

# Varicose Veins: Predisposing Factors and Patient Outcome After Surgery

VIKAS DEEP GOYAL, SANJEEV SHARMA, ATUL MAHAJAN, RAM KISHAN ABROL,  
VISHAV CHANDER, PRITESH MAHESHWARI

## ABSTRACT

**Background:** Retrospective analysis of risk factors associated with varicose veins and results of surgical treatment over a period of two years.

**Methods:** From February 2012 to January 2014, 22 patients underwent surgery for varicose veins. Their mean age, sex, body mass index, symptomatology, associated diseases, surgical technique, wound infection, hospital stay and complications have been evaluated.

**Results:** Twenty two patients underwent surgery for varicose veins. Mean age of the patients in the study was  $40.23 \pm 11.67$  years, Mean body mass index was  $21.60 \pm 3.18$  and mean hospital stay was  $7.26 \pm 2.51$  days. Majority of patients in this study were males, non-obese and of young and middle age group. There was no operative

mortality and no major complication. Three patients had minor wound infection. Follow up was completed for 81.81% patients and mean follow up time was  $1.13 \pm 0.61$  years. Significant number of patients in this study were smokers and alcoholic.

**Conclusion:** Female sex, obesity and old age were not found to be the predisposing factors in this study in contrast to the western literature. This study highlights that predisposing factors vary from region to region and between different races. Smoking and alcoholism were found to be the predisposing factors for varicose veins in this study. Conventional surgery for varicose veins is a very safe procedure with negligible mortality and morbidity rates.

**Key Words:** Conventional surgery, Patient outcome, Predisposing factors, Varicose veins

## INTRODUCTION

Varicose veins is a common disease found in adults. Most of the literature is from western countries [1,2,3] with limited data available from India [4]. Various predisposing factors for development of varicose veins as reported in literature are deep vein thrombosis, prolonged standing, obesity [5], female sex, hypertension, old age and in many cases where there is no predisposing factor it is labeled as primary or idiopathic. This study was conducted to analyze the results of conventional surgical treatment for varicose veins over a period of two years and risk factors associated with varicose veins and whether the predisposing factors as mentioned in western studies also applies to Indian subset of population or the predisposing factors differ between different regions, dietary habits, life style, genetic built up and environment.

Patients of varicose veins present with features of fatigue, heaviness in legs, leg cramps and in case with severe disease pigmentation and or non-healing ulcer develop over the medial aspect of leg above medial malleolus. Studies in literature have also reported depression like symptoms in patients of varicose veins [6]. Many patients undergo treatment of varicose veins

for cosmetic reasons, other indications are edema of limb, difficulty in walking, pigmentation and non-healing ulcer. Treatment options for varicose veins are, compression stockings, injection sclerotherapy, stripping and ligation, multiple ligation and recent advances like foam sclerotherapy, endovenous laser ablation and radiofrequency ablation [7]. Most patients get significant relief from the symptoms after surgery with better quality of life and self esteem.

## PATIENTS AND METHODS

From February 2012 to January 2014, 22 patients underwent surgery for varicose veins. Their demographic data, preoperative, intraoperative and postoperative characteristics are shown in [Table/Fig-1, 2 and 3].

### Patient Selection

#### Patients with following indications were selected

1. Symptomatic cases of varicose veins with severe incompetence of either saphenofemoral junction or saphenopoliteal junction with or without perforator incompetence.

2. Patients having severe varicose veins, pigmentation of skin and or ulceration.
3. In cases with bilateral disease, the side with more severe disease was operated first.

#### Following patients were not included in the study

1. Patients having history of deep vein thrombosis with varicose veins.
2. Patients who were suffering from severe systemic disease and were not fit for surgery.
3. Patients of mild disease without incompetence of either sapheno-femoral junction or sapheno-politeal junction.
4. Patients having perforator Incompetence only

All the cases were thoroughly investigated with routine blood tests, colour doppler study of the involved limb in venous phase and cases who had evidence of Deep Vein Thrombosis (D.V.T) on colour Doppler examination were not included in the study. All the cases were operated under spinal or combined spinal and epidural analgesia. Cases having sapheno-politeal junction incompetence (SPJI) were operated under spinal anesthesia and cases of sapheno-femoral junction incompetence (SFJI) with perforator incompetence (PFI) were operated under spinal or combined spinal and epidural analgesia. In cases having combined SFJI, SPJI and PI the territory with more severe varicosity was operated first. In cases with bilateral disease, the side with more severe disease was operated first.

### Surgical approaches

#### High Ligation and Stripping of Great Saphenous Vein (GSV) with Ligation of perforators

All patients who underwent ligation and stripping of GSV with ligation of perforator the surgical technique and steps were similar. Before shifting the patient to operating room, sites of perforator incompetence and bunches of dilated varicose veins were marked with a marker pen with patient in a standing position. Patients were operated under spinal or combined epidural and spinal anesthesia. Oblique incision in the groin 1 finger breadth below inguinal ligament centered over femoral vein was used in all the cases, great saphenous vein (GSV) was identified and its branches were ligated and divided,

Age group (Years)	n (%)			Mean age (years) ± SD		
	Male	Female	Total	Male	Female	Total
21 – 40	8 (36.4)	4 (18.2)	12 (54.5)	34.25 ± 6.69	28.25 ± 6.85	32.25 ± 7.07
41 – 60	7 (31.8)	--	7 (31.8)	44.71 ± 2.14	--	44.71 ± 2.14
61 – 80	3 (13.6)	--	3 (13.6)	61.67 ± 0.58	--	61.67 ± 0.58
Total	18 (81.8)	4 (18.2)	22 (100.0)	42.89 ± 10.90	28.25 ± 6.85	40.23 ± 11.67

**[Table/Fig-1]:** Distribution of patients according to age group & sex

after division of the branches sapheno-femoral junction was identified and saphenous vein was doubly ligated and divided and transfixated flush at its junction to femoral vein, the other end was clamped in an artery forceps. The GSV was then exposed at the ankle anterior to medial malleolus and through a small incision in the vein the metallic vein stripper was inserted so as to come out of the other end in the thigh incision after releasing the artery forceps, some manipulation of the stripper during its passage was usually required. The vein was then tied around the stripper tightly and stripper was pulled out gently stripping the vein in its entire length. In cases with ulcers or deep pigmentation around the ankle area, stripper was passed retrogradely from the upper end of the vein with some manipulation up to distal one third of leg above the ulcer area and incision was given over the site after stripper was felt, the vein was incised over the stripper and was tied over the stripper After the tip of stripper came out of the vein. The vein was ligated and divided distal to the exit point of the stripper. The stripper was then pulled out bringing out the vein through the thigh wound. Multiple transverse small incisions were used for ligation and division of remaining dilated veins at the previously marked sites. Standard closure was done and pressure bandage applied.

#### Ligation and removal of Short Saphenous Vein (SSV)

All patients who underwent ligation and division of SSV with removal of dilated veins the surgical technique and steps were similar. Before shifting the patient to operating room sites of perforator incompetence and bunches of dilated varicose veins were marked with a marker pen with patient in a standing position. Patients were operated under spinal anesthesia in prone position. Transverse incision was given in the crease

Variable	Male	Female	Total
Mean height (meters) ± SD	1.70 ± 0.06	1.58 ± 0.02	1.68 ± 0.07
Mean weight (kgs) ± SD	64.00 ± 9.89	47.75 ± 7.50	61.05 ± 11.33
Mean BMI (kgs/ meter <sup>2</sup> ) ± SD	22.17 ± 3.18	19.02 ± 2.54	21.60 ± 3.18
Hypertension n (%)	3 (13.6)	--	3 (13.6)
Smoking n (%)	11 (50.0)	--	11 (50.0)
Alcoholism n (%)	14 (63.6)	--	14 (63.6)
Middle class SES n (%)	8 (36.4)	--	8 (36.4)
Lower class SES n (%)	10 (45.5)	4 (18.2)	14 (63.6)
Unilateral disease n (%)	11 (50.0)	3 (13.6)	14 (63.6)
Bilateral disease n (%)	7 (31.8)	1 (4.5)	8 (36.4)
Varicose veins without ulceration and pigmentation n (%)	9 (40.9)	4 (18.2)	13 (59.1)
Varicose veins with pigmentation n (%)	4 (18.2)	--	4 (18.2)
Varicose veins with ulceration and pigmentation n (%)	5 (22.7)	--	5 (22.7)

**[Table/Fig-2]:** Pre – operative characteristics of patients  
SES- Socioeconomic status

Variable	Male	Female	Total
<b>Disease pattern</b>			
SFJI n (%)	2 (9.1)	1 (4.5)	3 (13.6)
SPJI n (%)	2 (9.1)	2 (9.1)	4 (18.2)
SFJI with PFI n (%)	13 (59.1)	--	13 (59.1)
SFJI & SPJI n (%)	1 (4.5)	1 (4.5)	2 (9.1)
<b>Operated side</b>			
Right n (%)	7 (31.8)	1 (4.5)	8 (36.4)
Left n (%)	11 (50.0)	3 (13.6)	14 (63.6)
<b>Operative technique</b>			
SLGSV n (%)	3 (13.6)	1 (4.5)	4 (18.2)
SLGSV and PFL n (%)	13 (59.1)	1 (4.5)	14 (63.6)
LSPJ, RSSV and PFL n (%)	2 (9.1)	2 (9.1)	4 (18.2)
<b>Anaesthetic technique</b>			
SA n (%)	7 (31.8)	3 (13.6)	10 (45.5)
Combined SA and EA n (%)	11 (50.0)	1 (4.5)	12 (54.5)
<b>Complications</b>			
Paresthesia n (%)	2 (9.1)	--	2 (9.1)
Wound infection n (%)	2 (9.1)	1 (4.5)	3 (13.6)
No complication n (%)	14 (63.63)	3 (14.3)	17 (77.27)
Mean hospital stay (days) ± SD	7.06 ± 2.02	8.33 ± 4.93	7.26 ± 2.51
Mean follow-up time (years) ± SD	1.14 ± 0.63	1.05 ± 0.63	1.13 ± 0.61

**[Table/Fig-3]:** Operative and post-operative data. SFJI- Saphenofemoral junction incompetence, SPJI- Saphenofemoral junction incompetence, PFI- Perforator incompetence, SLGSV- Stripping and Ligation of Great Saphenous Vein, LSPJ- Ligation at Sapheno-popliteal junction, RSSV- Removal of short saphenous vein, PFL- Perforator Ligation, SA- Spinal Anesthesia, EA- Epidural analgesia

of knee joint in posterior aspect, short saphenous vein was identified and was usually found to be more tortuous than the great saphenous vein. The short saphenous was dissected proximally and distally and after reaching at its junction with the popliteal vein it was ligated and divided flush at the sapheno-popliteal junction. The distal end was then followed and sometimes a second transverse incision was required in the calf. The vein was removed under the cutaneous flap between two transverse incisions after undermining the skin incisions.

### Postoperative course

After surgery patients were shifted to postoperative ward, operated limb was kept in propped up position. Patients were started oral liquids in the evening and from next day onwards normal diet were started. Patients were mobilized on the second post-operative day and majority of patients were discharged on the second post-operative day.

### Follow up

Our protocol was, first follow up at 15 days, second follow after 1 month, and third follow-up after 3 months and thereafter once in 6 months.

Data is reported as mean ± standard deviation and in percentage. Software used for analysis of data is Microsoft

excel, Chi-square test was used for statistical analysis and p-value < 0.05 was considered significant.

## RESULTS

Total 22 patients underwent surgery for varicose veins. Prolonged standing was the most common predisposing factor. Ratio of male to female in the study was 4.5:1. Mean age of the patients was 40.24 ± 23.92 years and mean BMI was 21.60 ± 3.18. Mean hospital stay was 7.28 ± 5.18 days. There was no operative mortality and no major complications, 3 patients had wound infection which resolved gradually with treatment, paresthesias were reported by 2(9.52%) patients. Follow up was completed for 81.81% of the patients in the study and mean follow up time was 1.13 ± 0.61 years. Statistical significance was found for the following predisposing factors 1) smoking: p-value was: 0.027 i.e. < 0.05 and 2) alcohol consumption: p-value: 0.003 i.e. < 0.05.

However there was no significant difference statistically between male and female patients among various age groups p-value: 0.130, between side of operation left or right: p-value: 0.601, socio- economic status, lower or middle class: p-value: 0.095, obese and non-obese: p-value: 0.310 Unilateral or bilateral disease: p-value: 0.601.

## DISCUSSION

Female sex, obesity and older age have been reported to be the predisposing factors for varicose veins as per the epidemiological studies reported in literature [8,9] but in this study in contrast to the western literature males were more commonly affected, most of the patients were in the age group of 21- 40 years and mean BMI was 21.60 ± 3.18. Similar findings have also been reported by Subramanian A et al., [10]. Although in this study statistical significance for sex, age and obesity was not found probably due to less number of cases in the study but studies with large number of cases from different regions will probably highlight the difference in the risk factors predisposing to varicose veins between different races, regions, environment, working culture and hereditary factors. Smoking and alcoholism were found in significant number of cases in this study.

Most of the patients in this study belonged to poor socio-economic group and majority of patients were either barbers, shopkeepers, farmers, athletes and men from armed forces with prolonged standing as the common factor in all of them. Majority was in the age group of 20-41 years and mean BMI was 21.60 ± 3.18.

Murad Mh et al., [11] have reported long term safety and efficacy of surgery for varicose veins. Results of treatment of varicose veins with conventional surgery are excellent in long term with negligible complication rates [12,13]. Early and midterm results with recent techniques like radiofrequency ablation, endovenous

laser ablation and ultrasound guided foam coagulation are also comparable with the conventional surgery [14,15,16] but long term result need to be evaluated. Although recent minimally invasive techniques give the advantage of treatment on day care basis but multiple visits may be required and in complicated cases the results may not match the standard conventional surgery. However patients in whom varicose veins are of mild to moderate severity without associated complications one can choose any of the technique.

In some parts of the world most of the procedures for varicose veins are done endoluminally and in other parts open surgery is done more frequently [17], in the present scenario one cannot say that one technique is markedly superior or inferior to the other techniques. In analyzing the results of minimal invasive interventions versus open surgery for varicose veins cost is also an important factor, in developing countries the cost of open surgery is less as compared to minimal invasive interventions but that may not be the same in developed countries.

## CONCLUSION

Female sex, obesity and old age were not found to be the predisposing factors in this study in contrast to the western literature. This study highlights that predisposing factors vary from region to region and between different races. Smoking and alcoholism were found to be the predisposing factors for varicose veins in this study. Conventional surgery for varicose veins is a very safe procedure with negligible mortality and morbidity rates.

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### AUTHOR(S):

1. Dr. Vikas Deep Goyal
2. Dr. Sanjeev Sharma
3. Dr. Atul Mahajan
4. Dr. Ram Kishan Abrol
5. Dr. Vishav Chander
6. Dr. Pritesh Maheshwari

### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Cardiothoracic and Vascular Surgery,
2. Professor, Department of Surgery,
3. Associate Professor, Department of Surgery,
4. Associate Professor Surgery, Department of Surgery,
5. Assistant Professor Preventive and Social Medicine,

- Department of Preventive and Social Medicine,
6. Junior Resident Surgery, Department of Surgery, Dr. RPGMC Kangra at Tanda (H.P)-176001, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Vikas Deep Goyal,  
Assistant Professor, Department of Cardiothoracic and Vascular Surgery, Dr. RPGMC Kangra at Tanda (H.P)-176001, India.  
Phone: 09736843656, E-mail: vigoyal77@yahoo.com

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