

PRIMARY VARICOSE VEINS PATHOGENESIS AND TREATMENT MODALITIES – A
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ABSTRACT

Valvular incompetence and reflux are seem to be as common features of primary varicose veins, and have long been thought to be their cause. Recent studies and information however, suggests that changes in the vein wall may precede valvular dysfunction. Age, sex, pregnancy, and a positive family history are significant risk factors for the development of varicose veins. Varicose veins have less total elastin than non-varicose veins do; overall collagen content variations are unclear. Every 1 in 4 persons suffers this condition and it goes unnoticed until the condition worsens so early precautions and preventive measures are needed. New researches are being done on bringing the medical and ayurvedic treatments on a board for treating varicose veins. New advancements discussing the personalised treatment and patient centralised curative methods are being studied. Increasing incidences of varicose veins demand less surgical and invasive modes of treatment, so developing novel medications for treatment is a call of hour and researches are made in the same direction.

KEYWORDS: Valvular incompetence, reflux, valvular dysfunction, family history, collagen content.

INTRODUCTION

Long, dilated, and winding veins are known as varicose veins. The Latin word "varix," which meaning twisted, is the source of the English word "varicose." Varicose can occasionally be categorized by to their size and anatomical distribution into trunk, reticular, and hyphen web types.^[1] Varicose veins afflict about one-third of adult population in Western countries. In addition to uncomfortable appearances, patients may have pain, itching, oedema, skin discoloration, bleeding, and ulceration⁵. According to estimates, treating varicose vein problems accounts for roughly 2% of all National Health Service spending in the United Kingdom. It is still unknown what causes primary varicose veins and how they develop. Venous reflux is commonly detected as a result of ventricular incompetence, which has long been assumed to be the main source of vein wall weakening and dilatation.^{[1],[2]}

PATHOGENESIS

When varicose veins are removed after surgery and during angiography, defects such as ripping, thinning, thickening, splitting, and scarring of the saphenous vein valves are more frequently observed than in non-varicose veins. In addition, compared to non-varicose veins, varicose veins exhibit hypotrophy of the valves and valvular annulus enlargement. Less collagen and the

characteristic viscoelastic characteristics of non-varices are present in the valves of varicose veins. Increased inflammatory activity in the valves is indicated by monocyte and macrophage infiltration into the valvular sinuses, which is likewise larger than that in the distal vein wall of varicose veins.^[3]

Here's a thorough look at the progression of this condition

1. **Venous Valve Dysfunction:** Blood going toward the heart is kept from flowing backward by the one-way valves found in healthy veins. These valves deteriorate or get damaged in varicose veins, which leads to their failure. Blood can flow backward and pool in the veins when the valves aren't working properly, which raises the pressure inside the vein.
2. **Increased Venous Pressure:** The backward flow of blood creates increased pressure in the veins. This increased pressure causes the veins to stretch and become dilated. The walls of the veins, which are normally elastic, become less resilient and more prone to damage.
3. **Weakening of Vein Walls:** Over time, the increased pressure and stretching can weaken the walls of the veins. This weakening can lead to the development of varicosities, where the veins become visibly swollen and twisted. The structural changes in the

vein walls are often due to a combination of genetic factors and environmental influences.

4. **Hormonal and Genetic Factors:** Varicose vein formation is mostly influenced by genetic predisposition. Varicose veins are more common in those who have a family history of the disorder. Hormonal fluctuations can also impact vein flexibility and play a role in the development of varicose veins. These fluctuations are particularly common during pregnancy, menopause, and the use of birth control pills and the condition is usually reversible.
5. **Chronic Venous Insufficiency (CVI):** The inability of the veins to adequately return blood to the heart is a disorder that is frequently linked to varicose veins. Prolonged standing, obesity, pregnancy, and other conditions that elevate vein pressure can all contribute to CVI.
6. **Thrombosis and Inflammation:** In certain situations, the condition may worsen due to the development of thrombosis or inflammation in the veins. Inflammation can exacerbate varicose veins by causing additional harm to the vein walls and valves.^[4]

SPECIAL TESTS

1. Tap Test

The exam may entail feeling for a palpable blood wave and watching the veins for any changes in size or form.

2. Cough Test

The medical professional watches how the veins react to the elevated pressure. Venous insufficiency can result from malfunctioning vein valves that enable blood to flow backward and cause a sudden bulge or visible wave of blood in the veins.

3. Trendelenburg Test

The physician tracks the rate at which the veins refill following the relaxation of the blockage. If the valves in a healthy vein system are operating correctly, the veins shouldn't refill right away. Rapid vein refilling is a sign of venous reflux caused by malfunctioning valves.

4. Perths Test

The patient is then asked to stand up while the tourniquet is still in place. This manoeuvre helps to assess how the veins and their valves are functioning under conditions of increased venous pressure.

5. Duplex Ultrasound

To measure vein size and health, check valve performance, and find venous reflux.

MANAGEMENT

1. After Pregnancy

-Improvement is seen after few weeks of delivery.

2. Simple management options

- Weight Loss

- Staying physically more active
- Keeping legs elevated for a while
- Use of compression stockings (only if any arterial disease is not present).^[5]

TREATMENT

1. Compression Therapy: Putting on compression stockings can help lower blood pressure, soothe symptoms, and impede the disease's advancement but the patient should be devoid any history of arterial disease and high blood pressure.

2. Lifestyle Changes: Lowering the body weight, getting regular exercise, and elevating the legs up can all help to enhance venous return and lessen discomfort.

3. Sclerotherapy: Using a sclerosing substance injected into the varicose vein, sclerosing therapy is a minimally invasive procedure that causes the vein to collapse and eventually be absorbed by the body. It is mostly applied to varicose veins that are small.

4. Endovenous Thermal Ablation: Heat is used to seal off varicose veins in procedures like endovenous laser therapy (EVL) and radiofrequency ablation (RFA). These are less intrusive than surgical procedures and are preferred treatments for bigger varicose veins.

5. Surgical Management: Vein Ligation and Stripping: Traditionally, this was the recommended course of action for varicose veins. It entails cutting and tying off the harmed veins.

Ambulatory Phlebectomy: This procedure, which is frequently used in conjunction with other therapies, entails making tiny incisions to remove varicose veins.

6. More Recent Advancements in the treatment of varicose veins are discussed

Venaseal (Cyanoacrylate Glue): This is a relatively new non-thermal non-tumescent procedure in which the varicose vein is sealed using medical adhesive.

Mechanochemical Ablation (MOCA): This procedure closes the vein by mechanically breaking down the venous wall and injecting a sclerosant.^[6]

MEDICINAL DRUGS AND AYURVEDIC TREATMENT

Medical treatments

1. Phlebotomy-Related Drugs: Hesperidin and diosmin are two flavonoids that are frequently used to treat varicose veins. Leg heaviness and swelling can be lessened by them by lowering capillary permeability, decreasing inflammation, and improving venous tone. Aescin, also known as horse chestnut extract, is well-known for its anti-inflammatory and anti-edematous qualities, which enhance venous tone and lessen fluid retention.

2. Anticoagulants: Low Molecular Weight Heparin (LMWH): These medications can stop blood clots from forming and lower the risk of consequences. They are mainly used in situations of superficial thrombophlebitis or deep vein thrombosis linked to varicose veins. Aspirin: In patients with varicose veins, aspirin is occasionally given in modest doses to lower the risk of blood clots.

3. Topical Treatments: Heparinoid Gels: These can be used topically to minimize the appearance of varicose veins and lower the risk of superficial thrombophlebitis as well as discomfort and swelling. Topical nonsteroidal anti-inflammatory drugs (NSAIDs): These medications are used to treat varicose vein pain and inflammation.^[7]

Ayurvedic Treatment

1. Brahmi: The greatest Ayurvedic remedy for varicose veins may be the native Indian plant brahmi. It gives the veins the nourishment they need to tone properly and lessens their tortuosity. Brahmi is consumed along with a mineral supplement, such as Jasad bhasma.

2. Allium sativum, or garlic: Garlic has numerous beneficial qualities, one of which is its ability to heal varicose veins. The protein in the body can be broken down and distributed more uniformly by garlic. As a result, the lower limb region receives more protein.

3. Zingiber officinale, or ginger: Ginger distributes and breaks down protein in the body in a similar way as garlic.

4. Allium cepa, or onion: The right distribution and absorption of protein in the human body are facilitated by onions. It provides inner fortitude. One onion chopped every day can assist find a permanent solution to the varicose vein issue.

Ayurvedic Aspect for Therapeutic use

The Brahmi is the recommended medication by Ayurveda for the treatment of varicose veins.

Brahmi is utilized for four weeks straight in order to obtain long-term advantages. Doses ranging from 10 to 20 milliliters are administered twice daily. The Jasad bhasma is also recommended in addition to brahmi. This bhasma has three advantages: (i) it is an excellent source of zinc; (ii) it promotes collagen production, which aids in blood clotting and healing; and (iii) it increases the amount of vitamin E in the blood. Chandraprabha vati, Nagarjunabhra rasa, and Punarnavadi guggulu are a few other commonly recommended medications.

Certain Ayurvedic oils can be applied topically to provide momentary comfort. These are the tailas of Chandanabala and Prasarini. It is important to use caution while massaging oil directly.

Varicose veins can be treated with yoga poses without the need for medication. The simplest poses to perform for this condition are the Sarvangasana, Pawanmuktasana, and Halasana. Easy workouts such as Exercises like cycling, swimming, walking, and leg stretches while seated are also beneficial.^[8]

RISK FACTORS AFFECTING PATHOGENESIS OF VARICOSE VEINS

- 1. Age:** Increasing age increases risk of getting varicose veins.
- 2. Family history:** in majority of cases varicose veins are seen related with the phylogeny of the disease in the person's family.
- 3. Pregnancy:** Distended veins appear around umbilicus during gestation period
- 4. Obesity:** Increasing weight increases compression around the veins.
- 5. Prolong Standing:** Valvular insufficiency is seen more common in the standing position due to increased blood pressure.
- 6. Deep Vein Thrombosis:** increases pressure on superficial veins.^[9]

RESEARCH GAP AND FUTURE SCOPE IN STUDY OF VERICOSE VEINS

Research Gap

1. Use of Oils or Massage

We find mismatching theories and concepts while studying use of oils or providing message for the treatment of varicose veins. Some studies indicate massaging varicose veins can further damage the veins by increasing the pressure on them.

While some researchers believe use of aloe vera, bramhi or Mahanarayan can improve circulation in the varicose veins.

2. Use of Panchakarma therapy

Some researchers find it useful as it helps to relieve pitta dosh and improve circulation but its effect on varicose veins is still a part of conflict of opinions.

3. Compression Therapy

They undoubtedly have an effect on resolving the symptoms of varicose veins but their permanent or curative effect is still unknown.

4. Effect of varicose veins on the Blood Pressure

Varicose veins effect the venous return to the heart decreasing the preload, but the significance of varicose veins on the change in blood pressure is yet not known.

5. Limited Long-Term Efficacy Data on Newer Treatments are also being studied

Numerous modern varicose vein treatments, including Venaseal, radiofrequency ablation (RFA), and endovenous laser therapy (EVLT), have demonstrated encouraging outcomes in short- to medium-term trials. Nevertheless, long-term studies about their safety and

efficacy are lacking. There are few studies that compare these treatments' durability to more established surgical techniques. It is necessary to conduct research on the long-term efficacy of these novel treatments, including recurrence rates and any side effects. This involves assessing long-term cost-effectiveness, quality of life, and satisfaction with treatment.

Future Research Scope

1. Integrating ayurvedic treatment with modern medicine

The effectiveness and safety of Ayurvedic remedies for varicose veins are not well-supported by scientific research, despite their widespread use. Lacking rigorous clinical trials, the majority of investigations on Ayurvedic therapies are small-scale or anecdotal.

Well-planned clinical trials are required to assess the efficacy of Ayurvedic treatments both on their own and in conjunction with traditional medicines. In addition to evaluating symptom relief, these studies ought to also evaluate objective outcomes like vein closure rates and venous pressure.

2. Exploring Non-invasive diagnostic tools

Presently available techniques for diagnosing varicose veins, including duplex ultrasonography, are efficient but call for specific tools and knowledge. There is still a research deficit in the development of non-invasive, affordable, and readily available diagnostic methods. Research into wearable devices or smartphone apps that track vein health and identify early indicators of vein insufficiency has the potential to completely transform varicose vein treatment.

3. Personalised Treatment

Future studies should concentrate on personalized medical strategies, in which a patient's course of treatment is customized based on their unique genetic composition, way of life, and venous pathology. In order to identify patients who are more likely to experience complications or recurrence, genetic screening may be used. Targeted medicines based on the molecular pathways behind varicose veins may also be developed.

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