

A Cross-Sectional Study of Complications and Management of Varicose Veins at SVRRGGH, Tirupati

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ABSTRACT

BACKGROUND

Chronic venous disorders are an important cause of disease and disability worldwide. Varicose veins are dilated, tortuous elongated veins. Varicose veins are either primary or secondary. Most of the patients are asymptomatic. Indian populations present with complications like venous bleed, thrombophlebitis, chronic venous insufficiency leading to edema, eczema, lipodermatosclerosis, and venous ulcers. Varicose vein surgery is characterized by a high recurrence rate of 20 % to 60 % after 5 years and even higher after longer periods of observation. Recurrence may be due to several causes like inaccurate initial diagnosis, progression of disease, inadequate initial surgery, altered venous dynamics, and neovascularisation.

METHODS

In this cross sectional single center study, 100 patients above 18 years of age of both genders presenting with complications of varicose veins and cases of post-operative recurrent varicose veins were included. This study was conducted in the Department of General Surgery, Sri Venkateswara Ramnarayan Ruia Government General Hospital (SVRRGGH), Tirupati, over a period of one year.

RESULTS

In the present study, the great saphenous vein (GSV) was involved in 85 % of cases, the short saphenous vein (SSV) in 2 %, and both long and short saphenous in 9 %. The commonest complication was edema in 88 % of the patients, followed by 43 % with eczema. Recurrent varicose veins were seen in 4 % of patients.

CONCLUSIONS

Complications were more common in our setting at the time of presentation. Variable anatomy of the venous system of the lower limb makes prior duplex scan assessment compulsory in the surgical management of cases. Surgical management is to be planned properly after complete evaluation and should be planned at the right time, as it is a progressing clinical entity.

KEYWORDS

Varicose Veins, Complications, Recurrence, Management

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DOI: 10.18410/jebmh/2021/367

How to Cite This Article:

Vasudha S, Sabita P, Prakash GV, et al. A cross-sectional study of complications and management of varicose veins at SVRR GGH, Tirupati. J Evid Based Med Healthc 2021;8(23):1954-1959. DOI: 10.18410/jebmh/2021/367

*Submission 05-12-2020,
Peer Review 15-12-2020,
Acceptance 30-03-2021,
Published 07-06-2021.*

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BACKGROUND

Chronic venous disorders are an important cause of disease and disability worldwide. Despite the gravity of the problem, little effort has been made to prevent such chronic disorders.¹ Varicose veins, either primary or secondary, have always bothered humankind. Hence, they have been recognized as a chronic disorder, and their discussion is documented from days of Hippocrates. Though a common condition, many times patients are asymptomatic. Western population turns up to treatment for cosmetic reasons. Indian populations present with complications like venous bleed, thrombophlebitis, periostitis, equinus deformity, chronic venous insufficiency leading to edema, eczema, lipodermatosclerosis, venous ulcers.^{2,3}

Varicose vein surgery is characterized by a high recurrence rate of 20 % to 60 % after 5 years and even higher after longer periods of observation. This is bothersome to both patients and treating surgeons as well. Recurrence may be due to several causes like inaccurate initial diagnosis, progression of disease, inadequate initial surgery, altered venous dynamics, and neovascularisation. Recurrence has been attributed to neovascularisation in the granulation tissue around the stump of great or short saphenous veins, or to the development of incompetence in pre-existing collaterals, which had not been adequately ligated by the previous surgeon.^{2,4,5}

Objectives

1. To determine the incidence of various complications occurring in patients of varicose veins.
2. To assess the patterns of recurrent varicose veins and possible causes of recurrence in the patients who underwent varicose vein surgery to the same limb.

METHODS

This is a cross sectional single centre study conducted among hundred patients for a period of one year among the patients admitted with complications of lower limb varicose veins and recurrent varicose veins to the Department of Surgery (outpatients and inpatients), Sri Venkateswara Ramnarayan Ruia Government General Hospital (SVRRGGH), Tirupati, after obtaining the informed consent.

A thorough history was taken and a detailed clinical examination was done. All the clinical tests were done, and patients were subjected to duplex scan. Routine investigations were done, and patients underwent treatment based on their clinical and investigational profile. Postoperative compression therapy was given. The postoperative course was noted, and further, the patients were followed. Recurrent varicose veins were thoroughly evaluated by duplex scan and pattern of recurrence was noted. Time period between initial surgery and onset of recurrence was noted.

The study was approved by the Institutional ethics committee bearing the reference number Lr.No.44 / 2018.

Inclusion Criteria

All patients of age above 18 years of both genders presenting with complications of varicose veins and cases of post-operative recurrent varicose veins were included.

Exclusion Criteria

1. Primary or secondary cases of varicose veins without any complications.
2. Cases of deep vein thrombosis were excluded from the study.

Statistical Analysis

The data was entered in Microsoft excel and was analysed using statistical package for social science (SPSS) version 21.0. Quantitative variables were expressed in mean and standard deviation. Categorical data was expressed in frequencies and association was tested using chi-square and Fischer exact test, wherever appropriate. P value less than 0.05 was considered significant.

RESULTS

In the present study, great saphenous vein was the involved vein in 85% of the cases followed by both great saphenous and short saphenous in 9% of the patients. In the present study, Duplex Scan in the patients revealed incompetence in 57 % at perforators followed by 31% at both sapheno-femoral junction and perforator.

Venous System Involved	Number of Patients	Percentage
Great saphenous vein	85	85 %
Short saphenous vein	2	2 %
Both veins	9	9 %
Only perforators	4	4 %
Total	100	100 %

Table 1. Distribution of Cases by the Venous System Involved

Site of Incompetence by Duplex Scan	Number of Patients	Percentage
SFJ (Sapheno-femoral junction)	5	5 %
SPJ (Sapheno-popliteal junction)	1	1 %
Perforators	57	57 %
SFJ + Perforators	31	31 %
SPJ + Perforators	2	2 %
SFJ+ SPJ + Perforators	4	4 %
Total	100	100 %

Table 2. Distribution of Cases by the Site of Incompetence by Duplex Scan

Complications Present	Number of Patients	Percentage
Edema	88	88 %
Eczema	43	43 %
Lipodermatosclerosis	15	15 %
Thrombosed vein	9	9 %
Stasis ulcer	14	14 %
Venous bleed thrombophlebitis	2	2 %
Thrombophlebitis	4	4 %

Table 3. Distribution of Cases by Complications

Note: Each patient can present with one or more complications

Rare Complications	Number of Patients	Percentage
Equinus deformity	5	5 %
Recurrent varicose vein	4	4 %
Bleeding	1	1 %

Table 4. Distribution of Cases by Rare Complications

Complications

In the present study, 88 % of the patients had edema, followed by 43 % with eczema. 15 % of the patients had lipodermatosclerosis, and 14 % had stasis ulcers. Edema is present in most of the cases. Skin changes due to chronic venous insufficiency and ulcers were seen in varied proportions. In the present study, equinus deformity was seen in 5 % of the patients, and the recurrent varicose veins were seen in 4 % of cases.

Recurrent Varicose Veins

In the present study, in 50 % of recurrent cases, recurrence occurred after more than 10 years, and in 25 % of cases, recurrence occurred after 6 to 10 years. In patients with recurrence, perforators were involved in 50 % cases, great saphenous vein in 25 % of recurrent cases, and both great saphenous vein and perforators were involved in 25 % of recurrent cases.

Time Period between Surgery and Recurrence of Varicose Veins	No. of Patients	%
< 2 years	-	
2 – 5 years	1	25 %
6 – 10 years	1	25 %
> 10 years	2	50 %
Total	4	100 %

Table 5. Distribution of Cases by Recurrence of Varicose Veins

Pattern of Recurrence	Number of Patients	Percentage
GSV (Great saphenous vein)	1	25 %
SSV (Short saphenous vein)	-	
Perforators	2	50 %
GSV + Perforators	1	25 %
Total	4	100 %

Table 6. Distribution of Cases by Venous System Involved in Recurrence

Surgical Procedure Performed	No. of Patients	%
SFJ ligation	1	1 %
Perforator ligation	9	9 %
Graft for ulcer	1	1 %
SFJ ligation + Perforator ligation	3	3 %
SFJ ligation + Stripping of GSV	3	3 %
SPJ ligation + Perforator ligation	2	2 %
Perforator ligation + Graft for ulcer	6	6 %
SFJ ligation + perforator ligation + stripping of GSV	55	55 %
SFJ ligation + SPJ ligation + perforator ligation + stripping of GSV	4	4 %
SFJ ligation + perforator ligation + stripping of GSV + Graft for ulcer	10	10 %
SFJ ligation + SPJ ligation + perforator ligation + stripping of GSV + Graft for ulcer	1	1 %
Total	95	95 %

Table 7. Distribution of Cases by Surgical Procedure Performed

SFJ - Saphenofemoral junction, SPJ - Saphenopopliteal junction, GSV (Great saphenous vein)

Management

Sapheno-femoral junction (SFJ) ligation with the stripping of GSV and perforator ligation is employed in most of the cases. 5 % of cases with complications were treated conservatively and advised surgery later.

DISCUSSION

Varicose veins of the lower limb are a common clinical entity, which starts early in life but remains asymptomatic for a

variable period. In our settings patients present with complications to seek treatment.

Classification of Varicose Veins

1. Congenital: Due to congenital venous anomalies like venous ectasias, congenital absence of venous valves and klippel trenaunay syndrome
2. Primary or idiopathic: Acquired idiopathic variety and cause is due to injury to vein walls and venous valves
3. Secondary: Cause is an underlying deep vein thrombosis or chronic venous obstruction
 - a. Obstructed/incompetent deep venous system
 - b. Following vein valve destruction of the ankle perforators or the short saphenous system as sequelae to deep venous thrombosis
 - c. Following compression on the iliac segment due to pelvic or intra abdominal mass or pregnancy.
 - d. Secondary to A-V fistula

Pathophysiology of Varicose Veins

Varicose veins are a response to a dynamic process of strong retrograde flow and are not just due to static venous distension. It typically consists of a retrograde circuit having four components.

1. A high-level source of outflow from deep to superficial veins
2. A conducting pathway of incompetence down the limb.
3. Re-entry points joining superficial flow to the deep veins.
4. A return pathway provided by the deep veins and the musculo venous pumping mechanisms.

Both this intrinsic venous wall and valve defects contribute to different proportions to result in the broad spectrum of chronic venous disease. Irrespective of the cause, the incompetent venous system results in defective venous pump mechanism, leading to ambulatory venous hypertension, which is the leading cause of the spectrum of disease associated with venous insufficiency

Hypothesis of Venous Hypertention

1. Fibrin cuff hypothesis: It was accepted for a longtime that, perivascular cuff formed from extravasated proteins like fibrin, collagen IV and fibronectin resulted in venous hypertension, and this cuff acted as a barrier to diffusion of nutrients, leading to ulcer formation. Research proved that no such barrier exists.
2. White cell trapping hypothesis: It was thought that leucocyte sequestration in the microcirculation of the leg and their inappropriate activation led to venous hypertension, finally leading to skin changes.

Patterns of Clinical Presentation

The International consensus committee on the chronic venous disease (porter) 1995 has defined

1. Telangiectasia: (Synonym: thread veins, spider veins, venectasia, phlebectasia, venous "flares", Hyphen web veins) are dilated intradermal venules usually less than 1 mm in diameter. They often appear on the legs (particularly the thighs) of women following pregnancy and may be related to hormonal changes
2. Reticular veins: Dilated non-palpable sub dermal vein usually less than 3 mm in diameter
3. Varicose veins: Dilated, palpable, subcutaneous veins greater than 3 mm, due to incompetent great saphenous vein, incompetent short saphenous vein, incompetent perforator vein or combination of these
4. Corona phlebectatica: Fan shaped telangiectasias at the ankle. It is an early sign of advanced venous insufficiency

Venous System Affected

In this study, the great saphenous vein was involved in 85 cases (85 %), the short saphenous vein in 2 %, and both long and short in 9 %. Al-Mulhim et al. King Fahad hospital in their study had found varicosity of great saphenous vein in 68.42 % and only 7.02 % in short saphenous vein. Both involved in 24.56 %. This can be attributed to the longer length of great saphenous vein when compared to the short saphenous vein, which runs in a deep fascial tunnel in the lateral aspect of the calf. The perforator veins are mostly indirect in the short saphenous system, while direct communicating veins are present in the great saphenous system

Site of Incompetence

In the present study, perforator incompetence accounts for 57 %, saphenofemoral and perforator incompetence accounts for 31 %, SFJ incompetence alone of 5 %, SPJ incompetence of 7 %. In the present study, dealing with complicated varicose veins, perforator incompetence was seen in most of the cases and junctional incompetence accounts for nearly half of the cases

Complications

The symptoms of this disease are diverse and bizarre. Symptoms are more common and severe in legs with visible venous disease, when compared to legs without visible disease.⁶ The most frequent complaints for which patient seeks help are -

1. Disfigurement (prominent tortuous veins in the limb)
2. Pain in the limb
3. Edema of the limb
4. Complications of the disease

Chronic varicosities of lower limb present with varied number of complications. Patients with complications seek treatment in our setting. Regardless of the source of increased hydrostatic pressure in the venous system, ambulatory venous hypertension is the main underlying cause of the spectrum of complications.^{7,8,9}

The complications are as follows –

Oedema of the Limb

Increased fluid volume in the skin and subcutaneous tissues leads to edema, and it is of classical pitting type. It starts distally and progresses proximally. Becomes more evident as the day progresses. It becomes relieved by foot end elevation and compression therapy.

Eczema / Venous Stasis Dermatitis

Erythematous dermatitis of the limb due to chronic edema. Characterised by severe itching and discomfort, and may lead to blistering of the skin.

Hyperpigmentation

Also termed as haemosiderosis. Seen in distal calf region or gaiter region. Also seen in the vicinity of varicose veins and incompetent perforators

Lipodermatosclerosis (LDS)

Tight contracted woody leg appearance of the limb due to chronic inflammation and fibrosis of the skin and subcutaneoustissue. Haemosiderosis and LDS are signs of advanced disease.

Thrombophlebitis

Inflammation of the vein wall presenting with pain and redness. It may be caused by trivial trauma, iv cannulation and drug abuse. Mild inflammation may occur following injection of sclerotherapy. It may extend into the deep veins. Chronic or resolved forms may present as partially thrombosed varicosity with a palpable segment of vein.

Fat Necrosis

It is a common complication of varicose veins caused by endarteritis obliterans and associated fibrosis. It commonly affects the subcutaneous tissue of shin just above the medial malleolus. It presents as areas of painful induration and is mistaken for thrombophlebitis.

Equinus Deformity

In long-standing chronic ulcer, the patient walks on toes for pain relief. This leads to shortening and fibrosis of Achilles tendon, leading to the equinus deformity of the ankle joint

Periostitis

It occurs in long-standing cases of venous ulcer over the tibia.

Venous Stasis Ulcers

Full thickness skin loss at the ankle region due to chronic venous stasis and hypertension. It does not heal spontaneously. It is mainly due to deep vein thrombosis, rather than varicose vein alone.

Varicose Venous Bleed

Haemorrhage from varicose veins is a serious complication. It can occur spontaneously from thinned out variceal wall or by trivial trauma. The limb should be elevated to arrest bleeding immediately

Marjolin's Ulcer

In long standing venous ulcer, rarely malignant transformation occurs, resulting in raised and everted edges, and when it infiltrates healthy surrounding skin presents with enlarged inguinal lymph nodes. In the present study, oedema accounts for 88 %, eczema for 43 %, lipodermatosclerosis for 15 % and ulceration for 14 %.

Recurrent Varicose Veins

In the present study of 100 cases, recurrent varicose veins were seen in 4 %. 1 case recurred below 5 years of intervention. This is a case of secondary varicose veins who sustained blunt injury to abdomen and pelvis bone and femur fracture with probable distorted venous anatomy, which would be the cause for early recurrence. 1 case recurred between 6 and 10 years after intervention. 2 cases recurred after 10 years of intervention. The pattern of distribution of sites of incompetence is atypical, and 4 % of cases is a low number to categorise and analyse.

Management

Conservative treatment was given to all the patients pre-operatively.

Conservative / Nonoperative Treatment

The main objective is to improve symptoms caused by venous hypertension.

1. External compression using elastic hosiery.¹⁰ This is the first measure, and acts by reducing ambulatory venous pressure, improvement in skin microcirculation and an increase in subcutaneous pressure, which decreases transcapillary fluid leakage. It should be worn by day only. ABPI of less than 0.7 is a contraindication for compression therapy. British classification for stockings according to the pressure exerted - Class 1-14 to 17mm of Hg; Class 2 -18 to 24 mm of Hg; Class 3-25 to 35 mmHg.
2. Lower limb elevation for two brief periods during daytime, such that feet must be at above heart level
3. Exercises that activates the calf muscle pump, which decreases ambulatory venous high pressures.

Surgical Management

SFJ and SPJ ligation, stripping of GSV up to the knee, perforator ligation, grafting for ulcers were employed. Trendelenberg procedure is employed in every case involving GSV. Post-operative compression was followed routinely to prevent hematoma formation after stripping and were advised to wear elastic crepe bandage/stockings for three to four months. Sclerosant therapy was not tried in the present study. Endovenous ablations and newer methods were not employed in this study.

Varicose Ulcer Management

In venous ulcer associated with primary varicose veins, the Bisgaards line of conservative treatment and ablative surgery is effective in ulcer healing. Compression therapy plays the main role. Compression is by means of a four-layer bandaging system using orthopaedic wool, cotton crepe,

elastic bandage and cohesive bandage. Newer biological dressings with fetal keratinocytes and collagen dressings are tried. If the ulcer is large, pinch grafts or simple skin grafts are done after excising the ulcer. In the case of post-thrombotic ulcers, a similar line of conservative treatment is tried. If it fails, venous reconstructive surgery should be considered.

Pharmacological Treatment in Venous Ulcer Disease

Efficacy of pentoxifylline, in the treatment of venous leg ulcers has been reported in recent meta-analysis. It acts by inhibition of cytokine-mediated neutrophil activation. Treatment with pentoxifylline along with compression is more effective. Prostaglandin E1 (PGE1) has profound effects on the microcirculation and reduces cholesterol levels in the vessel wall. It is a potentially useful drug in treatment of venous ulcers.

CONCLUSIONS

Chronic venous insufficiency of the lower limb is a debilitating clinical condition, resulting in the morbidity of significant percentage of the population. Complications were more common in our setting at the time of presentation. Variable anatomy of the venous system of the lower limb makes prior duplex scan assessment compulsory in the surgical management of cases. Surgical management is to be planned properly after a complete evaluation and should be planned at the right time, as it is a progressing clinical entity. Incompetent perforator veins in the region of calf and ankle are to be attended accurately to avoid further complications of ambulatory venous hypertension leading to chronic ulcer formation. Further, long duration prospective studies are required to analyse the pattern of recurrent varicose veins.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

We are thankful to the Department of General Surgery, in our hospital for helping us to conduct this study.

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