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Research Article

An Evaluation of the Clinical Outcomes of Commonly Practised Surgical Management Techniques for Varicose Veins in a Tertiary Care Setup

[1]Dr. Amit Mahajan, [2]Dr. Anuj Chabhra, [3]Dr. Anil Luther, [4]Dr. Renji Mathew
[1]Assistant Professor, [2]PG Resident, [3]Professor, [4]PG Resident, Department of General Surgery, Christian Medical College, Ludhiana, Punjab, India

***Corresponding author**
Dr Renji Mathew
Email: drrenjimathew@gmail.com

Abstract: Aim of study to evaluate the outcome of the management of lower limb varicose veins by conventional surgeries. Varicose veins are enlarged, tortuous, subcutaneous veins that commonly occur in the legs. The incidence of chronic venous insufficiency & selected varicose veins is variable & fluctuated according to factors such as age, sex and geographic location. Recent U.S data have revealed nearly twice as many women with varicose veins as men (27.7 Vs15%). Extrinsic environmental factors, as well as intrinsic pathology conditions, contribute to this disease, including family history, obesity, older age. Clinical presentation, along with Doppler ultrasound scanning enables a reliable pre-operative diagnosis. Surgery is the best-known treatment for varicose veins, especially when great saphenous vein is involved. This involves sapheno-femoral or sapheno-popliteal disconnection, stripping of the great saphenous vein & removal of superficial varicosities and sub-fascial ligation of incompetent perforators. The purpose of this study is to evaluate the clinical outcome of surgical management of varicose veins.
Keywords: Varicose veins, Incompetent perforators, Sub-fascial ligation, chronic venous insufficiency, venous ulcer, great saphenous vein, varicose veins surgery

INTRODUCTION

Varicose veins are enlarged, tortuous, subcutaneous veins that commonly occur in the legs. The principal superficial leg veins are the great saphenous vein (GSV), which ascends in the inner side of the leg from the inner arch of the foot up to the femoral vein, and the small saphenous vein (SSV), which runs from the outer arch of the foot up to the popliteal vein via the back of the leg [1]. In patients with all stages of chronic venous insufficiency (CVI), the proportion of limbs with total saphenous reflux (GSV and SSV reflux) ranges from 22% to 35%. By contrast isolated SSV reflux accounts for only about 14% of the limbs with CVI [2].

The incidence of chronic venous insufficiency and related varicose veins is variable and fluctuates according to factors such as age, sex, and geographic location. Extrinsic environmental factors, as well as intrinsic pathologic conditions, contribute to this disease, including family history, obesity, older age, pregnancy and female gender [3]. The main factors involved in its development are age, obesity, family history, female sex, and multiple pregnancies. Together with the clinical presentation, Doppler ultrasound scanning (DUS) enables a reliable preoperative diagnosis [3]. Current options for eliminating target reflux include compression bandages, high ligation, ligation and stripping (L&S), EVA, sclerotherapy, and ambulatory phlebectomy. Each of these techniques has its own role in the treatment of patients with symptomatic varicose veins or CVI. The modern vascular surgeon should be comfortable in applying these procedures in a thoughtful manner based on the patient's individual needs. However in Indian scenario, the use of newer modalities is also limited by the availability of facilities and affordability of patients. CMC Ludhiana caters to a mixture of urban suburban and rural population – true representation of any developing cities of Punjab. The majority of patients referred to the vascular surgical clinic have C 2 disease (simple varicose veins). Patients with C3-6 disease are demonstrating an increasing severity of chronic venous insufficiency, and all have a functional abnormality of the venous system. These patients are most at risk of chronic ulceration and require specialised tests [4]. Assessing results of any treatment requires well-defined outcome measures, and this is particularly difficult for varicose vein surgery. Possible outcomes include relief of symptoms, adverse sequelae of surgery and freedom from recurrent varicose veins [5]. Our center has been performing only the conventional surgical managements for varicose veins. The results of this study can easily be extrapolated to represent a majority of centers, which still perform only open surgical management of varicose veins.

MATERIALS AND METHODS

This was a prospective study for 1 year and retrospective for 9 years conducted in Department of Surgery from 1st January 2003 to 31st December 2012. All patients were assessed on the basis of clinical examination and Doppler ultrasonography. All patients were categorized on the basis of CEAP classification and those who require surgical treatment will be included in the study. Patients with incompetent sapheno-femoral junction underwent stripping and ligation of sapheno-femoral junction, patients with incompetent perforators underwent sub-fascial ligation of the incompetent perforators, multiple stab avulsions were done for varicosities. All patients underwent dressing change at 48hr and follow up was done at regular interval postoperatively till 3 months. The evaluation was done on the basis of relief of symptoms and post-operative complications as per protocol; complications such as DVT and Pulmonary Embolism were assessed by radiological examination. The results of the study were analyzed statistically.

INCLUSION CRITERIA

All patients above age of 18 years who required and were willing for varicose vein surgeries in our institution were included in the study.

EXCLUSION CRITERIA

- Patients with recurrence after previous management
- Patients whose initial presentation were with complications like thrombophlebitis, lymphangitis, DVT, infected ulcers, were excluded
- Patients with severe systemic illnesses such as bleeding diathesis, hepatic dysfunction, malnutrition, which can profoundly affect the outcome of surgeries, were excluded.

RESULTS AND ANALYSIS

The present study was conducted to evaluate the clinical outcome following surgical management of varicose veins in the department of general surgery in Christian medical college and hospital Ludhiana from the time period 1st January 2003 to 31st December 2012. A total of 97 patients were operated for varicose veins during this period. The study was divided in two groups namely, The Retrospective group which included the period between 1st January 2003 to 31st December 2011; and The Prospective group which included the period from 1st January 2012 to 31st December 2012. (Table-1). Out of the total number of 97 patients in the study group, the retrospective group included 81 patients and the prospective group included 16 patients. The results of the study were summarized as follows:

The majority of the varicose veins surgeries in the study population were done in the age group of 31 to 40 years.

The majority of the patients that is 67(69.07%) were males in the study population. Dilated veins were seen in 96 (98.96%) patients in the study population (Figure-1). Lipodermatosclerosis was seen in 64(65.97%) patients. Patients who had pain in the lower limb were 62 (63.92%). Venous Ulcer as a main presenting complaint was seen in 18 (18.55%) of patients. Edema of the lower limb was observed in 9 patients (9.2%). Ankle Swelling was observed in 7 of patients (7.21%). Eczema as a presenting symptom was observed in 3 (3.09%) of patients. In male, dilated veins, lipodermatosclerosis, and pain in the lower limb, were most common symptoms. In females, dilated veins, pain in the lower limb and lipodermatosclerosis were most common symptom. In 63 patients (64.94%), calf tenderness was the main finding on examination. Peripheral pulses in the lower limb were seen in all patients in the study group (Table-2). Tredelenburg test was positive in 95 patients (97.93%), modified Perthe's test in 47 patients (48.45%), Schwartz test in 2 patients (2.06%) patients. Fegan test was not appreciated in most of the patients in the study population. In the study population, left lower limb varicosity, above the knee was found in 63 patients (64.94%) and below the knee was found in 71 patients (73.91%). In the study population, right lower limb varicosity, above the knee was found in 33 patients (34.02%) and below the knee was found in 45 patients (46.39%). All patients had undergone subfascial ligation of incompetent perforator as part of surgical treatment (table 3). 96 patients (98.96%) had undergone flush ligation of SFJ and stab avulsion of varicose veins and 10 patients (10.3%) had also undergone flush ligation of SPJ. Maximum patients in the prospective group of study population were discharged after 48 hours of surgery. After 3 months of follow up following surgery, 68 patients (70.1%) had uneventful recovery, 3 patients (18.75%) in prospective group and 26 patients (32.10%) in retrospective group had complications. Most common complication seen in patients following surgical management of varicose veins in our study was ecchymosis and wound infection (table 4), 8 patients in each (8.25%). Postoperative paraesthesia was seen in 7 patients (7.21%) on follow up. Lymphatic complication in 5 patients (5.15%) and blister on ankle in 1 patient (1.03%). No patients in our study population had thrombophelibitis of GSV, DVT and pulmonary embolism.

Table-1: Grouping of Study Population

	Number	Percentage (%)
Retrospective group	81	83.51
Prospective group	16	16.49
Total	97	100

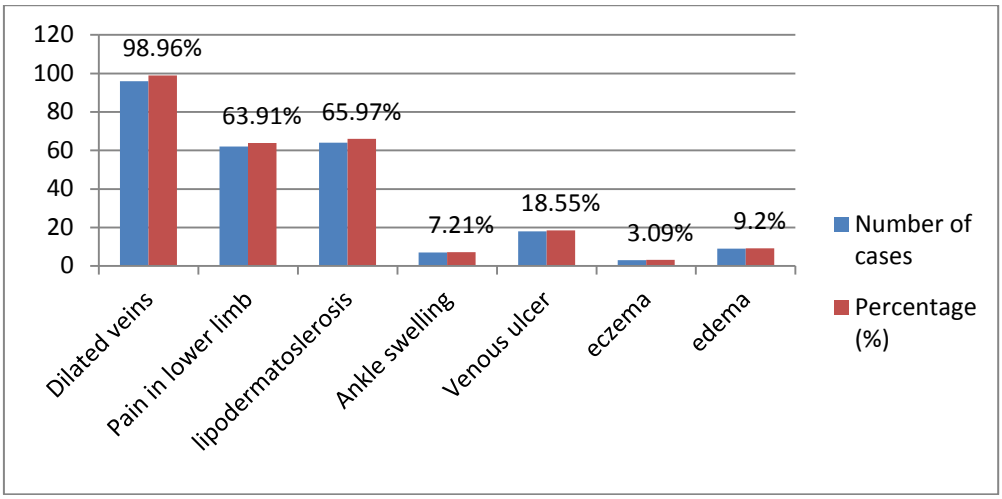

Fig-1: Presenting Symptoms

Table-2: Clinical Examination

Examination	Number of Patients with Positive Findings	Percentage
Peripheral pulses in lower limb	97	100
Tenderness	63	64.94
Venous dilatation	96	98.96
Positive Trendelenburg test	95	97.93
Positive Modified Perthe's test	47	48.45
Positive Schwartz test	02	2.06
Positive Fegan test	00	00
Left limb above knee varicosity	63	64.94
Left limb below knee varicosity	71	73.91
Right limb above knee varicosity	33	34.02
Right limb below knee varicosity	45	46.39

Table-3: Details of Conventional Surgery

Treatment Given	Number of Cases	Percentage (%)
Flush ligation of Sapheno- femoral junction(SFJ)	96	98.96
Flush ligation of Sapheno-popliteal junction(SPJ)	10	10.30
Subfascial ligation of incompetent perforator	97	100
Stab avulsion of varicose veins	96	98.96

Table-4: Complications of Varicose Vein Surgery in All Patients

Complications	Number of Cases	Percentage (%)
Ecchymosis	08	8.25
Wound infection	08	8.25
Paraesthesia	07	7.22
Lymphatic Complication	05	5.15
Thrombophelibitis of GSV	00	00
Blister on ankle	01	1.03
DVT	00	00
Pulmonary Embolism	00	00
Total	29	29.90

DISCUSSION

Varicose veins are tortuous, twisted, or elongated veins**.** The primary cause of the condition is poorly functioning valves and decreased elasticity in the vein walls, resulting in venous reflux (reversed blood flow in the vein); it may also be the result of prior thrombotic events**.** The resultant blood pooling leads to an enlargement of the veins, with smaller vessels developing telangiectasia (spider veins), and larger vessels such as the saphenous veins becoming elongated and tortuous. The symptoms of patients with varicose veins can include: aching leg pain, leg swelling, throbbing, night cramps, restless legs, leg fatigue and heaviness, and/or itching and burning**.** Untreated venous reflux has also been associated with various complications such as rupture of varices with hemorrhage and superficial thrombophlebitis. It may also lead to chronic venous insufficiency (CVI) with prevalence increasing with age**.** CVI itself is a pathological condition of the skin and subcutaneous tissues that is secondary to prolonged stasis of venous blood flow**.** The clinical signs of CVI result from venous hypertension occurring over time causing chronic inflammation, which further leads to a spectrum of conditions including edema, hyperpigmentation, eczema, lipodermatosclerosis and ulcers. Leg ulcers represent the disease end point for severe CVI [6-12]. Varicose veins are generally identified by their twisted, bulging, superficial appearance on the lower extremities. They also can be found in the vulva, spermatic cords (varicoceles), rectum (hemorrhoids), and esophagus (esophageal varices) [13]. Risk factors include chronic cough, constipation and family history of venous disease, female sex, obesity, older age, pregnancy, and prolonged standing. The exact pathophysiology is debated but it involves a genetic predisposition, incompetent valves, weakened vascular walls, and increased intravenous pressure [14].

Signs and symptoms of saphenous nerve injury are common at long-term follow-up their greater saphenous vein stripping to the ankle. However, there appears to be little, if any, significant resultant morbidity. The risk of saphenous nerve injury should therefore not be considered a reason to avoid stripping of the greater saphenous vein to the ankle**.** Invagination of the GSV in uncomplicated primary varicose may be associated with less surgical trauma compared to a conventional stripping technique [15, 16].

Flushing of the great saphenous vein tunnel with bupivacaine plus adrenaline significantly reduces postoperative pain and hematoma formation in patients. Endovenous vein obliteration without high ligation dramatically reduces the presence of varicosities and refluxes and, when performed with the prescribed pull-back methodology, is comparable with vein stripping at 1 and 2 years. Patient satisfaction with the procedure is high at 2 years, regardless of technical outcome. At 2 years, the closure procedure is a viable alternative to stripping [17, 18].

Symptomatology of varicose veins varies greatly. Patients may present with complications like venous ulcer, bleeding or thrombophlebitis. In study by G. R. Kompally 2009, 75% patients have heaviness in legs **[**19]. Itching & cramping were the other common symptoms. This finding correlates with Edinburgh's vein study, which describes aching/ heaviness as the commonest symptom in women and itching as the commonest symptom in men and showed that 39.7% of men and 32.2% of women had dilated veins of lower limb [20].

A study comparing Radiofrequency ablation with great saphenous vein stripping revealed similar closure rates of great saphenous vein but quality of life index was superior in Endovenous radiofrequency ablation group [21].

Gohel et al. observed that superficial venous surgery in addition to compression therapy for chronic venous leg ulceration reduced ulcer recurrence and improved ulcer free time when compared with compression alone but does not improve ulcer healing. Chronic leg ulceration is common and distressing for patients and an important financial burden for healthcare providers. These long term findings support the early results from the effect of surgery and compression on healing and recurrence study and present a cogent argument for the widespread provision of colour duplex scanning and superficial venous surgery for patients with chronic venous leg ulcers [22].

Varicose vein is a common surgical problem. The incidence of varicose veins varies among different populations. We do not have much statistical data of varicose veins in India but incidence in India is on the rise. This could be because of environmental factors and life style changes [23]. In the present study there were total of 97 patients with primary varicose veins who were admitted, investigated, operated and followed up. The results were analyzed. In our study the age range was from 21-73 years**.** Most of the study population belonged to age group 31-40 years in which there were 26 patients (26.8%). The second commonest group was the age group 41-50 years 25 patients (25.77%). Malhotra et al. in their study comprising 677 patients from both North India and South India had an age range from 18-65 years [24]. Among the 97 patients who were operated for primary varicose veins, 67 patients (69.07%) were males and 30 patients (30.92%) were females**.** The male to female ratio in our study was found to be 2.2:1 which was slightly more than Burkitt et al. [28] study that showed a ratio of 1.5:1.

As noted in the observation an increased incidence of varicosity was noted on the left side. The cause for the increased incidence on the left side is not

mentioned in any of the text books but could be attributed to the longer course traversed by left iliac vein [25]. The presence of symptoms such as heaviness, aching or swelling and clinical or ultrasound evidence of saphenous vein reflux is generally accepted as indications for surgery. Obvious indications for surgery are skin changes ascribed to varicose veins, superficial thrombophlebitis and bleeding. Complications of varicose vein surgery are rare. Minor complications are skin nerve injuries, hematomas, infections and lymphatic fistulas. Major complications include injury to the femoral vein or artery. If the preoperative assessment is accurate and the principles of selective surgical treatment are followed, the surgeon is able to perform a curative operation with a low complication rate and excellent cosmetic results [26]. This study showed that the risks of varicose vein surgery are not trivial and that a complication of some sort occurred in 29/97(29.89%) of patients. Complications in the prospective group of our study were 3/16 (18.75%), which was comparable to study done by G. Critchley et al in which 107/599 patients (18%) had complications following surgery [26]. Many of the minor complications and even some of the major ones are probably preventable. Evidence in the literature suggests that postoperative swelling, bruising, hematoma formation and thromboembolism can be reduced by adequate postoperative compression [27]. In Present study no patient in the study group had pulmonary edema after surgery of varicose veins. G V Miller et al. [28] and Hagmuller GW [29] in their study reported 0.2% and 0.06% cases of pulmonary embolism postoperatively during follow up. The reduction in thromboembolic complications is likely due to a number of factors, use of venous thromboembolic prophylaxis in high risk cases and replacement of standard crepe bandages with compression bandaging as crepe is thought not to exert even or reproducible compression on the limb and is more prone to variation in tension, and has been shown to result in greater blood loss as a result of poor compression [27].

Comparison of unilateral surgery versus bilateral surgery suggests that an increased length of time on the operating table does not increase in incidence of thromboembolic complications, although some patients may undergo bilateral surgery by two surgeons operating synchronously. Early mobilization may play a role, as may the prolonged use of anti-embolic stockings. A significant number of the more major complications appeared to occur after surgery performed by relatively inexperienced surgeons. This agrees with findings in the literature that poor outcome from varicose vein surgery and postoperative complication rates are directly influenced by operator experience. Patients undergoing bilateral surgery did not suffer complications any more readily than those undergoing unilateral surgery, and their length of hospital stay are significantly longer than those undergoing unilateral surgery [28]. There is definitely reduction in the complication rate if an experienced Vascular Surgeon does the surgery, as which has been seen in the prospective group of our study.

CONCLUSIONS

This study has demonstrated that the risks of varicose vein surgery in General Surgery Department, Vascular Unit of Christian Medical College Ludhiana, are not trivial and that a complication of some sort occurred in 18.75% patients in prospective group and 32.10% patients in retrospective group. Many of the minor complications and even some of the major ones are probably preventable. Minor complications are skin nerve injuries, hematomas, infections and lymphatic fistulas. Major complications include injury to the femoral vein or artery. If the preoperative assessment is accurate and the principles of selective surgical treatment are followed, the surgeon is able to perform a curative operation with a low complication rate and excellent cosmetic results. Complication rate was much less in the prospective group as nearly all the surgeries in the prospective group were done by an experienced vascular surgeon, however which was not the case in the retrospective group.

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