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A Review on Varicose Veins Management

Ajit Kothari, Meenakshi Yeola*

Department of Surgery, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha, India

ABSTRACT

Varicose veins are a very emerging problem and are seen in nearly 30% of world's population. This condition needs interventions so that it does not cause any further complications and the quality of life is maintained. The purpose of this study is to assess the present day methods of management of varicose veins. Various methods are available in order to manage this problem, each having some pros and some cons. The cost effectiveness, patient compliance, postoperative complications of all this management methods was compared. The newer methods like Endovenous Laser Ablation(EVLA),Radio-frequency Ablation(RFA),Foam sclerotherapy (FS) are gentle, Patient friendly, with lesser risk and side effects in comparison with conventional method of high ligation and stripping; Foam sclerotherapy and radio-frequency ablation are known to have better compliance and requires less time to recover in comparison with both EVLA as well as conventional high ligation; Patient undergoing EVLA and RFA shown to recover faster than the those undergoing high ligation and stripping; Since the past decade, the lesser invasive methods like EVLA, RFA, etc., which do not require hospitalization, have been replacing the conventional treatment modality of ligation and stripping. Due to the increasing incidence of Varicose Vein, it is necessary to know the appropriate management modalities with lesser risk and costs.

Key words: Varicose veins, EVLA, RFA, FS, High ligation and Stripping.

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Corresponding author: Meenakshi Yeola

e-mail✉: mpatil98dent@gmail.com

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INTRODUCTION

Varicose veins are tortuous and dilated veins. They are majorly the tributaries arising from the greater and the lesser saphenous vein. There is overall 10-30% incidence rate of varicose, general they are found in 20-20%men and 25-33% women [1]. Various predisposing factors for occurrence of Varicose veins includes older age, gravid female, female sex, obesity, occupation requiring long standing duration, etc.; exact pathophysiology of varicose veins is not known, but it involves genetic predisposition, incompetent valves, increased intravenous pressure, etc [2]. This tortuous and dilated veins are mainly found in the lower limbs (surrounding the knees), but they can also be seen in Vulva/scrotum (varicocele), rectum (hemorrhoids), and esophagus (esophageal varices) [3]. For treating varicose veins, various treatment modalities are available. Out of which the conventional is vein stripping and ligation; the new, lesser invasive methods are EVLA (Endovenous laser ablation), RFA (Radio-frequency Ablation), FS (Foam sclerotherapy) [4].

MATERIALS AND METHODS

Search strategy and selection criteria-

We reviewed key papers and also undertook searches of electronic database such as PubMed, Medline, Lilacs, and Central. We excluded non English articles, case reports and studies.

The search items for PubMed were 'varicose veins' for the past 10 years, along with 'varicose veins management', 'vein stripping and ligation', 'endovenous laser ablation', 'radio frequency ablation', 'CEAP classification', 'foam sclerotherapy', etc. The South Asian database of

Controlled clinical trials were searched by use of the term 'varicose veins'. Articles were selected based on their effectiveness on varicose veins diagnosis and management. We also checked reference list of articles.

Presentation of varicose veins

Clinical manifestations of this condition have a wide range of clinical features,which ranges from being

asymptomatic to causing cosmetic problems and significant features like discomfort, dull aching pain, skin pigmentation, lower limb ulcer, malleolar flare, atrophic blanche, etc [5]. Due to such variability in clinical manifestations, a system which classifies various venous disorders (chronic) is developed, known as CEAP classification –in which C stands for clinical classification, E stands for etiological classification, A stands for anatomical classification and P stand for pathophysiological classification [6], as shown in following part [7].

The 'clinical classification' is divided into

C-0 No signs of venous abnormality on inspection and palpation.

C-1 Capillary dilation /reticular vein.

C-2 Varicose veins; diameter of Varicose veins is greater than or equal to 3mm which makes it different from reticular vein which are smaller in diameter.

C-3 swelling.

C-4 Changes in skin and subcutaneous tissue following CVD Or C-4a Pigmentation or eczema Or C4-b Fatty skin hardening / white atrophy

C-5 Ulcerative ulcer.

C-6 Venous insufficiency ulceration.

S: Showing symptoms (symptomatic)

A: not showing symptoms (Asymptomatic)

Components of 'etiological classification' are
E-c: Congenital

E-p: Primary

E-s: Secondary

In: Unidentified venous cause

Components of classification based on anatomy
A-s: superficial vein

A-p: perforating vein

A-d: deep vein

A-n: vein position not determined

The last one is 'pathophysiological classification' which consists of
P-r: anti Flow

P-o: Obstruction

P-r, o: Regurgitation and obstruction

P-n: No identifiable vein pathophysiology

Diagnosis
For reaching an appropriate diagnosis, complete history along with physical examination is necessary. Later must be done in standing so that there is maximum enlargement of the veins .Following are various

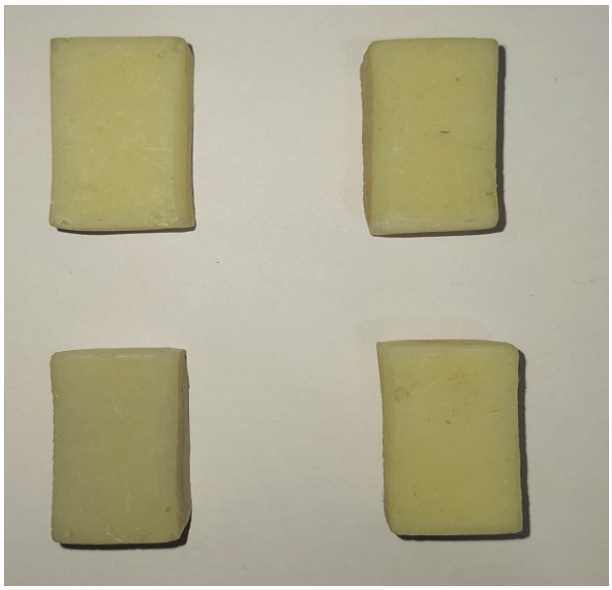

Figure 1: Blocks fabricated and polished from different provisional crown material.

measures for diagnosing varicose veins and chronic venous insufficiency

Duplex ultra-sonography
It is considered as an investigation of choice for varicose veins. It denotes the direction of blood flow. If blood is flowing away from the heart, it is denoted by red color but if the blood is flowing towards the heart,it is denoted by blue reflux. It is done by using beta-mode imaging along with spectral Doppler which helps in showing any venous obstruction in superficial and deep veins [8].

Trendelenburg test
Part 1: Lay the patient down and lift the leg. Empty the leg and strap a tourniquet below SFJ. Then the patient is asked to stand up. Then open the tourniquet. If rapid filling from above then it suggests that there is Incompetence of saphenofemoral junction.

Part 2: Lay the patient down and lift the leg. Empty the leg and tie a tourniquet below the SFJ. Then the patient is asked to stand up.

If there is gradual filling from below to above then it suggests that there is perforator incompetence [9].

Morrisey's cough impulse
Ask the patient to cough, If cough impulse is felt at saphenofemoral junction, it suggests that there is incompetence of SFJ [10].

Schwartz test
Tap over incompetent vein, if thrill is felt at SFJ, it suggests that there is incompetence of SFJ.A palpable conducted impulse indicates the congestion of saphenous vein by blood.

Fegan method & multiple tourniquets test
By this method one can denote the site of incompetent

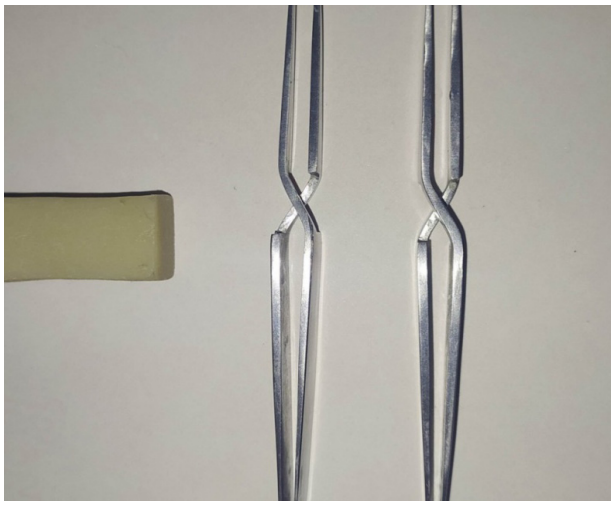

Figure 2: Molar tubes of APC II adhesive coated brackets, bracket placement tweezer and block used in this study.

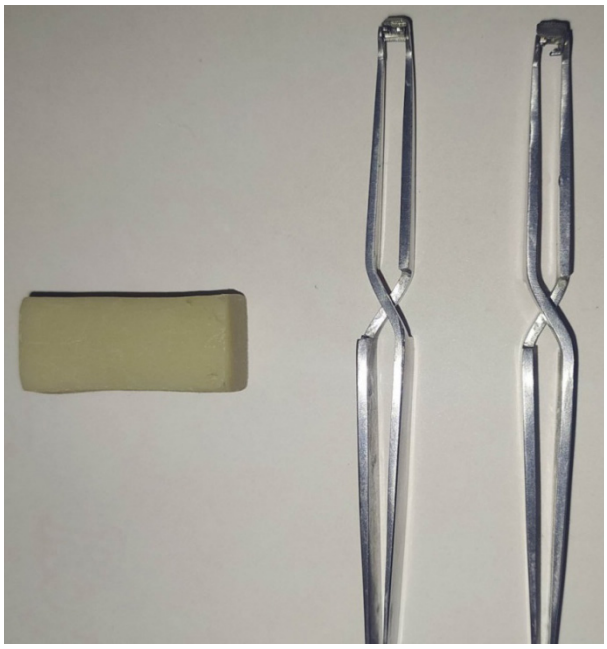

Figure 3: Adhesive precoated bracket and acid-etched block used in this study.

perforator.

Modified Perthes test

In this test we have to tie the tourniquet below the SFJ. (Don't empty the vein) Ask the patient to walk. Normally, the swelling reduces.

Swelling and pain will increase in DVT. Various vein surgeries are contraindicated in DVT9-10.

Management modalities

The first line treatment of varicose veins includes a conventional method which consists of compression stockings, medical management, along with reduction of risk factors by means of weight reduction, regular walking exercise, cessation of smoking, etc.

Compression stockings

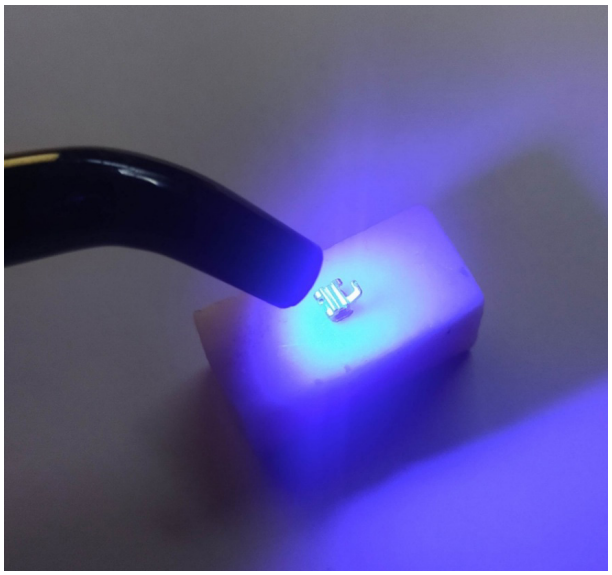

Figure 4: Light curing of the APC II adhesive coated bracket on the block surface.

Figure 5: Bracket bonded on the surface treated block ready for SBS testing.

The use of graded compression stockings provides compression of the lower extremity from the outside which opposes the hydrostatic pressure produced by the increased tension in the veins. Various types of stockings are designed with different tensions in them. Use of 30-40mmHg compression stocking has proven to be most helpful in improving patient's overall condition by reducing pain, swelling, skin pigmentation, etc. If the stockings are being worn on daily basis then it is necessary to change them within 6 to 9 months [11].

Medical management

For treating varicose veins various venoactive drugs with varying success have been used .But the most effective drugs are 'saponins' and 'gamma-benzopyrenes'. These drugs are used to increase the venous tone which in turn makes the vein more permeable. Even though the exact way by which it acts is not known [12].

Table 1: SBS mean and SD values of different materials and surface treatment methods (values in MPa).

Material	Surface Treatment				p-valueX
	SBS Mean ± SD				
	Surface Roughening	Sandblasting	Chemical Conditioning	CO2 laser	
Auto-polymerizing PMMA	10.42 ± 2.54a	9.41 ± 3.05 a	11.41 ± 3.56 a	12.56 ± 3.22 a	0.062
CAD/CAM PMMA blocks	11.89 ± 2.18 a	11.65 ± 4.01 b	12.92 ± 3.11 a	13.29 ± 3.98 c	0.082
bis-acryl	14.16 ± 2.97 a	14.88 ± 3.45 b	15.77 ± 2.84 a	16.08 ± 3.54 a	0.056
p-Value*	<0.001	<0.001	<0.001	<0.001	
XUsing Two-way ANOVA test					
Different alphabets in the superscript indicate statistically significant difference between groups (Tukey's test, α = 0.05).					

Table 2: ARI scores of different materials subjected to various treatment methods.

Material	Surface Treatment	ARI Score n (%)				p-value
		Score 0	Score 1	Score 2	Score 3	
Auto-polymerizing PMMA	Surface Roughening	17	2	1	0	0.0875
	Sandblasting	16	3	1	0	
	Chemical Conditioning	18	1	1	0	
	CO_2 laser	17	2	1	0	
CAD/CAM PMMA blocks	Surface Roughening	18	1	1	0	0.0651
	Sandblasting	17	1	1	1	
	Chemical Conditioning	17	2	1	0	
	CO_2 laser	16	3	1	0	
bis-acryl	Surface Roughening	14	2	3	1	0.0532
	Sandblasting	13	3	2	2	
	Chemical Conditioning	15	2	2	1	
	CO_2 laser	15	3	1	1	

Surgical management

Conventional surgical stripping

For more than a century, stripping and ligation of the Dilated and tortuous varicose vein along with the GSV is considered as the surgery of choice. It is done by making an incision in the groin and upper calf, ligating the great saphenous vein under the saphenofemoral junction and removing it from the incision in the calf. Ligation and stripping is not done below the level of knee as it possess high risk of damaging the saphenous and sural nerve (in case of small saphenous vein). This surgery may have many complications like DVT, hematoma, bleeding, infection, nerve injury, etc [13].

Endovenous thermo ablation

It includes (a) Endovenous Laser Ablation (EVLA) and (b) Radio-frequency Ablation(RFA).Both are less invasive procedures done by the use of catheters .In this procedures, catheter is inserted 2cm below SFJ or SPJ and the thermal energy and radio waves are passed through it to the venous walls respectively. This thermal energy and radio waves leads to inflammatory response causing subsequent fibrosis leading to closure of the vein [14].

Foam Sclerotherapy (FS)

It is the least invasive procedure which uses chemicals known as sclerosants to close the diseased veins. These chemicals are introduced either in liquid form or mixed with gas or air in order to make foam. Various sclerosants available now a days are detergents, osmotic agents like sodium morrhuate, sodium salicylate, etc. This procedure has less complications like bruising, hyper pigmentation, visual disturbances, etc. It is done under duplex USG and use of compression stockings after (FS) is must [15].

Newer modalities

Some newer methods of management are being used and have proven to be helpful in treating the problem. This method includes 'Endovenous glue therapy 'in which cyanoacrylate glue is used. Other is 'TRIVEX' which means Tran illuminated powered phlebectomy, in which subcutaneous illuminator and phlebectomy instruments are used [16].

RESULTS

Surgery versus Compression stockings

Even after being the first mode of management for varicose veins, compressions are not as useful as surgery in severe cases. More over there is difficulty in using compression stockings (fragility, arthritis) or physical limitations (obesity, dermatitis) or venous insufficiency at the same time. Various studies has shown that, half of the patients cannot continue using this for long time [17].

Surgery versus endovenous thermo ablation

According to various clinical studies there is negligible difference in postoperative pains and recurrence rate following the two management methods. The point at which the two techniques differ is that the later is minimally invasive process and has the advantage of faster recovery [18]. Though surgery has exact success rate and no risk of thermal injury but it also possess

more risk of nerve injury [19].

Surgery versus sclerotherapy

It is still not proven that either one method is better than the other in terms of efficacy, but sclerotherapy is associated with low cost of treatment [20]. Moreover, surgery takes a lot of time and hospitalization while sclerotherapy requires less time and no need to stay in hospital after procedure and patient can perform the daily activities immediately after the procedure [21]. Related studies were reported [22,23].

CONCLUSION

Varicose vein is a relatively common and increasing problem. Compression stockings are still considered as the major conservative treatment modality with patient's insurrection being the major problem. Though the minimally invasive treatments are less time consuming and provides quicker go back to daily activities, but surgery is considered as the only method of management which remains effective for a long duration.

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