DOI: http://dx.doi.org/10.21088/ijpn.2347.7083.5217.7

REVIEW ARTICLE

Varicose Vein

Nimarta

Nursing Tutor, All India Institute of Medical Sciences (AIIMS), Rishikesh–249201, Uttarakhand, India.

Abstract

Varicose veins are twisted, enlarged veins usually located on the lower extremities cause disfigurement and disability.The prevalence of varicose veins vary. Varicose veins in the lower limbs are estimated to affect at least a third of the population. The risksfactors are family history, obesity, older age, pregnancy, standing for long time. The pathophysiology involves a heredity factors, incompetentvalves, weakened vascular walls. Varicose vein management include conservative treatment include diet, lifestyle changes, and hydrotherapy which require a high degree of patient compliance to be helpful and interventional therapy, surgery. The option of therapy is affected by symptoms, patient preference, cost, potential complications. This review examines risk factors, symptoms, management (conservative and surgery) complication and prevention of varicose veins.

Keywords: Varicose Veins; Pregnancy; Pathophysiology; Obesity.

Introduction

Varicose veins are very common problem with broadly varying estimates of prevalence and it cause disability and impairment in the quality of life. It is easily recognized by their twisted, bulging, superficial appearance on the lower extremities, but they also can be found in rectum (hemorrhoids), and esophagus (esophageal varices) etc [1]. Varicose veins are very common: 40% of men and 32% of women aged 18-64 years have this condition [2].

Franz A, Wann Hansson (2016)conducted explorative qualitative study, it is concluded that patients with varicose veins classified C4 had notable symptoms of the disease that affected daily living, which required the use of different coping strategies to manage symptoms and significant adjustments related to activities and social life were made [3].

Cardia G et at (2012) concluded in article that leg varices is a progressive disease, so the treatment is not confined to a single procedure, adequate monitoring is important during follow-up [4].

Definition

Varicose veins are tortuous, enlarged, palpable-usually blue or dark purple in the subcutaneous tissues of the legs [5], ankle and are often easily visible.All of these veins contain one-way valves to ensure that the blood flows towards the heart, when their valves are usually incompetent so that reflux of blood occurs, and it results invenous hypertension, whichcan cause symptoms.

Incidence

Ebrahimi H et al. (2015) conducted cross sectional

Reprint Request: Nimarta, Nursing Tutor, All India Institute of Medical Sciences (AIIMS), Rishikesh - 249201, Uttarakhand, India.
E-mail: nimartarana@gmail.com

RECEIVED ON 01.06.2017, **ACCEPTED ON** 13.06.2017

study on 197 hairdressers, concluded that varicose veins in the legs of female hairdressers had a high prevalence, and it was associated with increasing age, family history , high blood Pressure, and prolonged standing [2].

The estimated prevalence rate of varicose vein in India providing warning is about 47,928,177 in statistics. According to another estimate, 15 to 20% of population in India is suffering vein disease [7].

Ceap Classification

The method of classifying varicose veins is used based on the clinical severity, aetiology, anatomical location and pathophysiology of varicose veins.

Revision of the CEAP classification for chronic venous disorders (Eklof B et al. 2004) [8].

Clinical Classification

C0: no visible or palpable signs of venous disease

C1: telangiectasies or reticular veins

C2: varicose veins

C3: edema

C4a: pigmentation or eczema

C4b: lipodermatosclerosis or atrophieblanche

C5: healed venous ulcer

C6: active venous ulcer

S: symptomatic, including ache, pain, tightness, skinirritation, heaviness, and muscle cramps, and othercomplaints attributable to venous dysfunction

A: asymptomatic

Etiologic Classification

Ec: congenital

Ep: primary

Es: secondary (postthrombotic)

En: no venous cause identified

Anatomic Classification

As: superficial veins

Ap: perforator veins

Ad: deep veins

An: no venous location identified

Pathophysiologic Classification

Basic CEAP

Pr: reflux

Po: obstruction

Pr,o: reflux and obstruction

Pn: no venous pathophysiology identifiable.

Risk Factors

The most important risk factors leading to thedevelopment of varicose veins are:

- *Age*

As person get older, the tissues of vein walls lose elasticity and as causing the valve system to fail. Evans CJ et al.(1999) done cross sectional survey on 1566 participants concluded that approximately one third of men and women aged 18-64 years had trunk varices [9].

- *Gender*

Women have a higher incidence of varicose vein disease due to female hormones and their effect on the vein walls. Brand FN et al. (1988) examined 3,822 adults, concluded that incidence of varicose veins is higher among women than men, and who had lower levels of physical activity and higher systolic blood pressure and higher smoking rates [10].

- *Heredity*

If parents and grandparents had the problem, it will increased risk of varicose veins.

Lee AJ et al. (2003) conducted study which conclude that, self-reported evidence suggested a familial susceptibility [11].

CornuThenard et al (1994) conducted a case control study on 134 families demonstrated a prominent role of heredity in the development of varicose veins [12].

Kohno K et al (2016) reviewed the data and concluded that genetic factors make a strong contribution to the familial transmission of varicose vein from parents to offspring [13].

- *Prolonged Standing*

Occupations that involve prolonged standing cause increased volume and pressure of blood in the lower limbs due to the effects of gravity.

Kohno K et al. (2014) concluded that that exposure to both prolonged standing at work and overweight exacerbate varicose vein development [14].

Tuchsen F et al. (2000) interviewed 5940 participants concluded that working in a standing position is associated with subsequent hospitalization due to varicose veins for both men and women [15].

- *Hormonal Changes*

These occur during puberty, pregnancy, multiparous, and menopause,post-menopausal, hormone replacement and other medicines containing estrogen and progesterone may contribute to the forming of varicose veins.Lesiak M et al (2012) critically examined the data and conclude that Caesarean section, pregnancy,family factors are associated with inheritance of the formation of varicose changes and venous insufficiency [16].

M. Dindelli et al.(1993) conducted survey on 611 women it concluded that to be secondiparae or more was associated with an increased risk of developing venous disease in pregnancy.Women who developed venous disease in pregnancy reported more frequently a family history of varicose disease than those who did not [17].

- *Obesity*

Being overweight can put extra pressure on veins; this can lead to varicose veins. Seidell JC et al (1986) conducted retrospective cohort study it is concluded that incidence of registered morbidity in the overweight group was higher for varicose veins for women [18].

- *Alcohol and Smoking*

Alcohol/ smoking also increases the risk of varicose veins.

Ahti TM et al. (2010) conducted cross sectional study on 4903 participants, It is concluded that alcohol is likely to increase the risk of varicose veins in women and Smokers had a higher incidence of varicose veins compared with non-smokers in both genders [19].

Musil D et al. (2016) conducted retrospective study on 641 patients concluded that age ≥70 years and obesity were strongly associated with an occurrence of venous thromboembolism [20].

- *Lack of Movement*

Sitting for a long time may force veins to work harder to pump blood to heart, especially when legs bent or crossed.

- *Sun Exposure*

This can cause spi-der veins on the cheeks or nose of a fair-skinned person.

- *Physical Trauma*

Trauma damage underlying blood vessels.

Pathophysiology

Naoum JJ, Hunter GC (2007) mentioned in article that the clinical and histologic features of varicose vein are the result of disruption of the normal structure of the venous wall as a consequence of remodeling of the extracellular matrix in response to increased venous distention and changed hemodynamic shear stress. Even though a number of genes, growth factors and their inhibitors known to vary the extracellular matrix have been implicated in the pathogenesis of varicose vein [21].

Causes of Varicose Vein [22]

The causes of varicose veins may be primary, secondary, or congenital.

- *Primary Varicose Veins*

Varicose veins have a hereditary factor i.einnate weakness in the wall of the vein and occur in some members of the same family.

- *Secondary Varicose Vein*

Varicose veins that develop because of secondary cause i.eafter trauma or deep vein thrombosis.

- *Familial and Congenital Varicose Veins* are due to disorders in the natural development of the venous system, due to vascular mal-formation in the limb, present at birth. Klippel Trenaunay Syndrome (KT syndrome).

Clinical Manifestations

For some people varicose veins are simply a cosmetic problem. For othersit causes more serious signs and symptoms.

- Aching pain that may get worse after sitting or standing for a long time.

  Henriet JP (1992)concluded in article that pain, regardless of its characteristics, its site or its severity, is one of the most constant clinical features of venous thrombosis and It is a warning

sign for the clinician [23].

- Veins look twisted, swollen, and lumpy
- The veins are blue or dark purple
- Throbbing or cramping
- Rash that is itchy or irritated
- Darkening of the skinand loss of soft texture of the skin.
- Swelling
- A minor injury to the affected area may result in longer bleeding than normal
- Heaviness/Tiredness:Tender areas around the veins
- Lipodermatosclerosis - fat under the skin just above the ankle can become hard, resulting in the skin shrinking
- Venous eczema : Skin in the affected area is red, dry, and itchy
- Atrophieblanche - irregular whitish patches that look like scars appear at the ankles.
- Restless legs syndrome

Diagnosis of Varicose Vein [1]

- History taking
- Detailed physical examination in sufficient light
- A positive tap test and negative Perthes test.
- Angiogram
- Doppler test - an ultrasound scan to check the direction of blood flow in the veins and checks for blood clots in the veins.
- Color duplex ultrasound scan
- Tourniquet tests (such as the Trendelenberg test)
- Venography
- Ambulatory venous pressure measurements

Prevention

Oliver R et al. (2007) reviewed 24 articles investigated the different parameters, concluded that leg ulceration has an impact on quality of life [24].

- *Exercise:* Regular exercise is a way to promote increased blood circulation, as well as vein and muscle strength. If already the patient has varicose veins, overly strenuous exercises should be avoided.
- *Weight Control:* Weightcontrol avoids placing increased pressure on leg circulation.
- Avoid sitting for long periods by taking short walks every 30 minutes.
- *Clothing:* Be sure to wear loose-fitting comfortable clothing to help promote good circulation throughout the body.
- *Elevate legs:* Take several short breaks throughout the day to elevate legs above the heart level. This will improve venous circulation.
- *Compression Stockings:* ithelps veins and leg muscles move blood more efficiently. Joseph et al (2016) were reviewed retrospectively medical records of 170 varicose vein cases concluded that use of compression stocking at work place could help in betterment in quality of life [25].
- *Healthy Diet*: Eat low sodium and high-fiber diet. Eating low sodium diet can help to prevent swelling in legs.

  Lozano SA et al (2014) report a clinical case, it is concluded that, nutrition is an important factor in chronic wound prevention and treatment. The prevalence of low extremity wounds increases in population ≥ 65 and malnutrition risk is related due to physiological changes in ageing [26].
- Do not stand or sit for long periods. If person must stand for a long time, shift weight from one leg to the other every few minutes. While sitting for long period, stand up and move around.
- High heels should be avoided for long periods.
- *Be Active:* Moving leg muscles keeps the blood flowing.
- *Control Blood Pressure:* High blood pressure, putting an extra strain on blood vessels and making them more susceptible to becoming varicose veins.

Brown A (2012) reviewed 16 papers, concluded that there is some evidence that increasing physical activity, improving mobility and foot exercises may be beneficial in preventing ulcer recurrence [27].

Treatment [1]

Conservative Measures

- Compression (e.g., bandages,Support stockings)
- Elevation of the affected leg
- Life style modifications
- Weight loss

Endovenous or Interventional Therapy

- External laser therapy

- Sclerotherapy

Surgery

- Ligation
- Phlebectomy
- Stripping

SSubramonia, TA Lees (2007) reviewed studies, concluded that there is no single method of treatment appropriate for all cases. Conventional surgery is safe and effective and is still widely practised [28].

Murad MH et al. (2011) reviewed 39 eligible studies it is concluded that short-term studies support the efficacy of less invasive treatments, which are associated with less periprocedural disability and pain [29].

Sclerotherapy

It is a slightly invasive outpatient procedure.A needle is used injects small and medium-sized varicose veins with a sclerosing solution that scars and closes those veins. In few weeks, the vein should collapse and fade away. Patients can expect to see a 50% - 90% improvement following their first procedure.

Foam Sclerotherapy

Injection of a large vein with a foam solution (air or gas) is also a possible treatment to close a vein and seal it by the guidance of ultrasonography.

Mwipatavi BP et al. (2016) reviewed articles and case reports it is concluded that soft tissue necrosis is a rare complication of foam sclerotherapy,this complication is highly disfiguring and requires aggressive treatment. As such, it should be adequately discussed with the patient prior to obtaining informed consent [30].

Endovascular Laser Ablation(EVLA)

In this method, thin catheter is insertedinto an enlarged vein and heats the tip of the catheter using either radiofrequency energy. As the catheter is pulled out, the heat destroys the vein by causing it to collapse and seal shut. This is a preferable treatment for larger varicose veins.

Cotton SC et al. (2016)conducted a study on 798 participants which conclude that both ultrasound-guided foam sclerotherapy and endovenous laser ablation resulted in more rapid recovery than surgery [31].

Go SJ et al. (2016) conducted a study on 17 patients who underwent who underwent endovascular laser ablation (EVLA), it is concluded that EVLA is an effective and minimally invasive treatment for varicose veins [32].

Surface Laser Treatments

This technique sends strong light through the skin onto the vein. This makes the vein slowly disappear. Laser treatments last for 15 to 20 min-utes. This treatment is not effective for varicose veins larger than 3 mm (about a tenth of an inch).

Surgical Ligation and Stripping

This procedure involves tying off a vein before it joins a deep vein and removing the vein through small incisions. Removing the vein will not affect circulation in leg.

Ambulatory Phlebectomy

Varicose veins are removed with hooks through small skin incisions. Only the parts of leg that are being pricked will be numbed with anesthesia and vein is removed in one treatment.

According to Swedish council on health technology assessment it is concluded that surgery of varicose veins can reduce the recurrence of venous leg ulcers in the elderly [33].

Hydrotherapy

The warm sitz bath is the hydrotherapy is an effective non-invasive therapy for uncomplicated varicoseveins, but requires a high degree of patientcompliance [34].

Complementary and Alternative Medicine

Tobon J (2010)mentioned in that article that one strategy is to adopt a more holistic approach to chronic pain management (venous leg ulcer pain) that includes complementary and alternative medicine therapies [35].

Herbs: [34]

- Horse chestnut
- Pycnogenol
- Gotu kola
- Butcher's broom
- Witch hazel
- Some nutritional supplements are also helpful in varicose vein such as bioflavonoids, vitamin

C,essential fatty acids and dimethylglycine.

Complications

- Skin ulcers
- Superficial thrombophlebitis.
- Bleeding

Aquila I et al (2017)report a case of 88 year old man found dead in a large pool of blood at home. An external examination of the victim showed an ulcer on the left foot and evident varicose veins untreated on the lower limbs. This report emphasize the role of treatment of varicose veins in the prevention of adverse events such as sudden death from acute haemorrhage [36].

- *Deep Vein Thrombosis*

  Engbers et al.(2015) case control study on 401 cases it conclude that clinical features of venous insufficiency ,varicose veins, leg ulcers and leg oedema, are risk factors for venous thrombosis in older people [37].

References

1. Jones RH, Carek PJ. Management of Varicose Veins. Am Fam Physician 2008;78(11):1289-1294.
2. M-C Nogaro, D J Pournaras, C Prasannan, A Chaudhuri. Varicose vein. BMJ 2012;344:e667 doi: http://dx.doi.org/10.1136/bmj.e667.
3. Franz A, Wann Hansson C. Patients' experiences of living with varicose veins and management of the disease in daily life. J clinNurs 2016;25(5-6):733-41
4. Cardia G, Catalano G, Rosafio I, Granatiero M, De Fazio M. Recurrent varicose veins of the legs. Analysis of a social problem; GChir 2012;33(11-12): 450-4.
5. National Clinical guidelines centre. Varicose veins in legs: The diagnosis and management of varicose veins; Commissioned by the National Institute for Health and Care Excellence. July 2013.
6. Ebrahimi H, Amanpour F, BolbolHaghigi N. Prevalence and risk factors of varicose veins among female hairdressers: a cross sectional study in north-east of Iran. J Res Health Sci 2015;15(2):119-23.
7. Statistics by country for varicose veins. Available from: http://www.curesearch.com/v/varicose-veins/stats.html. Accessed 24 may 2017.
8. Eklof B et al. Revision of the CEAP classification for chronic venous disorders: consensus statement. JVascSurg 2004;40(6):1248-52.
9. Evans CJ, Fowkes FG, Ruckley CV, Lee AJ. Prevalence of varicose veins and chronic venous insufficiency in men and women in the general population: Edinburgh Vein Study. J. Epidemiol Community Health 1999;53(3):149–153.
10. Brand FN, Dannenberg AL, Abbott RD, Kannel WB. The epidemiology of varicose veins: the Framingham Study.Am. J. Prev. Med 1988;4(2):96–101.
11. Lee AJ, Evans CJ, Allan PL, Ruckley CV, Fowles FS. Lifestyle factors and the risk of varicose veins: Edinburgh Vein Study. J ClinEpidemiol 2003;56 (2):171-9.
12. CornuThenard A, Boivin P, Baud JM, De Vincenzi I, CarpentiorPH.Importance of the familial factor in varicose disease. Clinical study of 134 families. J DermatolSurgOncol 1994;20(5):318-26.
13. Kohno K et al. Familial Transmission of Hospital-Treated Varicose Veins in Adoptees: A Swedish Family Study. J Am collSurgDermatol 2016;223(3): 452-60.
14. Kohno K et al. Standing posture at work and overweight exacerbate varicose veins: Shimane CoHRE Study. J Dermatol 2014;41(11):964-8.
15. Tuchsen F, Krause N, Hannerz H, Burr H, Kristensen. Standing posture at work and overweight exacerbate varicose veins: Shimane CoHRE Study. Scand J Work Environ Health 2000;26(5):414-20.
16. LesiakMR,Brêborowicz GH KasperczakJ.Risk factors for the development of venous insufficiency of the lower limbs during pregnancy. Ginekol Pol 2012;83(12).
17. Dindelli M, Parazzini F, Basellini A, Rabaiotti E, Corsi G, Ferrari A. Risk factors for varicose disease before and during pregnancy. Angiology 1993;44(5), 361–367.
18. Seidell JC, Bakx KC, Deurenberg P, van den Hoogen HJ, Hautvast JG, Stijnen T. Overweight and chronic illness – a retrospective cohort study, with a follow-up of 6–17 years, in men and women of initially 20–50 years of age. J. Chronic Dis 1986;39(8):585–593.
19. Ahti TM, Makivaara LA, Luukkaala T, Hakama M, LaurikkaJo.Lifestyle factors and varicose veins: does cross-sectional design result in underestimate of the risk. Phlebology 2010;25(4):201-6.
20. Musil D, Kaletova M, Herman J. Risk factors for superficial vein thrombosis in-patient with primary chronic venous disease. Vasa 2016;45(1):63-6.
21. NaoumJJ, Hunter GC. Pathogenesis of varicose veins and implications for clinical management. Vascular 2007;15(5):242-9.
22. Vasular disease foundation. Varicose vein, 2012 www.vasculardisease.org.
23. Henriet JP. Pain in venous thrombosis of the leg.Phlebologie 1992;45(1):67-76.
24. Herber OR, Schnepp W, Rieger MA. A systematic review on the impact of leg ulceration on patient's quality of life. Health qual life Outcomes 2007;25;5:44.

25. Joseph N, B A, Faizanthouseef, Devi M U, Abna A, Juneja I. A multicenter review of epidemiology and management of varicose veins for national guidance. Ann Med Surg 2016;30(8):21-7.
26. Lozano SA, Bonet CM, Bou JE, Llobet Burgues. Nutrition and chronicwound healing. A clinicalcase of a patient with a hard to heal venous leg ulcers. Rev Enferm 2014;37(5):26-30.
27. Brown A.Life-style advice and self-care strategies for venous leg ulcer patients: What is the evidence? J Wound care 2012;21(7):342-4, 346, 348-50.
28. S Subramonia, TA Lees. The Treatment of Varicose Veins.Ann R CollSurgEngl 2007;89(2):96-100.
29. Murad MH et al. A systematic review and meta-analysis of the treatments of varicose veins. J vas Surg 2011;53(5suppl):49 S-65S.
30. Mwipatayi BP, Western CE, Wong J, Angel D. Atypical leg ulcers after sclerotherapy for treatment of varicose veins: Case reports and literature review. Int J Surg case rep 2016;25:161-4.
31. Cotton SC, Maclennan G, Brittenden J, Prior M, Francis J. Behavioural recovery after treatment for varicose veins . Br J surg 2016;103(4):374-81.
32. Go SJ, Cho BS, Mun YS, Kang YJ, Ahn HY. Study on the Long-Term Results of Endovenous Laser Ablation for Treating Varicose Veins.Int J Angiol 2016;25(2):117-20.
33. Swedish Council on Health Technology Assessment, Chronic Ulcers in the Elderly: Prevention and Treatment; 2014.
34. MacKay D .Hemorrhoids and Varicose Veins:A Review of Treatment Options.Altern Med Rev 2001;6(2):126-140.
35. Tobon J. Complementary and alternative medicine for older adults with venous leg ulcer pain.J Gerontol Nurs 2010;36(11):46-53.
36. Aquila I, Sacco MA, Gratteri S, Di Nunzio, Ricci P. Sudden death by rupture of a varicose vein: Case report and review of literature. Me Leg J 2017; 85(1):47-50.
37. Engbers et al. Clinical features of venous insufficiency and the risk of venous thrombosis in older people. Br J Haematol 2015;171(3):417-23.