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A retrospective comparison on surgical management of varicose veins with and without venous stripping

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Abstract
Varicose veins, one of the oldest known diseases of mankind were treated by various modalities starting from simple phlebotomy to minimally invasive approaches.
Aim and Objectives: In this study the outcome of two surgical treatment modalities of varicose surgery with and without venous stripping was compared based upon a follow up period of two months.
Materials and Methods: Among the 92 patients operated for varicose veins between September 2018 to November 2019 in all surgical units of Trichy SRM Medical College Hospital, S50 patients of age group 16 – 70 yrs were taken up for the study after matching.
Results: In this study males contribute the maximum bulk of about 82%. As for as the age is considered, patients aged between 40 – 70 yrs was more, which was about 58%.The hematoma formation after venous stripping was 28% whereas it was only 4% in the other group. There was no significant difference in healing of leg wounds in both the studies The first postoperative comfortable ambulation with minimal pain was possible in more patients who did not undergo venous stripping (92%) than who underwent stripping (68%).Long postoperative stay of more than 6 days was found in 8% of those who underwent stripping and 4% of the other group. The long stay was mostly due to pain and delayed wound healing. Pain relief was seen in 96% of those who had venous stripping and 88 % of those who did not undergo venous stripping at the end of second month.
Conclusion: This study on observation concludes there was no significant difference in healing of leg wounds, hospital stay and pain relief in both the studies, but the Trendelenburg procedure with incompetent perforators ligation without venous stripping appears to be better than Trendelenburg procedure with incompetent perforators ligation with venous stripping.

Keywords: Varicose veins, venous stripping, trendelenberg

Introduction
In this comparative study the outcome of surgical management of varicose veins with and without venous stripping is compared and analyzed.
There is no universally accepted definition for varicose veins [1]. The word varicose vein was first proposed by Hippocrates [2] in 460 B.C [3]. In Latin varix refers to enlarged vein, artery or lymphatics. In routine usage the word varix is used to mention vein and varicosity refers to a vein that is enlarged in diameter and tortuous. Varicose veins are superficial veins of the lower limb that has lost its valvular function and as a result of resulting venous hypertension becomes dilated, thickened and tortuous [4, 5].

Objectives of the study
The main objective of this comparative study is to compare the outcome of two surgical treatment modalities of varicose veins.
One group of patients undergoes Trendelenburg procedure with Subfascial ligation of incompetent perforators whereas the other group undergoes Trendelenburg procedure with Subfascial ligation6 of incompetent perforators with stripping of long saphenous vein from groin to knee. The two modalities are compared in terms of
1. Hematoma formation in the thigh.
2. Healing of wounds in the leg at the site of incompetent perforators.
3. Comfortable ambulation without much pain on first post-operative day.
4. Postoperative hospital stay.
5. Pain relief of the patient after two months

Materials and Methods

During the period of September 2018 to November 2019, 92 cases of varicose veins were operated in all surgical units in Trichy SRM Medical College Hospital, Irungalur Trichy.
For this study 50 cases in the age group of 16 to 70 were taken.

Study design: Retrospective Comparative study.

Inclusion criteria

1. Varicose vein with sapheno femoral valve incompetence and perforator's incompetence.
2. Age between 16 and 70. Exclusion Criteria
1. Age extremes <16 and >70.
2. Patients with deep vein thrombosis.
3. With associated short saphenous vein varicosity.
4. With venous ulcer or other skin changes
5. Recurrent varicosity.

For all the patients, detailed history, clinical examination, basic blood investigations, chest x-ray, ECG, venous Doppler11,12 of the affected limb were taken.
The selected cases were matched for sex, age so as to avoid bias.

Table 1: Age and sex matching

S. No	Matched Items	With Venous Stripping	Without Venous Stripping
1	Male	20	21
2	Female	5	4
3	16-40 Yrs	10	11
4	41 – 70 Yrs	15	14

After explaining the procedure and getting informed consent from the patients, they were subjected to one of the two types of surgical treatment modality.

Group I

In one group 25 patients underwent Trendelenburg procedure by making a transverse incision of length 3cm just below the groin crease extending from femoral artery pulsation site towards medially. The incompetent perforators in the thigh and leg are ligated and divided subfascially by making small transverse incision across the path of the vein at the site of incompetent perforators marked preoperatively. Then the long saphenous vein is stripped from groin to just below the knee by passing stripper into the vein.

Group II

In the other group 25 patients underwent Trendelenburg procedure is done by making a transverse incision of length 3cm just below the groin crease extending from the site femoral artery pulsation medially. The incompetent perforators in the leg are ligated and divided subfascially by making small transverse incision across the path of the vein at the site of incompetent perforators marked preoperatively. In both groups the wounds closed with good hemostasis, limb elevated and elastocrepe bandage applied. All the patients were followed in the postoperative period and for a period of next two months.
The details of all the patients and their investigations, procedure undergone, follow up were recorded in separate proforma for individual patients.

Observations of the study

The following observations were recorded by follow up of the patients for a period of two months. The factors that are taken for comparison are

1. Hematoma formation in the thigh

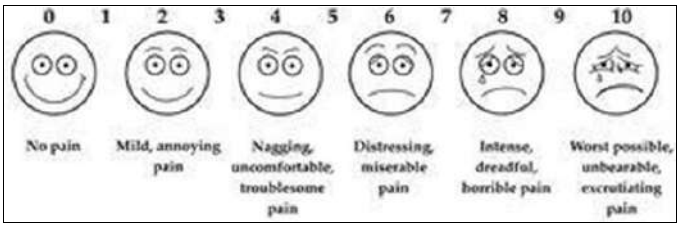
All the patients were examined daily in the postoperative period to look for hematoma formation in the thigh.

2. Healing of wounds in the leg at the site of incompetent perforators

The time taken for the wound in the leg made for approaching the incompetent perforators was noted down. If the wound takes more than 6 days to heal it was considered as delayed and were recorded.

3. Comfortable ambulation without much pain on first post-operative day

On the first postoperative day, all the patients were encouraged to walk for some time with elastic stockings. The patients who were able to walk comfortably on first postoperative day with minimal pain were recorded.



4. Postoperative hospital stay

Usually the patients were discharged on third postoperative day. Those who were in the ward for more than 6 days because of pain, delayed wound healing were noted.

5. Pain relief of the patient after two months

The pain in the affected limb of the patient was enquired and recorded as per visual analog scale preoperatively. All the patients were enquired after two months of the procedure about their pain relief and recorded as per visual analog scale. An improvement of more than five score was considered as good pain relief.

Visual analog scale

0 – No pain
2 – Mild pain
4 – Discomfort
6 – Distressing pain
8 – Intense pain
10 – Excruciating pain.

The following table shows the magnitude of all the observed variables in both the procedure and the same is depicted in the bar chart below.

Table 2: Observed results

S. No	Factors Compared	With Venous Stripping		Without Stripping	
		Number (Out Of 25)	Percentage	Number (Out Of 25)	Percentage
1	Hematoma	7	28%	1	4%
2	Delayed Wound Healing	1	4%	1	4%
3	Comfortable Ambulation On First Postop Day	17	68%	23	92%
4	Long Hospital Stay	2	8%	1	4%
5	Pain Relief	24	96%	22	88%

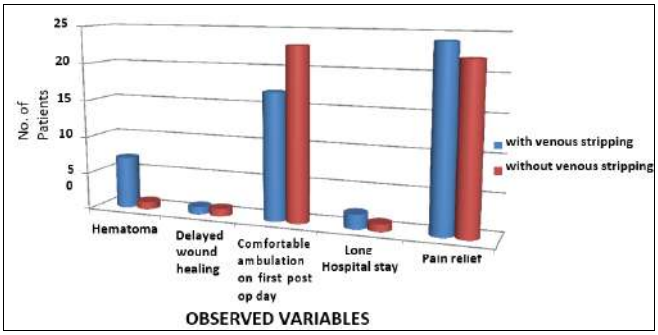


Fig 1: Bar chart: Observed variables

Discussion

The two studies were compared statistically to find out whether there is significant difference between the outcomes of two surgical procedures.

The null hypothesis was assumed: That is to begin with it was assumed that there is no significant difference between the two procedures.

By using chi – square test all individual variables were checked for significance.

Since we use 2x2 table, the degree of freedom is 1.If the chi-square value is >3.84, the P value is < 0.05 the difference is significant.

1. Hematoma formation in the thigh: Observed frequency (O)

Table 3: Observed frequency of hematoma7 formation

Procedure	Hematoma in thigh	No hematoma	Total
With venous stripping	7	18	25
Without venous stripping	1	24	25

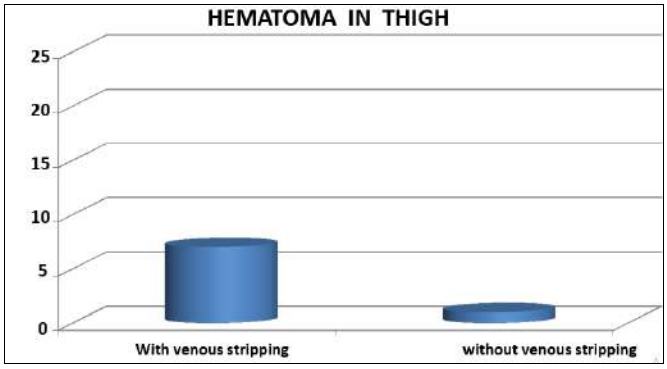


Fig 2: Bar chart: Observed frequency of hematoma formation

Proportion of hematoma formation = 8/50 = 0.16
Proportion of no hematoma = 42/50 = 0.84
According to null hypothesis expected frequency (E) is,

Table 4: Expected frequency of hematoma formation

Procedure	Hematoma in thigh	No hematoma	Total
With venous Stripping	(7+18)x0.16 = 4	(7+18)x0.84 = 21	25
Without venous Stripping	(1+24)x0.16 = 4	(1+24)x0.84 = 21	25

Chi square = 5.34 which is more than 3.84. The P value is less than 0.05.Hence it is significant. So the null hypothesis is not true and there is significant difference between the two procedures with respect to hematoma formation.

2. Healing of wounds in the leg at the site of incompetent perforators

Observed frequency (O)

Table 5: Observed frequency of delayed wound healing

Procedure	Good wound	Delayed wound	Total
With venous	24	1	25
Without venous	24	1	25

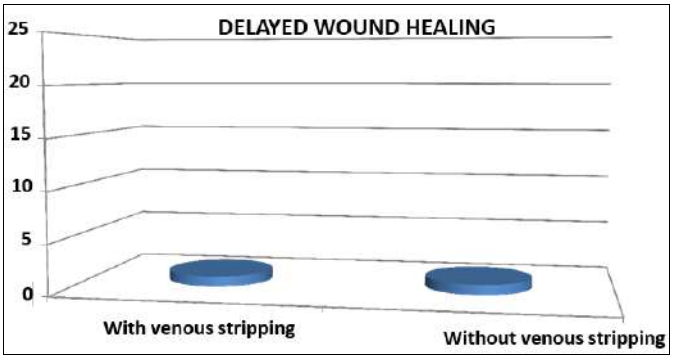


Fig 3: Bar chart: Observed frequency of delayed wound healing

Bar chart: Observed frequency of delayed wound healing

Since the observations are same in both studies, no need to apply chi-square test to check the null hypothesis.

3. Comfortable ambulation without much pain on first post-operative day

Observed frequency (O)

Table 6: Observed frequency of comfortable ambulation

Procedure	Comfortable Ambulation	Painful Ambulation	Total
With venous Stripping	17	8	25
Without venous Stripping	23	2	25

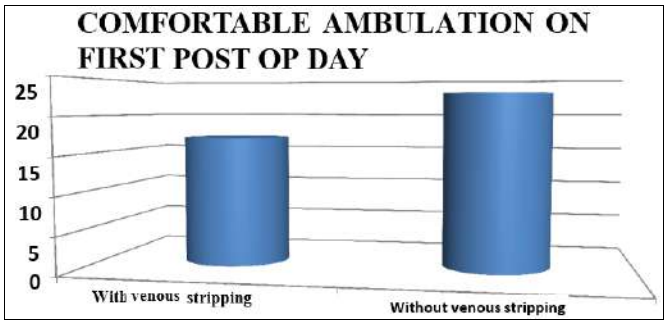


Fig 4: Bar chart: Observed frequency of comfortable ambulation

According to null hypothesis expected frequency (E)

Table 7: Expected frequency of comfortable ambulation

Procedure	Comfortable Ambulation	Painful Ambulation	Total
With venous Stripping	20	5	25
Without venous Stripping	20	5	25

Chi square value is 4.5 which is more than 3.84 and the P value is less than 0.05. Hence the null hypothesis is false. So there is significant difference between the two procedures.

4. Long postoperative hospital stay: Observed frequency (O)

Table 8: Observed frequency of long postoperative stay

Procedure	<6 days	>6 days	Total
With venous Stripping	23	2	25
Without venous Stripping	24	1	25

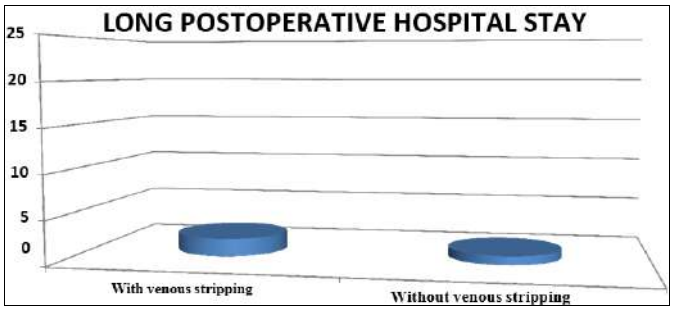


Fig 5: Bar chart: Observed frequency of long postoperative stay

Table 9: Expected frequency of long postoperative stay

Procedure	<6 days	>6 days	Total
With venous stripping	23.5	1.5	25
Without venous stripping	23.5	1.5	25

Chi square value is 0.356 which is less than 3.84 and the P value is >0.05. So the null hypothesis is true and there is no significant difference between the two procedures.

5. Pain relief after two months: Observed frequency (O)

Table 10: Observed frequency of pain relief

Procedure	Relieved	Not relieved	Total
With venous Stripping	24	1	25
Without venous Stripping	22	3	25

Fig 6: Bar chart: Observed frequency of pain relief

Table 11: Expected frequency of pain relief

Procedure	Relieved	Not relieved	Total
With venous Stripping	23	2	25
Without venous Stripping	23	2	25

The chi square value is 1.0434 which is less than 3.84 and the P value is >0.05. So the null hypothesis is proved and hence there is no significant difference between the two procedures. So, among the observed variables, only the hematoma formation and the comfortable ambulation on first postoperative day were significantly different between the two procedures.

Discussion

1. Male patients constitute 82%. Among the 50 patients in this study 20 males underwent venous stripping and 21 males underwent procedure without venous stripping. This is comparable to the study by M. G. Vashist, Jyotsna Sen, Pawanjit Rohilla: Management Of Saphenofemoral Junction (SFJ) Incompetence In Varicose Veins: Simple High Ligation Or Stripping - A Prospective Randomized Study. The Internet Journal of Surgery ISSN: 1528-8242 in which also the sex was predominantly male.

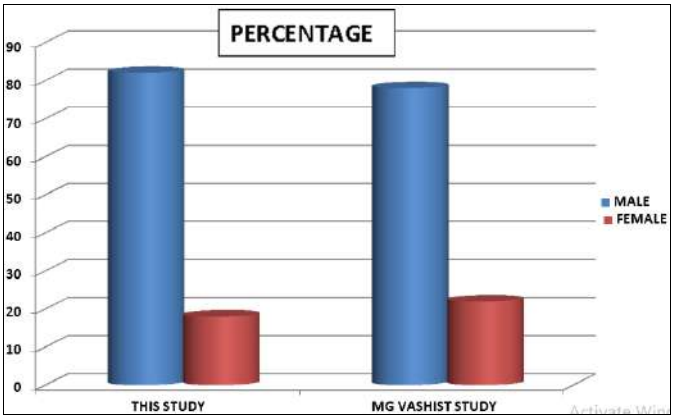


Fig 7: Bar chart: Sex incidence

2. This study includes age between 16 and 70. The lowest age in our study is 25 and the highest is 69. The age group of 16 to 40 constitute 42% whereas 40 to 70 age group contribute 58%. In this study 41-70 yrs constitute the majority whereas according to study by M. G. Vashist, Jyotsna Sen, Pawanjit Rohilla: Management Of Sapheno femoral Junction (SFJ) Incompetence In Varicose Veins: Simple High Ligation Or Stripping - A Prospective Randomized Study.The Internet Journal of Surgery ISSN: 1528-8242, the majority of the patients were of the age group 30 to40 yrs.

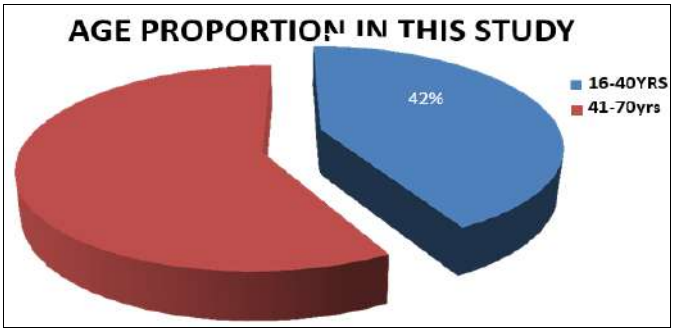


Fig 8: Pie chart: Age proportion

3. The left leg was more commonly involved than the right side. The left limb was involved in 66% and the right limb was involved in 33% of patients. The frequency of involvement of the left and the right limbs is shown in the pie chart.

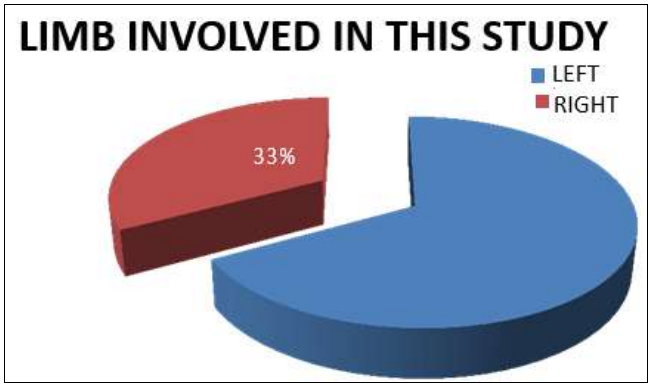


Fig 9: Pie chart: Limb involvement

4. The hematoma formation in the thigh was seen in 28% of patients who underwent venous stripping whereas it was seen in 4% who underwent Trendelenburg procedure alone without venous stripping. The hematoma formation with venous stripping in this study is comparable to results of Nisar A, Shabbir J, Tubassam MA, Shah AR, Khawaja N, Kavanagh EG, Grace PA, Burke PE: Local anaesthetic flush reduces postoperative pain8 and haematoma formation after great. Saphenous vein stripping- a randomised controlled trial.Eur J VascEndovasc Surg. 2006 Mar; 31(3):325-31. Epub 2005 Oct 19, according to which the percentage of hematoma formation was seen in 24% of patients. The increased incidence of hematoma formation in the thigh in patients who undergo stripping was due to tissue trauma that occurs during venous stripping.

Table 12: Comparison of hematoma formation

Variable	This study	Nisar study
Hematoma	28%	24%

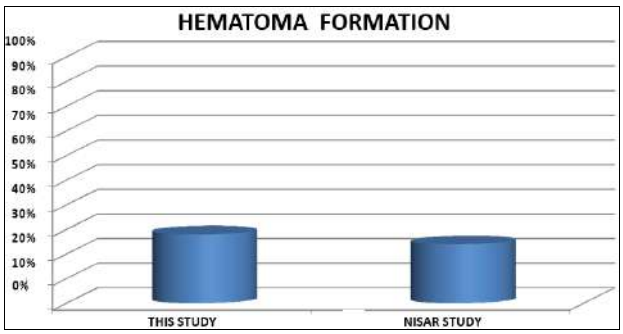


Fig 10: Bar chart: Comparison of hematoma formation

5. In both the groups, the incompetent perforators in the leg were approached by making a transverse incision at the site marked preoperatively under Doppler guidance. These wounds were examined in the postoperative period. 4 % patients in each group had delayed wound healing9. This is comparable to the results of M H Kam, S G Tan: Results of long saphenous vein stripping. Singapore Med e J 2003 Vol 44(12):639-642 according to which the wound infection and delayed healing was seen in 5.8% of patients who underwent venous stripping.

Table 13: Comparison of delayed wound healing

Variable	This study	M H Kam study
Delayed wound Healing	4 %	5.8 %

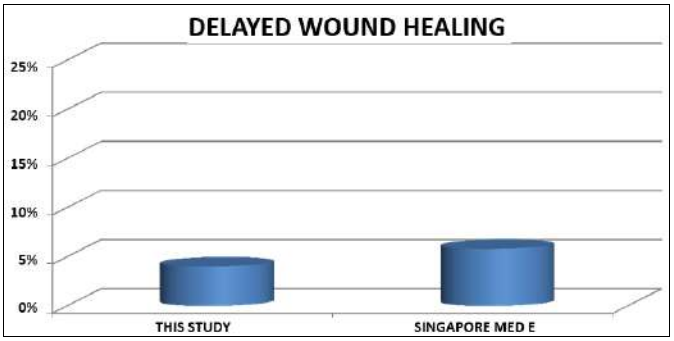


Fig 11: Bar chart: Comparison of delayed wound healing

6. When the patients were encouraged to walk on first post operative day, 68% of those who underwent stripping and 92%from those who underwent ligation alone had comfortable ambulation. It was found that in case of venous stripping, the tissue trauma, hematoma formation bruising and the pain was more.
7. Long stay of more than 6 days was found 8% of those who underwent venous stripping and 4% of those who had Trendelenburg procedure without venous stripping. It was due to pain and delay in wound healing. Subsequently all patients recovered well without much morbidity.
8. At the second month follow up, the symptom relief was there in 96% of patients with venous stripping and 88% of those who didn‟t undergo venous stripping. This result is comparable to the results of Christenson JT, Gueddi S, Gemayel G, Bounameaux H: Prospective randomized trial comparing endovenous laser ablation8 and surgery for treatment of primary great saphenous varicose veins with a 2-year follow-up.J Vasc Surg. 2010 Nov; 52(5):1234-41 in which the patients who underwent stripping 98% had pain relief.

Table 14: Comparison of pain relief

Variable	This study	Christenson study
Pain relief	96 %	98

The pain relief during the follow up period in two studies is shown in the following bar graph.

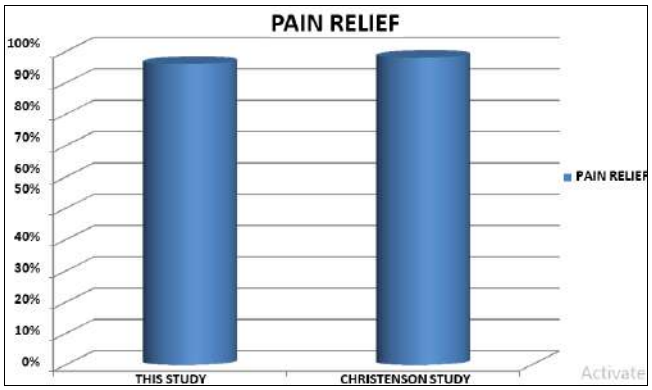


Fig 12: Bar chart: Comparison of pain relief

Conclusion

In this comparative study which was done in 50 patients, the observations of short term variables show that the venous stripping has increased incidence of hematoma formation and the ambulation of patients on first post operative day was very painful. With reference to wound healing, hospital stay and pain relief there is no significant difference between the two

procedures. So, as for as the variables observed, the Trendelenburg procedure with incompetent perforators ligation10 without venous stripping appears to be better than Trendelenburg procedure with incompetent perforators ligation with venous stripping.

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