

# Management Of Saphenofemoral Junction (SFJ) Incompetence In Varicose Veins: Simple High Ligation Or Stripping - A Prospective Randomized Study.

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## Abstract

Varicose veins affect a significant percentage of population in the society. They may not cause mortality but are a cause of considerable morbidity if not properly treated. The present study was conducted on 100 patients of varicose veins admitted for surgery at Pt. B.D.Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak. The cases were randomly divided in two groups: Group A and Group B (simple high ligation or stripping) alternately. The maximum number of patients (64) was between 16-35 years of age. The most common complaint was dilated and tortuous vein (90%), followed by pain in leg (78%), edema (60%), ulcer and pigmentation (26%). Ulcer healing was quicker and ankle swelling subsided quickly in group B where above knee long saphenous vein stripping was done. There was no haematoma and paraesthesia in any group postoperatively. Redness and ecchymosis were observed in 6 patients (24%) with above-knee long saphenous vein stripping, decreased at 3 weeks and completely disappeared at 3 months. On colour Doppler examination, saphenofemoral reflux was observed in one patient with high ligation of saphenofemoral junction after six months, whereas in the above-knee stripping group no reflux was observed. The cosmetic results were equally good in both groups of the patients. Hence it was concluded that stripping of the long saphenous vein from groin to knee does not lead to any complication but symptomatic relief is early and better in the stripping group and there are less chances of recurrence.

## INTRODUCTION

Varicose veins affect 10-20 percent of the population<sup>1</sup> and about 2% have skin changes which may precede venous ulceration<sup>1,2</sup>. Besides heredity, the other factors predisposing to varicose veins are pregnancy, prolonged standing, obesity, old age and heavy exercise<sup>3,4,5</sup>. The overall accuracy of various clinical tests in localization of the problem is 60-70%<sup>6</sup>. Hence duplex ultrasonography should be done in all patients for proper evaluation.

Surgery is still the best and reliable therapeutic option for treatment of varicose veins. High ligation, stripping and excision/ligation of varicose veins (shortly known as stripping surgery) is a procedure that was introduced at the turn of 19<sup>th</sup> to 20th century by three American surgeons<sup>7,8,9</sup>.

Reported rates of recurrence of the disease after treatment of superficial varicose veins range from 7-65 percent<sup>10,11</sup>. Numerous studies have attempted to identify reasons for high recurrence rates of varicose veins and the most common causes cited are: inadequate flush ligation of

saphenofemoral junction, failure to identify saphenopopliteal reflux and mid-thigh perforating veins. It has been reported that stripping produces a better immediate result and lower long-term recurrence rate<sup>12,13,14</sup>. Stripping of long saphenous vein only in the thigh reduces the incidence of nerve injury and reduces the incidence of recurrence by ensuring the avulsion of potential perforating veins (mid-thigh and tibial tubercle perforating veins.). Therefore, it was intended to undertake a study to compare long saphenous vein stripping from groin to knee and high saphenofemoral junction ligation in the treatment of varicose veins with saphenofemoral incompetence.

## MATERIAL AND METHODS

The study was conducted on 100 patients of varicose veins with long saphenous vein incompetence and perforator incompetence admitted in the Department of Surgery, Pt B.D.Sharma Post-Graduate Institute of Medical Sciences (PGIMS), Rohtak. Diagnosis of varicose veins was made on clinical basis by taking thorough history and clinical

examination. After doing routine laboratory investigations, color duplex sonography was done in all the patients with a high-resolution broad-band linear transducer of a frequency of 5-12 MHz, to find out and localize incompetent valves in the superficial system and perforators in the leg.

The cases were randomly divided in two groups: Group-A and Group-B alternately. Informed consent for inclusion in the particular group of study was taken from all the patients. Group-A patients were treated with high ligation of saphenofemoral junction along with perforator ligation and multiple avulsion of varicosities, while Group-B patients were treated with ligation of saphenofemoral junction along with stripping of long saphenous vein from groin to knee, with perforator ligation and multiple avulsion of varicosities.

Both groups were studied for:

-Incidence of bleeding, haematoma, pain, wound infection, saphenous nerve injury in the postoperative period and hospital stay.

-Incidence of recurrent varicose veins clinically and with Doppler ultrasonography at 3-month and 6-month follow-up.

-Relief in symptoms of the patient graded on a scale from 0-10 where 0 represented no symptoms and 10 represented worst symptoms.

-Cosmetic results were judged by the patients as excellent, moderate or poor.

Excellent: no visible or palpable varicose veins.

Fair: visible or palpable varicose veins less than 5mm in diameter.

Poor: varicose vein with a diameter of more than 5mm or visible incompetent main trunks.

The results obtained were tabulated, analysed and a conclusion was drawn.

## OBSERVATIONS

The maximum number of patients in our study was between 16-35 years of age (32 patients). The youngest patient was a 16-year-old male and the oldest patient was 58 years and male. There were 78 males and 22 females in our study. In group A, there were 40 males and 10 females, in group B 38 males and 12 females. In our study, the right side was involved in 38 patients and left side in 42. Bilateral involvement was observed in 20 patients. In case of bilateral

involvement, surgery was done on the side which was more symptomatic.

Dilated and tortuous veins were the commonest presenting complaint in 90% patients. Seventy-eight percent of patients complained of pain during walking while sixty percent had swelling feet indicating moderate stage of disease.

Ulceration and pigmentation were found in 26%.

**Figure 1**

**TABLE 1 COMPARISON OF SYMPTOMATIC RELIEF IN GROUP-A AND GROUP-B PATIENTS**

Symptoms	Follow up					
	2 weeks		3 months		6 months	
	Gp. A	Gp. B	Gp. A	Gp. B	Gp. A	Gp. B
Dilated Veins	0(46)	0(46)	0	0	0	0
Pain during working	2(38)	0(40)	0	0	0	0
Oedema	4(28)	0(32)	4(28)	0	0	0
Ulceration	10(12)	0(14)	2(12)	0	0	0
Pigmentation	12(12)	14(14)	12(12)	14(14)	12(12)	14(14)

On comparison of both groups, it was observed that ulcer healing was quicker in group-B patients: Ulcers healed in all 14 patients at 14 days of follow-up, while ulcer healing was complete in only 2 patients in Group A at 14 days. Two patients still had ulcers at 3 months of follow-up in group A, which healed at 6 months. The ankle swelling subsided very quickly in group-B patients as compared to group-A patients. Four patients of Group A still had swelling at 3 months of follow-up which was relieved at 6 months. There was no evidence of any prominent vein in the leg after surgery in both groups. The pigmentation persisted in all the patients at 3 months and 6 months of follow-up irrespective of the procedure done on them. Patients presenting with complaint of pain during walking could walk without feeling discomfort on the 14<sup>th</sup> day and at 3 months and 6 months of follow-up in group B. In group A, only two patients complained of pain during walking at 2 weeks of follow-up. There was no complaint of pain during walking at 6 months of follow-up by any of the patients in group-A (Table1).

## COMPLICATIONS IN GROUP-A AND GROUP-B PATIENTS

In group A, there was no incidence of haematoma, ecchymosis and pigmentation but there was mild wound infection at the incision site in the groin in 4 patients (8%),

which healed with local dressings. There was no incidence of paraesthesia after surgery in any patient. In group B there was ecchymosis and pigmentation at the mid-thigh region in 6 patients (12%), which appeared around the 4<sup>th</sup> post operative day, decreased at 3 weeks and disappeared completely at 3 months. There was mild wound infection in two cases (4%) in the groin which was relieved after local dressings. There was no incidence of paraesthesia after surgery in any patient.

## COLOUR DOPPLER FINDINGS AT FOLLOW-UP

On colour Doppler study, saphenofemoral junction reflux was observed in one patient (2%) in group A at 6 months follow-up and no reflux was observed in group-B patients at 3 months and 6 months follow-up. The deep venous system was normal in both groups.

Cosmetically, there was no visible vein and telangiectasia in both group A and group B patients at 3-month and 6-month follow-up. The cosmetic result was excellent in both groups

## DISCUSSION

The efficacy of long saphenous vein stripping and high saphenofemoral junction ligation in the treatment of varicose veins with saphenofemoral incompetence was compared in the present study.

## AGE DISTRIBUTION

The maximum number of patients in our study was in the age group of 16-35 years (64%). This age group requires maximum long standing activities for earning for their families. The mean age in our study was 31 years. In literature, the age distribution of varicose veins in most of the studies varied from 30-40 years<sup>6</sup>. But a few studies have reported a variable age of presentation. The reported mean age is 70.4 years by Pierik et al.<sup>15</sup>, 51 years by Antoch et al.<sup>6</sup>, 45 years by Chan et al.<sup>16</sup> and 48.7 years by Kam et al.<sup>17</sup>

## SEX DISTRIBUTION

In the present study there were 78% males and 22% females. But according to the literature, females are affected twice more common as compared to males<sup>2-4,18</sup>. The predominance of males in our study may be due to male-dominant society; more males turned up for the treatment. Females being either less health conscious or being neglected by the families in rural India reported less for treatment. The Basle Survey has also reported a male to female preponderance<sup>19</sup>.

## SIDE INVOLVEMENT

In our study, the left side was more commonly involved (42%) than the right side (38%) and bilateral involvement was observed in 20% of cases. In the series of Killewich et al., the left side was involved in 47%, the right side in 31%, and 22% had bilateral involvement<sup>3</sup>.

**Figure 2**

**TABLE-2 PRESENTING COMPLAINTS IN VARIOUS CLINICAL TRIALS**

References	Dilated Vein	Pain	Oedema	Ulcer	Pigmentation
Hamilton <sup>13</sup>	79%	50%	42%	2.5%	-
Lofgren <sup>20</sup>	25%	71%	60%	8%	-
Frank <sup>21</sup>	-	45%	21%	-	-
Munn <sup>14</sup>	-	-	-	8%	22%
Kam <sup>17</sup>	98%	56%	12%	17%	-
Present Study	90%	78%	60%	26%	26%

In the present study, 90% of patients complained of dilated and tortuous veins followed by pain during walking (78%), ankle swelling (60%) and ulceration and pigmentation in 26% of patients. In his trial of 516 patients, Jakobsen<sup>13</sup> reported dilated veins in 79%, pain in 50%, oedema in 42% and ulcer in 2.5% of cases. In a group of 350 patients who underwent varicose vein surgery at the Mayo clinic, Lofgren<sup>20</sup> reported pain in leg in 71%, swelling in 60%, dilated veins in 25%, pigmentation in 16% and ulcer in 8% of cases. Munn<sup>14</sup> gave a very brief description of preoperative features of 57 patients involved in his trial; where ulceration was found in 8% and pigmentation in 22% of cases. In a study of 114 patients, Frank<sup>21</sup> found swelling in 21% and pain in 45% of patients. In his trial of 156 limbs, Kam<sup>17</sup> et al. found dilated veins in 98%, pain in 56%, swelling in 12% and ulcer in 17% of patients. In all studies including the present study, dilated and prominent veins were the commonest presenting symptom while other symptoms were present in variable percentage in different studies depending on the stage of disease (Table 2).

## POSTOPERATIVE RESULTS

The overwhelming majority of operations were performed for symptomatic disease. Patients presenting with dilated veins as a main complaint were completely relieved of varicosities on the 14<sup>th</sup> postoperative day at the time of suture removal irrespective of the procedure done on them.

In the study done by Kam et al., 153 of 156 limbs presented with dilated veins. Out of 153 limbs, 121 had saphenofemoral vein reflux on Doppler scans. There were five limbs (3 patients) with unresolved varicosities at 6 months postoperatively<sup>17</sup>. Thus, patients presenting with dilated veins had a 96%-chance of being free of dilated veins after stripping of the long saphenous vein and multiple ligations (116/121)<sup>17</sup>. In contrast to this, there was 100% improvement in varicosities after stripping of the long saphenous vein, multiple ligations of perforators and avulsion of varicosities (25/25) in the present study. Similar results were obtained by high ligation without long saphenous vein stripping with multiple ligation of perforators and avulsion of varicosities (25/25). Thus, cosmetic results of long saphenous vein stripping were excellent in our study (100%) as compared to the study by Kam et al. where it was 96%. Kam et al. did not investigate the outcome of long saphenous vein stripping on ulcer healing and eczema, etc., whereas in our study it was observed that ulcer healing was quicker after above-knee long saphenous vein stripping in comparison to high ligation without stripping. But there was no improvement in pigmentation in the leg even at 6 months of follow-up in both groups.

In the study done by Sarin et al., with long saphenous vein stripping in addition to saphenofemoral junction ligation there was significantly greater improvement in the patients' subjective sensation of 'ache'. Itching was reduced in both groups and there was no significant difference between them in this respect<sup>22</sup>. In the present study also there was no significant difference in both the groups of patients in relation to pain during walking.

**Figure 3**

**TABLE-3 COMPARISON OF COMPLICATIONS**

Clinical Trials	No. of Limbs	Complication	High Ligation Only	High Ligation with LSV Stripping
Sarin S et al.	69	Paraesthesia	7%	4%
		Haematoma bruising	0	0
		Infection	2%	2%
Present Study	100	Paraesthesia	0	0
		Bruising	0	12%
		Infection	8%	4%
Kam et al.	50	Bruising	-	6.4%
		Paraesthesia	-	3.2 %
		Infection	-	5.8 %

Sarin et al. reported paraesthesia in 7% of patients in the group with high ligation without stripping while it was 4% with high ligation with stripping. But in the present study we did not find any evidence of paraesthesia in both groups. The possible reason may be that veins were properly separated from surrounding tissues before ligation in the present study to avoid any incidental ligation of nerves along with veins. Wound infection was observed in 2% cases in both groups by Sarin et al. while it was slightly higher (8%) in group A and 4% in group B in the present study, possibly because of seroma formation which got infected.

There was redness and ecchymosis at the site of stripping in 6 patients (12%) in the group with above-knee long saphenous vein stripping in the present study. However, this ecchymosis and redness disappeared at 3 months of follow-up. No such complication was observed in the group where high ligation of saphenofemoral junction alone was done. Haematoma was not observed in any group in the present study as well as in the study of Sarin et al. Kam et al. studied the complications in patients of long saphenous vein stripping only. Wound infection was observed in 5.8%, bruising in 6.4% and paraesthesia in 3.2% cases<sup>17</sup> (Table 3).



**Figure 4**

**TABLE-4 COMPARISON OF RESULTS WITH LITERATURE**

Reference	No. of Patients	Follow-up (months)	Assessment	LSV Stripping			High Ligation only		
				No. of limbs	Recurrence (%)	Paraesthesia (%)	No. of limbs	Recurrence (%)	Paraesthesia (%)
Jakobsen <sup>18</sup> (1979)	326	36	Clinical	161	10.2	-	165	34.8	-
Munn et al. <sup>14</sup> (1981)	100	30, 42	Clinical	57	36	33	57	60	14
Hammarsten et al. <sup>23</sup> (1990)	42	52	Clinical, SGP	24	12	-	18	11	-
S. Sarin et al. <sup>22</sup> (1992)	69	3	Clinical SGP Duplex Sonography	49	18	4	56	45	7
Present Study	50	6	Clinical Color Doppler	50	-	-	50	4	-

(SGP = Strain gauge plethysmography, LSV= Long saphenous vein)

Jackobsen reported a 10.2% recurrence rate in the group where high ligation with stripping was done as compared to a 34% recurrence rate in cases where only high ligation of the saphenofemoral junction was done<sup>13</sup>. This study was done only on clinical basis. Munn et al. reported paraesthesia in 33% and recurrence rate in 36% of cases when LSV stripping was done while in the high-ligation group paraesthesia was observed in 14% of cases and recurrence in 60%<sup>14</sup>. This study was also done only on clinical basis. Hammarsten et al. demonstrated a recurrence rate of 12% after stripping and an 11% recurrence rate after high ligation only. This study was based on clinical basis and findings on strain gauge plethysmography<sup>23</sup>. Sarin et al. showed paraesthesia in 7% and recurrence in 45% of cases after high ligation without LSV stripping and paraesthesia in 2% and recurrence in 18% after high ligation with long saphenous vein stripping<sup>22</sup>. This study was based on clinical basis and colour Doppler examination. In our study, residual reflux at saphenofemoral junction on color doppler examination was observed in 2% of cases after high ligation without LSV stripping. There was no saphenofemoral junction reflux after above-knee long saphenous vein stripping. Paraesthesia was not observed in any patient in both groups (Table 4). Recurrence rate was higher in high ligation of saphenofemoral junction without stripping as reported by most of the studies in the literature. So the authors recommend high ligation of the saphenofemoral junction with long saphenous vein stripping from groin to knee along

with perforator ligation and multiple avulsion of varicosities to decrease recurrence rate in varicose veins.

## CONCLUSION

It is concluded from the present study that varicose veins with saphenofemoral incompetence should be treated by high ligation of the saphenofemoral junction with long saphenous vein stripping from groin to knee with perforator ligation and multiple avulsion of varicosities in the leg as this is associated with a lower recurrence rate as compared to high saphenofemoral junction ligation only with perforator ligation and multiple avulsion of varicosities. There is no high incidence of complications in the stripping group except for ecchymosis and pigmentation in the thigh along the path of long saphenous vein stripping in some patients which clears within few weeks. Therefore, stripping of long saphenous vein from groin to knee should be done in patients of saphenofemoral junction incompetence.

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