IJPSR (2017), Vol. 8, Issue 5 **(Review Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 25 October, 2016; received in revised form, 24 December, 2016; accepted, 31 December, 2016; published 01 May, 2017

VARICOSE VEINS: AN OVERVIEW OF CURRENT AND HERBAL TREATMENTS

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Keywords:

Varicose veins, Venous deficiency, Natural drugs, Antioxidant.

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ABSTRACT: Varicose Veins can be explained as a disorder of the veins (especially of legs) wherein they get affected due to the backward flow and turbulence in the circulation of the blood. The veins get perverted, become enlarged due to a condition called edema. The disease also shows many associated symptoms which worsens the condition of the varicose veins. The present article deals with brief introduction regarding the etiopathogenesis of varicose veins, related causes and symptoms, the current surgical and non-surgical treatments, and the study of natural drugs which may be useful in curing the varicose veins. It indicates the benefits of the natural drugs over the complicated treatments. The natural treatments may prove to be more beneficial and cost effective than the other complex treatments such as surgeries, and laser treatments. The aim of writing this review is to evaluate the role of the herbal drugs for the treatment of varicose veins and the critical analysis of invasive surgeries and complex treatments.

INTRODUCTION: Varicose Veins is common disease which affects one third of the population of which prevalence is observed in the Western Europe and the United States. A study revealed that, from the affected population, there is around 1-73% of females (especially during pregnancy) exposed to this disease and on an average 2-56% of males. Thus, we may conclude that women are more likely to be affected than men [1]. Varicose Veins or Venous Insufficiency is a disease which involves enlargement and gnarling of the Veins usually of legs. In this disorder, there is reflux flow of blood through the valves of legs, hence instability in circulation of blood.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.8(5).1959-66

Article can be accessed online on: www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.8 (5).1959-66

The risk factors of includes age, hereditary, pregnancy, obesity, occupation which involves prolonged hours of standing, Diet, Type of physical activity, Excess use of hormones, etc [2]. These factors are not clearly known yet. Symptoms related to Varicose may not be observed in case of some affected population. If seen the symptoms at initial stages include severe pain, swelling, itching, heavy legs, and lipodermatosclerosis (skin thickening). If left untreated, the further complications lead to bleeding veins, eczema, skin pigmentation or discoloration, venous ulcers, and hence complete vein incompetence. Diagnosis of the disease is done using the duplex scan method of investigation [3].

Duplex Scan: This device is commonly used technique as it helps detecting the refluxed blood flow through the valves and also allows visualizing the superficial and deep veins including surrounding tissues by using the pulsed Doppler ultrasound [4].

Treatment: The traditional treatments for varicose veins included compression therapies- use of special type of compression stockings and socks and surgeries- vein stripping, cryosurgery and ambulatory phlebectomy. But presently there are more effective Non-Surgical Techniques which help healing Varicose Veins better and sooner. These treatments include Sclerotherapy or Foam Sclerotherapy and Endothermal Ablation [5]. There are plenty of natural therapies available for the treatment of Varicose Veins. This mainly includes horse chestnut seed extract, *Centella asiatica*, apple cider vinegar, butcher's Broom, garlic, amla, grape seed extract, citrus fruits, etc. The aim of this article is to introduce the prevention and cure of Varicose Veins using Natural Drug Therapies rather than undergoing the other tricky treatments. **Fig. 1** shows all the treatments at a glance.

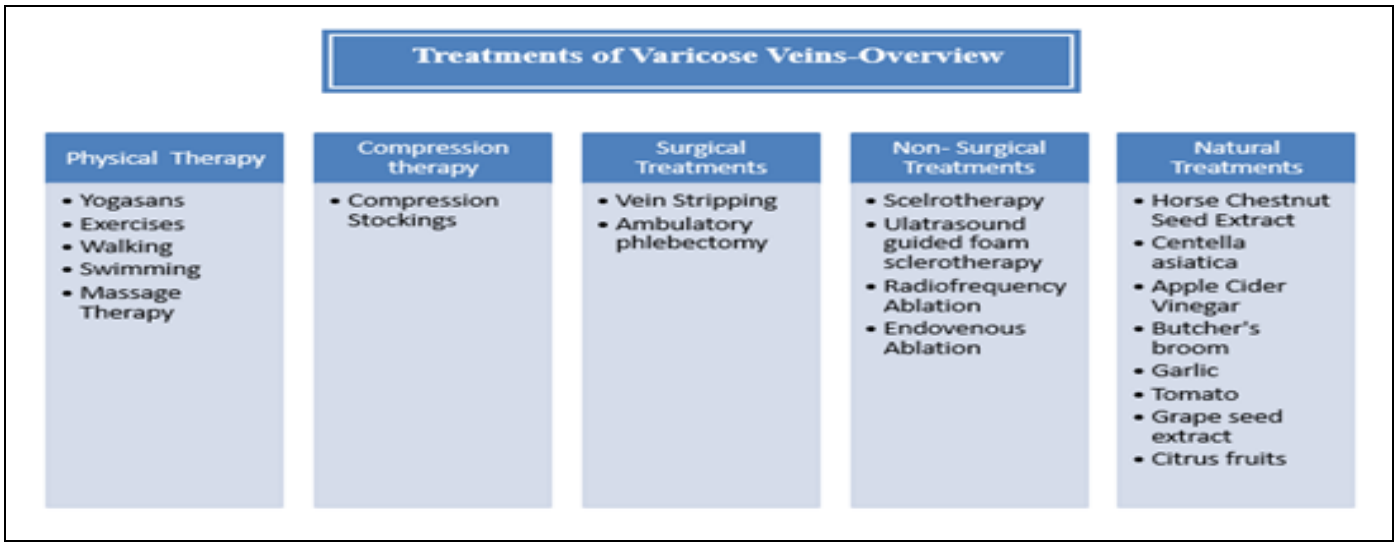

FIG. 1: TREATMENTS AT A GLANCE

Pathogenesis of Varicose Veins: The normal flow of blood occurs from the superficial veins to the deep veins and from the legs up to the heart. Both the pathway for the flow of blood consists of a single-way venous valve. The ineffectiveness of the systems causes difficulty in the flow of blood and hence, leads to backward flow of blood, pooling of blood and in turn venous hypertension. Prior to the venous hypertension, there is increase in the hydrostatic pressure of the calves which then results in failure of the pump mechanism due to the perforating veins. Venous hypertension causes the dilation and distortion of the veins. This causes the venous insufficiency results in Varicose Veins [8]. The diagrammatic representation has been shown in Fig. 2: a and b.

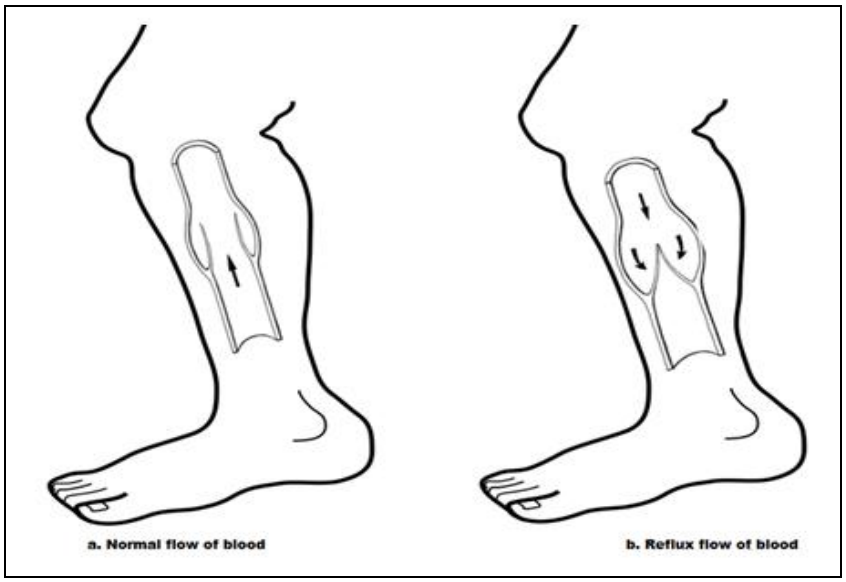

FIG. 2: DIAGRAMMATIC REPRESENTATION OF NORMAL VEINS AND VARICOSE VEINS

Brief Introduction of Current Treatments:

Physical Therapy: Exercise and Yogasans increase the muscle strength, stimulate the flow of blood and enhance the circulation. This relieves pain and other complications and thus promotes healthy veins. Sarvangasana, Halsana, Pawan Muktasana are some the vitalizing and effective yogasans for reducing the complications resulting from Varicose veins. In addition to this, the simple everyday activities such as walking, cycling, swimming, etc. help toning the muscles.

The elevation of the legs using pillows or any other props overnight or for a few hours in the day time is recommended as it helps in better flow of blood. Massage therapy in which the tension is applied onto the muscles in the upward direction of the legs using oils such as citrus oils, olive oil, mustard oil, castor oil etc. also results in good circulation and proper drainage of blood [20].

Compression therapy: The therapy uses the special type of compression stockings which constricts the dilated veins by creating pressure on surface of the calves. Therefore, there is decrease in the passage of the veins which in turn results in increased blood movement towards the heart [2, 11].

Non-surgical Treatments:

a. **Sclerotherapy:** Spider veins or angioectasis is treated using this technique. The technique involves use of sclerosing agents such as sodium salicylate, polidacanol, chroamted glycine which is injected using small needles. The treatment is accompanied with compression stockings to be worn after the sclerotherapy so as to constrict the treated vessels. Side effects to this treatment include scars at the site of injection, neovascularization (formation of petite veins which may take a couple of months to year to disappear), swelling and small ulcers (in severe cases) [2, 7].

b. **Ultrasound guided foam sclerotherapy**: The method involves the damaging of the endothelial layer of the vein so as to create a blockage and scar formation in the dilated veins. The sclerosing agent here is in the form of foam as it provides larger surface area on the wall of the veins. The side effects to this treatment were bubble embolism and thrombophlebitis.

c. **Endothermal Ablation:** The treatment involves use of energy from radiofrequency and lasers to fasten the affected veins. These treatments ensure a rapid recovery. It includes two of the following methods:

i. **Radiofrequency ablation of the Varicose Veins:** The affected veins are heated by using the bipolar generator and inducing radiofrequency catheter into it along with sheath able electrodes. This method is carried out at the temperature of 85±3 °C.

ii. **Endovenous Ablation:** The method involves the closure of the vein by placing the catheter through the saphenous vein at the saphenofemoral junction (under the knee) and passing the laser fiber through it. This method is 98% successful method to cure the venous insufficiency. Complications observes were stiffness in the limb, pain and bruising [2, 4, 7].

Surgical Treatments:

a. **Vein Stripping:** This is a surgical technique in which the affected veins are treated by insertion of special wires made of any suitable material by providing a tear onto the saphenous vein so as to “strip” the veins. The leg is operated by giving general anesthesia and known as bilateral surgery. Bleeding, bruising, infections may be observed as side effects [2, 8].

b. **Ambulatory Phlebectomy**: The method in which the superficial veins are removed by performing incisions in the skin. The procedure is performed on the out patients by the dermatologist. The compression socks are continued to be worn after the surgery for some period of time. Temporary swelling and inflammation may be observed.

Natural Treatments:

Horse Chestnut Seeds Extract: Europe and Germany have been the users of the horse chestnut seed extract **(Fig. 3)** for the management of the chronic venous insufficiencies. Crude or unprocessed seeds are not used because it may prove to be noxious to health. Studies show that it

has been equally efficient in action as the compression therapy. Contents of the horse chestnut seed extract include aescin, tannins, flavanoids, quinines, sterols and some fatty acids, coumarins and scopolin. Of these, aescin is the most active constituent of the horse chestnut seeds and comprises about 16-20%. The vascular permeability of the veins and capillaries is treated by this active constituent aescin. It acts by decreasing the hyper permeability of the veins. It also decreases the inflammation and edema which results in improved venous pressure and blood flow. Besides the extract have the antioxidant properties which help in toning the veins, reduce the vascular permeability and enhance the venous return. The hydroxyl coumarin has the anti-thrombin action on to the veins. Many oral and topical formulations have been utilized [15]. The dose limit for this aescin supplement is as stated in **Table 1**.

TABLE 1: DOSAGE FORMS AND RESPECTIVE DOSE OF AESCIN

Dosage forms	Dose
Aescin (oral)	50-75mg every 12 hours
2% Aescin gel (topical)	Twice/ thrice per day

FIG. 3: HORSE CHESTNUT SEED

Gotu kola *(Centella asiatica)*: The drug Gotu kola **(Fig. 4)** is known for it treats the skin related disorders and also promotes healthy veins. It has also been enlisted in the Indian Pharmacopeia in the 19th century for it has the ability to cure the various skin diseases such as leprosy, varicose ulcers, psoriasis, eczema, etc. Asiaticoside is the active constituent of the plant in which a triglyceride moiety is linked with the aglycone Asiatic acid. It is antioxidant, antiulcer and anti-inflammatory in action. Madecassol is a triterpenoid derivative obtained from the plant. The triterpenoids such as saponins and sapogenins shows the wound healing properties and have vascular effects. The activity is because it increases the collagen formation at the site of injury (wound). Hypertension in veins can be reduced by the compound Centelloside along with its derivatives. These constituents work collectively to strengthen the walls of the blood vessels and enhance the blood flow through the veins.

The permeability of the veins is increases by hyperplasia which is provoked by the active constituents of the plant. The reported doselimits of different dosage forms were stated in **Table 2**. Besides the above dosage forms, gotu kola can also be taken in the form of tea by adding its leaves into the boiling water. This way, the plant drug provides relief from the symptoms of the varicose veins and helps in treating them [16, 17].

TABLE 2: DOSAGE FORMS AND DOSE OF GOTU KOLA

Dosage forms	Dose
Dried leaf infusion capsules	300-680 mg thrice a day
Madecassol tablets	10 mg thrice a day
Emdecassol ointments	Twice a day
Tincture	10-20 ml per day

FIG. 4: GOTU KOLA LEAVES

a. Apple Cider Vinegar: An experiment conducted on a certain group of patients suffering from varicose veins revealed that the application of apple cider vinegar **(Fig. 5)** helped in providing the relief from the pain, edema, irritation, pigmentation, ulceration, fatigue, and other symptoms of the disease. The patients were asked to apply the apple cider vinegar on the affected region and keep it covered using a cloth for about 30 minutes twice a

day for a month along with the doctor's treatment. On the completion of the test, the statistical data showed that there was decrease in the pain, fatigue, edema, itching, pigmentation, and cramps as compared to the patients who were not asked to apply the vinegar. Acetic acid is the most important component of the apple cider vinegar. Other components include pectin, polyphenols, carotenoids. These constituents have the prebiotic and antibacterial activity which results in the health benefits. Thus, it can be concluded that the harmonizing function of apple cider vinegar increases the effect of other routine treatments. No reliable data was found regarding the dose of this drug [18].

FIG. 5: APPLE CIDER VINEGAR

Butcher's Broom: It is also known as *Ruscus aculeatus* **(Fig. 6)**. The plant contains steroidal saponins, ruscogenin, and neoruscogenin as the active constituents. Other chemical compounds comprise of steroidal saponins, sapogenins, sterols, triterpenes, coumarins, flavanoids, glycolic acid, sparteine, tyramine, etc. Roots of the plant contains higher amount of ruscogenins, hence have been used conventionally for the therapeutic purpose. The animal and in vitro studies give an idea about the vaso-constrictive effect of the plant extract and its ability to reduce the vascular permeability. These activities clarify the herb's understandable utility in patients with interminable venous deficiency. Studies state that the plant's activity takes place due to either one of the following reasons; activation of post junctional alpha-1 and alpha-2 adrenergic receptor activation or the alpha-adrenergic obstruction. A study also uncovers that the vaso-constrictive effect may be a result of histamine induced permeability intervened by calcium and alpha-1 adrenergic receptors. The clinical trials; placebo-controlled trials and the open trials showed improvement in the conditions resulting from varicose veins and provided relief from its symptoms such as itching, edema, cramping, and strain in the legs [19]. The dose limits are shown in **Table 3**.

TABLE 3: DOSAGE FORM AND DOSE OF BUTCHER'S BROOM

Dosage forms	Dose
Commercial capsules	30-50 mg thrice a day
Capsules of Ruscogenins	7-11 gm thrice a day

FIG. 6: BUTCHER'S BROOM

Garlic (*Allium sativum*): Garlic **(Fig. 7)** has been used as a customary drug for treating various diseases because of its different medicinal applications and health advantages. The chemical constituents of Garlic include- allicin, allin, ajoene, dially polysufides, S-allycysteine, vinyditthins, saponins, glycosides, amino acids, vitamins and minerals. It helps reducing the blood pressure and also possesses antioxidant properties. Apart from this, it is also said to have protein breakdown ability which distributes the protein substance evenly in the body and hence results in increased supply of protein to the lower limbs. This helps curing the condition of the varicose veins [20].

FIG. 7: GARLIC

***Emblica officianalis*:** The plant known as Amla, or Indian gooseberry **(Fig. 8)** is an important Ayurvedic medicine having enormously high health related benefits. It is rich in Vitamin C, iron and calcium, hence has a powerful antioxidant or free radical scavenging activity which provides protection to the skin. This helps prevention of ulcers and other possible infections. It is also capable of controlling high blood pressures and thus treating the associated complications. The low molecular weight hydrolysable tannins are responsible for protection from the destructive effects of the free radicals by recyclisation of the sugar moieties. This activity of Amla is dependent upon he chemical constituents such as emblicanin A and B, punigluconin and pedunculagin. It is also said to have anti-inflammatory action again due to the presence of high amount of ascorbic acid. Vitamin C helps in improving the fragility of the capillaries. In this way, the varicose veins and its symptoms may be treated by intake of Amla along with the regular diet [22, 24].

FIG. 8: AMLA

Tomato: Tomatoes **(Fig. 9)** are known for their main chemical constitutes Lycopene and β-carotene. It has a crucial antioxidant property resulting from the free radical quenching action of the lycopene. It neutralizes the action of the free radicals that are very unsafe to the health. Moreover, presence of vitamin C and pro vitamin A enhances the action of lycopene and β-carotene. The four constituents have very powerful anti-oxidant properties. It also helps in vasodilation of the constricted blood vessels that is caused due to the high blood pressure and other related causes. The wounds can also be repaired and healed as the chemical moieties promote the development of connective tissues that helps at the time of recuperating of the wound from the body. The flavonoids are beneficial in strengthening the walls of the blood vessels, all contributing towards treatment of varicose veins and allied symptoms [25, 27].

FIG. 9: TOMATO AND LYCOPENE

Grape Seed Extract: The extract consists of a polyphenolic compound, known as proanthcyanidin. The compound is obtained from the seeds of the red grape **(Fig. 10)** and is chemically regarded as oligomeric flavonoid. Proanthocyanidin is said to have anti-oxidant, anti-inflammatory and vasodilating activity. The drug helps in dilating the constricted blood vessels, capillary permeability and reducing the blood pressure to the normal range. The effects of proanthocyanidin were evaluated and it was claimed that the drug was capable of reducing the itching, heaviness, and pain. It was also found to be helpful in reducing the swelling caused due to varicose veins [28].

FIG. 10: GRAPE FRUIT AND SEEDS

Citrus Fruits: The fruits majorly include Oranges, Sweet lime, and Lemon **(Fig. 11)**. The major

constituents of citrus fruits are vitamin C, flavanoids, dietary fibers, folic acid, etc. These components help in treatment of varicose veins as they show anti-oxidant properties similar to Tomatoes and Amla. These fruits have the similar action of quenching the free radicals and preventing their harmful effects. It also helps in lowering the blood pressure and increasing the proportions of High density lipoprotein (good cholesterol). This prevents the narrowing of the blood vessels and thus promotes normal flow of blood through the vessels. Other than this, some studies also suggest that the use of Hespiridin (a flavanoid obtained from orange peels) in combination with Diosmin may be an effective treatment option because of its anti-inflammatory, anti-oxidant and anti-allergic action which helps in reducing the swelling, ulcers, bleeding, cramps, etc. Therefore, helps in treatment of varicose veins [30].

FIG. 11: CITRUS FRUITS

***Rubia cardifolia*:** The dried powder of the stem and root of the plant *Rubia cardifolia* **(Fig. 12)**, commonly known as Indian Madder or Manjistha in hindi is used as the effective blood purifier. The drug is traditionally known for its detoxifying action which helps in purification and thinning of the blood. In addition, the drug also shows anti-inflammatory and anti-oxidant action which soothes the toxic effects of varicose veins [31, 32].

FIG. 12: MANJISTHA ROOTS

Ayurvedic Management: According to the Ayurveda, Varicose Veins is a result of rakta-pitta dosha. Thus, the dosha can be removed by working either of the two mechanisms, that is by purifying the blood using the blood purifiers and blood thinners or by removing the pitta dosha (inflammation). It is suggested that the use of laxatives help in removing the pitta dosha (pitta saran). The mixture of nano ashes of pearl, conch shell, pearl oyster, cowries, coral along with latex of *Calotropis procera*are used for the laxative effect [33].

CONCLUSION: Patients suffering from varicose veins usually have to undergo through various complex treatments, surgical or non-surgical, that involves number of intricate processes and other complications. Although, these methods are highly recommended by the physicians, they have certain drawbacks. The symptoms of the disease may reoccur in some cases if proper care is not taken. In order to get over these hitches, it is necessary to opt for other alternatives such as the herbal drugs. These drugs were found to have all those properties which help in the treatment of the complications related to the varicose veins. These drugs not only assure an enduring effect on the venous disorders but also they prove to be cost effective and help patients recover better. The agenda of this article is to knock down the herbal drugs that can be more effective than other existing treatments of varicose veins. There is a vast scope for research in this field so as to bring up these plant drugs in the form of various dosage forms and assigned doses.

ACKNOWLEDGEMENT: The authors are thankful to the Director, Dean and Associate Dean of School of Pharmacy Technology and Management, NMIMS, Shirpur, Maharashtra, for giving us the opportunity to carry out this review.

CONFLICT OF INTEREST: There is no conflict of interest between the authors.

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How to cite this article:
Mor D and Dande P: Varicose Veins: An Overview of Current and Herbal Treatments. Int J Pharm Sci Res 2017; 8(5): 1959-66.doi: 10.13040/IJPSR.0975-8232.8(5).1959-66.

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