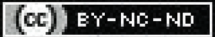


A Brief Review of Varicose Veins in the Upper Limb from an Ayurvedic Perspective

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ABSTRACT

Varicose veins typically occur in the lower limbs, caused by valvular insufficiency leading to the swelling and tortuosity of subcutaneous veins. Although rare in the upper limbs, they can be successfully diagnosed and treated. Rare causes include congenital vascular anomalies like Klippel-Trenaunay syndrome and Parkes Weber syndrome, characterised by Arteriovenous (AV) fistulae. Subclavian vein thrombosis-induced venous outflow obstruction is another uncommon cause. Diagnosis involves a thorough history taking with clinical examination, often supplemented by investigations. Invasive procedures are rarely necessary but may be used in unique cases to define the pathology further. Treatment for upper limb varicose veins closely mirrors lower limb approaches. The stab-avulsion technique combined with stripping of lengthier sections yields outstanding cosmetic and functional results. Surgical ligation with stripping effectively eliminates varicosities with a low risk of recurrence. Sclerosing agents like Sodium Tetradecyl Sulphate and Polidocanol are substitutes for surgery. In cases of varicosities resulting from upper limb arteriovenous fistulae, surgical intervention involving ligation of the distal venous limb or division of the fistula is the standard approach. In summary, while upper limb varicose veins are exceptionally rare, they can be accurately diagnosed and effectively treated with surgical interventions similar to lower limb varicose veins.

Keywords: Circulation, Sclerotherapy, Surgery, Varices, Varix

INTRODUCTION

Varicose veins develop as a consequence of valvular insufficiency within the deep, superficial, and perforating venous systems. This valvular inadequacy results in the backflow of blood, leading to elevated venous pressure and subsequent distension, elongation, and tortuosity of the subcutaneous veins in the lower limbs [1]. The legs represent the most commonly affected area by varicose veins, characterised by the accumulation of blood in the superficial leg veins [2]. This venous condition often results in the swelling and elevation of these veins, causing them to become visible through the skin with a purple or blue hue. Spider veins, a milder form of varicose veins, share a similar vascular pattern [3]. Haemorrhoids refer to varicosity located in the vicinity of the anus, while varicocele pertains to their presence in the scrotal region [4]. Varicose veins occurring in the upper limb are exceptionally uncommon, making this clinical presentation an unusual occurrence in this anatomical region [5]. Varicose veins are a prevalent condition, affecting 40% of males and 32% of females in the age group of 18 to 64 years [6]. No data are available about the prevalence or incidence rate of varicose veins of the upper limb. Given the myriad of physical, social, and psychological ramifications associated with varicose veins, these conditions can exert a substantial adverse impact on an individual's overall quality of life [7]. The presence of severe varicose veins may indicate the presence of chronic venous insufficiency, which impairs the ability of veins to effectively pump blood back to the heart. Individuals with varicose veins might face an increased risk of developing blood clots. These varicose veins are commonly recognised as a characteristic clinical manifestation of chronic venous disease [8]. Varicose veins can be associated with a condition in Ayurveda known as "*Siraj Granthi*" (the occurrence of nodular growth in the body channels) [9]. In this condition, the blood vessels in the affected area become swollen, fibrous, and twisted. The veins responsible for carrying blood lose some of their elasticity [10]. Prolonged periods of standing, carrying heavy loads, exhaustion, and extended walks put a strain on the veins in the lower leg; the same pathology may be applicable, particularly in the arm

and forearm [11]. Consequently, veins in this part, like the cephalic vein, become fatigued and have difficulty pushing blood upwards. Over time, this results in the veins swelling, expanding, and losing their ability to contract and return to their original state, leading to the development of varicose veins in the upper limbs [12]. In the context of "*Siraj Granthi*," two primary imbalanced factors in Ayurveda are "*Vata*" (*dosha* responsible for movement and cognition) and "*Rakta*" (blood tissue). According to Ayurvedic principles, this condition is considered "*Krichhsadhya vyadhi*" (difficult to cure), meaning it is curable with difficulty in its early stages but becomes "*Asadhya*" (non curable) in the later stages [13]. The manifestation of "*Siraj Granthi*" involves the dilation of veins, known as "*Siraakunchana*" (vasoconstriction), and a distortion in the vein structure, referred to as "*Vakreekarana*" (tortuosity). These effects are the result of an accumulation of "*Rakta*" and an aggravation of "*Vata*" in the "*Siras*" (blood vessels), leading to localised congestion. Consequently, this congestion gives rise to symptoms such as "*Shoola*" (pain) and "*Shotha*" (swelling) in the affected area. Acharya Sushruta, often regarded as the Indian father of surgery, possessed a comprehensive repertoire of both surgical and parasurgical techniques, which gave rise to what is known as a four-fold approach for managing various medical conditions. These four procedures are referred to as "*Shastrakarma*" (surgical intervention), "*Ksharakarma*" (use of alkali), "*Agnikarma*" (thermal cauterisation), and "*Raktamokshana*" (bloodletting). This four-fold approach is notably effective in the successful treatment of varicose veins [14]. In contemporary medicine, treatment choices for varicose veins are compression stockings, endovenous laser, sclerosing injection, radiofrequency ablation, and procedures like stripping and avulsion phlebectomy. Additionally, lifestyle modifications, which involve receiving advice, refraining from tight clothing, dietary adjustments, elevating the legs, and engaging in exercise, also play a crucial role in managing this condition [15]. The principles of Ayurveda have proven insightful in elucidating the presentation of this uncommon varicose vein condition in the upper limbs. Lower limb varicose veins have been extensively covered in existing literature [16]. The present review

aimed to explore the uncommon occurrence of varicose veins in the upper limbs, investigate the causes and management of varicose veins in the upper limb, and shed light on the Ayurvedic and modern perspectives.

LITERATURE SEARCH

The search terms “varicose veins of the upper limb,” “varicose veins of the upper extremity,” “varicose veins,” and “*Siraj Granthi*” were employed in searches conducted within the online databases PubMed and Google Scholar. The investigation encompassed a comprehensive review of experimental research, case studies, and case series, focusing on discussions related to the causes and management of varicose veins in the upper limb. The present review excluded studies with unavailable abstracts or those presented in languages other than English, ensuring the inclusion of relevant and accessible scholarly works. Data acquisition was accomplished through the review of classical Ayurvedic texts.

DISCUSSION

Causes of Varicose Veins

Several causes can be attributed to the occurrence of varicose veins. These include:

- 1) **Prolonged standing:** Varicose veins can develop as a result of spending extended periods standing, which increases blood volume and pressure in the upper limb due to the gravitational consequence. Both excess weight and extended periods of standing, often associated with certain occupations, are linked to the formation of varicose veins [17].
- 2) **Pregnancy:** During pregnancy, the body experiences an increase in blood volume, leading to heightened venous pressure. The rise in blood volume during pregnancy, mainly due to increased plasma activity, may further exacerbate this condition [18].
- 3) **Age:** As individuals age, vein valves undergo wear and tear, and the elasticity of vein walls diminishes. These age-related changes contribute to the weakening of the valve system. Reports have shown that a substantial population of adults between the ages of 18 to 64 years may develop varicose veins in the upper limb [19].
- 4) **Obesity:** Excess weight places added strain on veins, impeding their ability to return blood to the heart. This increased pressure can lead to valve dysfunction and leakage. Obese individuals, in particular, seem to be more susceptible to the development of varicose veins in the upper limb due to their body weight [20].
- 5) **Genetics:** Varicose veins can run in families, indicating a genetic predisposition for weakened venous walls. This hereditary aspect plays a fundamental role in the development of the condition [21].
- 6) **Tobacco smoking:** Smoking is associated with an increased risk of varicose veins due to its contributions to oxidative stress [22], hypoxia [23], and endothelial damage [24]. Hypoxia, caused by smoking, leads to localised inflammation, increasing vascular permeability and causing oedema. This process involves various physiological factors contributing to venous insufficiency in the upper limbs [25].
- 7) **Physical trauma:** Trauma to the underlying blood vessels can damage the veins and lead to the development of varicose veins in the upper limb [26].
- 8) **Prolonged activity:** Extended periods of lifting heavy weights can increase the workload on veins, potentially weakening vein walls and valves. When vein walls lose their elasticity and valves malfunction, blood can flow backward, leading to vein swelling and enlargement. The exact cause of varicose veins is not always clear and can result from a combination of these factors, or it may be idiopathic in many patients [27].

Nidana (causes) of Siraj Granthi

According to Ayurveda, the causes of “*Siraj Granthi*” include excessive physical exertion beyond one’s capacity, especially in individuals who are physically weak (*Shramatiyogat*), prolonged walking, particularly in individuals with reduced physical strength (*Adhwagamana*), immersing one’s forearms or legs in water, particularly cold water, engaging in strenuous physical exercise, and involvement in weightlifting activities (*Bharavahana*) [27].

Samprapti (Pathophysiology) of Siraj Granthi

“*Siraj Granthi*” can be attributed to an imbalance in the “*Vata*” within the body. When “*Vata*” becomes aggravated, it may localise in specific areas, such as the upper limb in this case, leading to symptoms like swelling and pain. If not properly managed, this can result in a serious health issue, such as varicose veins of the upper limb. Treating “*Vata*” is crucial in preventing varicose veins [28].

MANAGEMENT OF VARICOSE VEINS OF THE UPPER LIMB

Conservative Management

Conservative treatment for managing varicose veins in the upper limb involves various approaches such as compression, elevation, lifestyle modification, and weight loss. Compression, using items like bandages and support stockings, is employed to enhance blood circulation and alleviate symptoms associated with varicose veins. Elevation of the affected hand is another approach that helps reduce pressure on the veins and promotes improved blood flow. Lifestyle modifications, including regular exercise and avoiding prolonged periods of standing, are recommended to effectively manage varicose veins in the upper limb. Additionally, weight loss is considered a beneficial measure, as shedding excess weight can alleviate strain on the veins, potentially leading to a reduction in varicose vein symptoms [29].

Endovenous and Interventional Management

Endovenous and interventional treatments offer various methods for the management of varicose veins, including sclerotherapy, foam sclerotherapy, Endovascular Laser Ablation (EVLA), surgical ligation and stripping, and ambulatory phlebectomy. Sclerotherapy, a minimally invasive outpatient procedure, targets small and medium-sized varicose veins by injecting a sclerosing solution, prompting the veins to scar and close, ultimately disintegrating them [30]. Foam sclerotherapy, performed under ultrasound guidance, involves injecting a foam solution and is a preferred method for open, visible varicose veins, although it carries a rare risk of severe complications such as soft-tissue necrosis [31]. EVLA utilises a heated catheter inserted into enlarged veins, causing them to collapse and seal closed upon removal-A technique particularly chosen for larger varicose veins [32]. Surgical ligation and stripping involve tying off and removing a vein through small incisions without affecting circulation [33]. Ambulatory phlebectomy utilises hooks to remove varicose veins through tiny skin incisions, representing another effective approach in managing this condition [34].

Ayurvedic Management

Modalities of Ayurvedic management of varicose veins include the following:

- 1) **Basti karma (medicated enema):** It proves to be highly effective in the treatment of “*Vata vyadhi*”, particularly in cases of “*Siraj Granthi*”. According to Acharya Charaka, “*Vata*” plays a paramount role in the development of diseases, and there is no treatment more potent than “*Basti*”. In “*Siraj Granthi*”, an ailment characterised by an aberration in the “*Sira*” channels, “*Basti*” stands out as the primary therapeutic approach. This treatment holds the distinction of being the ultimate remedy, capable of curing various conditions while thoroughly cleansing the interior of the channels [35].

- 2) **Siravyadhana (Venepuncture):** It is a type of *Raktamokshana* (bloodletting). It is said to be '*chikitsardha*', meaning half of the treatment described in *Shalyatantra* (the surgery branch of Ayurveda); similarly, *Basti karma* is also known in *Kayachikitsa* (the medicine branch of Ayurveda). *Raktamokshan* is the process of removing morbid *Rakta* from the body. Acharya Sushruta considered *Rakta* as the fourth *Dosha* of the body; hence, it plays an important role in the manifestation of diseases. It is considered a primary or adjunctive treatment for varicose veins and aims to address imbalances in "*Vata*" and "*Rakta Dhātu*" which contribute to this condition. The procedure involves the middle part of the affected vein being marked and punctured using a *Kutharika* (scalpel) instrument; nowadays, scalp vein sets or intravenous catheters are used to remove blood [36].
- 3) **Jalaukaavacharan (Leech therapy):** It is also a type of *Raktamokshan* and is useful in cases of "*Rakta Vikara*" (diseases caused due to infected blood) to remove infected blood from a specific area. It is considered less invasive than *Siravyadhana* and involves the application of leeches to the affected region, utilising their bioactive compounds to aid in the treatment. Leech treatment has anti-inflammatory and analgesic effects, making it a valuable treatment option for varicose veins [37].
- 4) **Ayurvedic medicines:** Notable formulations include *Kaishor Guggulu*, *Mahamanjisthadi Quath*, *Sahacharadi Quath*, and Capsule *Ksheerbala Aavarti* for the management of "*Siraj Granthi*" [38] [Table/Fig-1].

S. No.	Therapeutic approach	Description
1.	<i>Basti Karma</i> (Medicated enema)	Balances vitiated <i>Vata Dosha</i>
2.	<i>Siravyadhana</i> (Venepuncture)	Balances vitiated <i>Vata</i> and <i>Rakta Dhoshā</i>
3.	<i>Jalaukaavacharan</i> (Leech therapy)	Balances vitiated <i>Vata</i> and <i>Rakta Dhoshā</i>
4.	Ayurvedic medicines	<i>Kaishor Guggulu</i> , <i>Mahamanjisthadi Quath</i> , <i>Sahacharadi Quath</i> , Capsule <i>Ksheerbala Aavarti</i>

[Table/Fig-1]: Ayurvedic management for *Siraj Granthi*.

Preventing and addressing "*Siraj Granthi*" early is crucial for reducing complications and enhancing the quality of life. While varicose veins in the upper limbs are rare, they can be diagnosed and treated successfully, similar to lower limb varicose veins. Although the exact cause is not definitively established, it is likely similar to lower limb varicose veins, potentially related to collagen defects in the vein walls that result in weakness and dilation [39]. In addition to collagen defects, primary valvular incompetence with floppy valve cusps is a recognised cause of deep venous reflux, which can extend to the superficial system, resulting in venous dilatation. Interestingly, varicose veins are notably less common in the thin-walled veins of the arms compared to the lower limbs, likely due to the increased hydrostatic pressure in the lower limbs when standing [40]. There are also rare causes of upper limb varicose veins, including congenital vascular anomalies like Klippel-Trenaunay syndrome [41] and Parkes Weber syndrome [42], as well as congenital arteriovenous fistulae [43], typically seen in haemodialysis patients. Venous outflow obstruction due to subclavian vein thrombosis [44] can be another uncommon cause. The diagnosis of upper limb varicose veins involves a thorough history and physical examination, complemented by non-invasive duplex investigations. Treatment of upper limb varicosities mirrors the approach used for lower limb varicose veins. The stabululsion technique [45] combined with stripping of longer segments yields excellent cosmetic and functional outcomes. Surgical ligation and stripping [46] successfully eliminate the varicosities, with a low risk of recurrence during follow-up. In some cases, sclerotherapy [47] with agents like Sodium Tetracycl Sulphate and Polidocanol serve as a viable alternative to surgery.

When addressing varicosities resulting from upper limb AV fistulae, surgical intervention is the standard approach, typically involving

ligation of the distal venous limb or division of the fistula itself [48]. Leech therapy is proven to be beneficial in providing pain relief and reducing redness, swelling, local warmth, and tenderness in the upper limb joints. These improvements collectively contribute to enhancing joint mobility and, consequently, have a positive effect on the patient's overall quality of life [49]. *Siravyadhana*, a type of blood purification therapy, is beneficial for its effectiveness in treating varicose veins in the upper limbs. By removing the vitiated "*Vata*" and "*Pitta*" *doshas* directly from the affected site, the therapy alleviates symptoms such as pain, dryness, and inflammation, addressing the root cause of the disease [50]. Previous case studies describe patients presenting with varicose veins who were successfully managed using Ayurveda. The patients experienced significant relief in pain, burning sensation, swelling, and skin discoloration, notably after internal oleation, *Snigdha Virechana* (purgation), and bloodletting, with the follow-up showing partial recovery in venous colour Doppler reports, emphasising the effectiveness of Ayurvedic conservative management for varicose veins [38,51].

CONCLUSION(S)

The diagnosis of upper limb varicose veins involves a thorough assessment to confirm the condition's presence and severity. Once diagnosed, a treatment plan can be employed to meet the individual's specific needs. Surgical interventions may be employed in more severe cases, where procedures like vein stripping or endovenous laser therapy can be used to address the issue. In addition to surgical methods, Ayurvedic treatments such as *basti*, *siravyadhana*, and leech therapy can complement the management of varicose veins. These therapies aim to balance the vitiated *doshas*, improve blood circulation, reduce inflammation, and alleviate associated discomfort. They are non-invasive and can provide relief to patients without the need for surgical procedures, making them valuable alternatives or complementary approaches to conventional medical treatments. In nutshell, although varicose veins in the upper limbs are quite rare, they can be accurately diagnosed and effectively treated through a combination of surgical and Ayurvedic interventions.

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