktaja Rogas* and therefore this particular season is preferred for *Jalaukavacharana*. In case of emergencies, *Jalaukavacharana* can be administered in all the seasons with proper precautions. [27]

#### **Procedure of *Jalaukavacharana***

##### ***Poorva karma* (pre-operative procedure):**

The patient to whom the *Jalaukavacharana* procedure is to be administered should be either made to sit or lie down on the table. The area of blood letting should be prepared by rubbing it with mud or the cow dung powder and the area is made dry. [23] Next, the leeches are to be made ready by the application of mustard and turmeric paste over them for a *Muhurta* (48min) and they are to be kept in a vessel of water or the leeches can be kept in the water which is mixed with turmeric powder. By this the leeches get rid of their exhaustion and are ready for application.

##### ***Pradhana karma* (operative procedure):**

Once both the patient and the leech are ready, the leeches are to be applied over the affected site. If they do not stick to the area, then either a drop of milk or blood may be applied. Even after these methods, if it doesn't catch hold of then *Gharshana* over the area can be done either with *Shastra* or the *Patra*. Or else a new leech can be tried. Once it starts sucking the blood, middle portion of its

body gets elevated assuming the shape of a horse shoe and it indicates that the leech is stuck and then it should be covered with a fine wet white cloth leaving their mouth open and the time should be noted down. Leeches are to be withdrawn when the patient starts feeling the pricking pain or itching sensation that is produced at the site of application and inferred that the leech has now started sucking pure blood. Based on this indication the leeches are removed. If it does not come on removal and sticking very hard to the site, *Saindhava lavana* or the turmeric powder should be powder should be applied to the mouth of *Jalauka*. [23]

##### ***Paschatkarma*(post-operative procedure):**

Once the leech is removed from the site, it should be made to vomit by applying turmeric powder or the *Saindhava lavana* to its mouth or, application of the rice powder over its body or by slight pressure put over its hind part slowly and gently upwards towards the mouth. When the leech completely vomits the blood, it is placed in a vessel of fresh water and checked for its activeness. As a post op measure, the wound should be dressed after anointing it with the *Shatadhauta ghrta* or the turmeric powder and bandaged tightly. [23]

##### **LEECH THERAPY:**

Medicinal leech therapy, also called as hirudotherapy is considered as one of the complementary and integrative treatment method. These are applied with blood-sucking leeches. In this procedure, one or more leeches are applied to the skin of problematic area and the purpose is gained by the potential utilities of saliva of the leech that is secreted. [28] The first recorded applications of leeches were observed in Ancient Egypt

and the term leech was obtained from the word “laece” which means physician. [29] Leeches are the segmented, hermaphrodite and carnivorous worms that live in fresh water. They are very sensitive to vibrations on the water, touch, light, heat, sound, and various chemicals. They are multisegmented and each segment has different organs such as ganglions and testicles. [29] A leech digests minimum 10–15 mL of blood per feeding and usually it takes almost 40 minutes. Its digestion is achieved by many enzymes and *Aeromonas hydrophila* and *Pseudomonas hirudinaria* etc mutual microorganisms. Regarding the number of leeches, more than 600 leech species of leeches are found among them *Hirudo medicinalis*, *Hirudo nipponia*, *Hirudo quinquestriata*, *Poecilobdella granulosa*, *Hirudo troctina*, *Hirudinaria javanica*, *Hirudinaria manillensis*, *Macrobdella decora* and *Haementeria officinalis* are the most frequently applied ones. [29]

This leech therapy has been studied on various diseases and widely used in cardiovascular diseases, deep vein thrombosis, postphlebitic syndrome, complications of diabetes mellitus, tinnitus, reconstructive, in reducing the pain of osteoarthritis, microsurgical applications, acute and chronic otitis. [29] These studies have found that leeches in their secretions consists more than 20 bioactive molecules. Their actions have also been studied and reported that these molecules have anti-inflammatory, platelet inhibitory, anticoagulant analgesic, extracellular matrix degradative antimicrobial effects and thrombin regulatory functions. Following the bite of leeches, hyaluronidase (27.5 kDa) and collagenase (100 kDa) enzymes are immediately released to facilitate tissue penetration and

spread of their bioactive molecules which also support the antimicrobial activity. [29, 30]

### **JALAUKAVACHARANA (LEECH THERAPY) IN VARICOSE VEINS**

In a study of Bapat et al, *Hirudo medicinalis* (medicinal leech) was applied to the area surrounding the varicose ulcer in 20 patients with varicose veins. Complications were assessed and patients were monitored for ulcer healing, decrease in hyper pigmentation, oedema and limb girth. The partial pressure of O<sub>2</sub> (pO<sub>2</sub>) of 7 patients' arterial and venous blood was compared to that sucked by the leech. After leech therapy all the ulcers showed healing, while 95 per cent of patients showed a decrease in oedema and limb girth. Seventy five per cent patients demonstrated a decrease in hyperpigmentation. The mean pO<sub>2</sub> of blood sucked by the leech was 40.05 +/- 7.24 mmHg, which was similar to the mean pO<sub>2</sub> of the patients' venous blood (34.33 +/- 8.4 mmHg). [31]

An RCT with 50 patients, divided into 2 groups, 30 in test group and 20 in control group. Control group was treated with grade 2 compression stockings and limb elevation and test group was treated with Taleeq (leech therapy) on alternate days for 2 months. Response was measured by assessment of pain, leg discomfort, limb girth at calf, ankle, and feet, pigmentation area and colour on every 15<sup>th</sup> day. Hb% was assessed on every 15<sup>th</sup> day to check anaemia. Test group showed significant reduction in pain, limb girth, pigmentation, number of perforators and reduction in pigmentation compared to the control group.

Some studies have shown that the leech therapy when administered in combination

with compression stockings in varicose veins patients and in case of obese patients with varicose veins or ulcer, leech therapy should be administered with other treatment modalities like weight loss therapies, physical therapy, dietary modification etc for the effective results. <sup>[31]</sup>

In one of the non-randomized open-label Single arm clinical trial of primary varicose vein that included 30 patients, were administered Ayurvedic treatment for 84 days in combination of *Punarnava guggulu*, local application of *Dasanga lepa* and leech. The treatment showed significant changes in reducing AVVQ score and in the symptoms of varicose veins such as itching, discolouration and numbness. <sup>[32]</sup>

**DISCUSSION:** Varicose veins are the twisted and tortuous veins that occur due to weak or damaged valves. It can occur anywhere in the body but they are most often found in the legs. <sup>[33]</sup> Its high prevalence has made varicose veins to incur higher health care expenditure on treatments. <sup>[34]</sup> Currently several less invasive treatment modalities are available such as radiofrequency or laser ablation of the great or small saphenous veins or both, combined with or without phlebectomy, liquid sclerotherapy, and foam sclerotherapy. Numerous randomized controlled trials and observational studies have been studied to evaluate their efficacy but no treatment has relieved the complaints of the patients completely till date. <sup>[32]</sup>

The use of leech therapy is dated back to 5000yrs, where Acharya *Sushrutha* has dedicated an entire chapter on the same. Medicinal leeches were used by ancient surgeons commonly to treat venous ulcer chronic and non-healing ulcer etc. <sup>[35, 36, 37]</sup>

In ancient times of India, the application of medicinal leeches was widely practiced. In *Sushruta samhita*, we find various indications of *Raktamokshana* mainly on *Jalaukavacharana* in *Chikitsa sthana*. <sup>[38]</sup> Phlebitis and thrombotic states were the two main conditions treated by leech therapy in ancient medical practice. The use of leech or the *Hirudo medicinalis* has increased recent clinical practice due to its effectiveness and applicability. <sup>[32]</sup>

Saliva of the leech contains many important constituents like hirudin, Gelin, and eflins. Presence of Hirudin in leech makes it perform antithrombin III <sup>[10]</sup> activities and therefore it helps in increasing the local blood flow and reduces the skin discoloration. Similar thrombin inhibitors present in leech saliva such as Gelin and eglins C possess anti-inflammatory and known to have effect on inhibiting the activity of  $\alpha$ -chymotrypsin, chymase, subtilisin elastase and cathepsin G. This helps in reducing the local swellings and relieves pain due to its anaesthetic effect. The local infection is reduced as the leech saliva contains antimicrobial activities. <sup>[11]</sup> As per the Ayurvedic concept, as leech therapy necessitates the blood purification it is administered to treat diseases pertaining to the skin. <sup>[12]</sup> In case of varicose veins, it does both the blood purification and also channelizes the circulation of the limbs and hence helps in relieving the severity of the problem.

The present study evaluates the effect of *Jalaukavacharana* or the leech therapy in the management of varicose veins which has high prevalence in the recent days due to the modified lifestyle, profession and working methods. Though there are many studies on the leech therapy, very limited studies are available on the leech therapy

and varicose veins. In this study, a detailed analysis of the leech therapy and varicose veins has been carried out. More number of studies are needed to authenticate the effect of the leech therapy in the management of varicose veins so that it can be applied in day to day practice as it is devoid of any adverse effects when it is applied after examining the patient and observing the indications and contraindications.

**CONCLUSION :** *Jalaukavacharana* is one of prime parasurgical procedure of Ayurvedic science that comes under the branch of Ayurvedic Surgery. There are number of studies showing the effectiveness of *Jalaukavacharana* in *Vranas* and *Twak vikaras* and least studies showing the effect of *Jalaukavacharana* in the varicose veins though it is very effective in relieving the complaints of the varicose veins and its complications. Present study focuses on the *Jalaukavacharana*, its role and its importance in the management of Varicose veins, which is one of commonest problem affecting the obese people and the ones who stand for longer period. Leech therapy is one of the effective procedures that is affordable, can be administered in day to day practice, even at the OPD level and with no adverse effects. It has shown effective changes both in the management of varicose veins and in reducing its complications after administering the leech therapy with proper examination. More and more number of randomized clinical studies with large sample size is required to authenticate the effectiveness of *Jalaukavacharana*.

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