



EFFECT OF SCLEROTHERAPY ON VARICOSE ULCERS AND OTHER SKIN COMPLICATIONS OF VARICOSE VEINS-A PROSPECTIVE COHORT STUDY.

Surgery

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ABSTRACT

BACKGROUND: Varicose veins are dilated, tortuous, elongated superficial veins that are usually seen in the legs. Prevalence of Chronic Venous Disease, as reported in studies, ranges from 2%-56% in men and from 1%-60% in women. Various treatment modalities include surgery, sclerotherapy and endo-venous occlusion by lasers or radiofrequency. Varicose veins and its dermatological complications like stasis dermatitis, ulcers, spontaneous bleeding, lipodermatosclerosis are commonly seen. However, there are no specific studies in India which is done to evaluate the role of sclerotherapy in the management of varicose veins and its skin complications. **OBJECTIVE:** To study the difference in proportion of improvement in venous ulcer of other dermatological complications associated with varicose vein during 6 months following sclerotherapy when compared to those who underwent surgical treatment. **METHODOLOGY:** The study was a prospective cohort study conducted in General Surgery Dept., Dr. SMCSI Medical College, Karakonam. Patients older than 18 years who have undergone sclerotherapy treatment and surgery for varicose veins with ulceration and with or without skin manifestations from March 2016 to March 2017 were considered eligible to enter the study. Sample size decided was 33 in patients undergoing sclerotherapy and 33 who underwent surgery. **RESULTS:** The difference in oedema and pigmentation between two groups was statistically not significant. The difference in pain relief during the initial 4 months were found to be statistically significant while after 4 months the difference in pain relief were same in both groups. **CONCLUSION:** The Trendelenberg surgery plus perforator ligation and foam sclerotherapy showed equivalent efficacy for treating patients with varicose ulcer and other complications of varicose veins.

KEYWORDS

Sclerotherapy, varicose veins, cohort, efficacy.

INTRODUCTION

Leg ulcers are usually characterized as a loss of skin on the lower limb that takes more than six weeks to heal (1). Globally, leg ulceration is a common chronic disease and the prevalence ranges from 0.62 to 5 per 1000 people, varying from country to country. Some estimates suggest a worldwide venous insufficiency prevalence of 60% (2). Furthermore, leg ulcer prevalence increases with age, rising to a peak prevalence between 60 years and 80 years old, with women suffering from ulcers about 1.6 times more frequently than men (3). High risk factors for leg ulcers include prolonged standing (4), obesity, a sedentary lifestyle and family history (5). Approximately, 80% to 85% of all leg ulcers occur as a result of venous diseases (6). They are a major public health problem due to their high prevalence, long healing time and high recurrence rate, high cost of care, and have a serious impact on patients quality of life as patients with Venous Leg Ulcers take nearly 50% more sick days than persons without venous leg ulcers (7). Proper diagnosis and adequate management are vital to promote faster healing and prevent recurrence.

Until recently, surgery was seen as the standard treatment for SSV insufficiency (8). High ligation and stripping are the traditional approach for varicose veins, still some alternative options have been used in recent decades like endovenous laser ablation, endovenous radiofrequency ablation, foam sclerotherapy or TriVex (9). Sclerotherapy is the elimination of varicose veins by injecting a sclerosing substance into the lumen of the vein (10). There are no specific studies in India, our study attempted to evaluate the role of sclerotherapy in the management of varicose veins and its skin complications.

AIMS AND OBJECTIVES

1. To study the difference in proportion of improvement in venous ulcer during 6 months following sclerotherapy when compared to those who underwent surgical treatment
2. To study difference in proportion of improvement of other dermatological complications associated with varicose vein

following sclerotherapy when compared to those who underwent surgical treatment.

METHODOLOGY

Study Design : prospective cohort study

Study Setting: Department of General Surgery in a tertiary care hospital, South Kerala.

Study Population: Patients older than 18 years who have undergone sclerotherapy treatment and surgery for varicose veins with ulceration and with or without skin manifestations of varicose veins like eczema, lipodermatosclerosis, oedema at Department of General Surgery from March 2016 to March 2017 were considered eligible to enter the study.

Study Duration : 1 year

Study Subjects

Inclusion criteria: Patients older than 18 years who have undergone sclerotherapy treatment for varicose veins with ulceration and with or without skin manifestations of varicose veins like eczema, lipodermatosclerosis and oedema. Patients older than 18 years who have undergone surgical treatment for varicose vein with ulceration and with or without skin manifestations of varicose veins like eczema, lipodermatosclerosis and oedema

Exclusion criteria: Patients with deep venous thrombosis, diabetes mellitus, pregnancy, myocardial decompensation, hypercoagulable state, dependency edema, arterial disease and any other serious illness. Sample size: 33 in exposed (on sclerotherapy) 33 in non exposed (on surgical treatment)

Anticipated relative risk - 1.73

significance level - 5%

Power - 80%

Proportion of disease in unexposed- 45%

Proportion of disease in exposed- 77.8%

Study Variables

- 1) Clinical variables
- 2) Treatment related variables

Data Collection Technique: After obtaining adequate history, the patients were meticulously examined in standing position with good illumination.

They were all followed-up for a minimum of 6 months after the procedure and the response was evaluated by two doctors independently to look for: (a) Symptomatic relief in pain, itching in affected limb (b) Recurrence of varicosity in clinically (c) Healing of venous ulcers by serial measurement of ulcer area in breadth and length (d) Response of eczema whether decreasing, resolving completely (e) Pigmentation of affected limb and (f) Reduction of edema by serial monitoring of limb circumference and by clinical examination

As a good result we considered disappearance of varices and eczema, reduction of edema, healed ulcers and relief of symptoms (pain, itching, fatigue, tiredness). Local medications were not used for venous ulcers. The responses were based on the clinical findings of the basic signs of varicose veins.

Patients were regularly followed up on monthly intervals. Remainders were via phones or messages. If patients were not reporting even after three remainders, investigator visited the patients home to get data. Dropouts were contacted via phone. Patients with dermatological complications were counseled and asked to consult a dermatologist.

Data Analysis

Data was entered into excel sheet. Categorical variables were expressed as proportions and quantitative variables were expressed as mean and standard deviation. Statistical test of significance-Chi-square test for categorical variables and student t test for quantitative variables.

Data analysis was done using appropriate statistical software.

Ethical Considerations

Institutional ethical committee clearance was obtained. Informed consent was obtained from the participants. Confidentiality was ensured and maintained throughout the study.

RESULTS

A total of 66 subjects were included in the analysis.

Table 1: Descriptive analysis for age in study population (N=66)

Parameter	Mean ±STD	Median	Min	Max	95% C.I. for EXP(B)	
					Lower	Upper
Age	53.27 ± 9.86	52.50	39.00	80.00	50.85	55.70

The mean age of study population was 53.27 ± 9.86 with the range 39 to 80 years. (Table1)

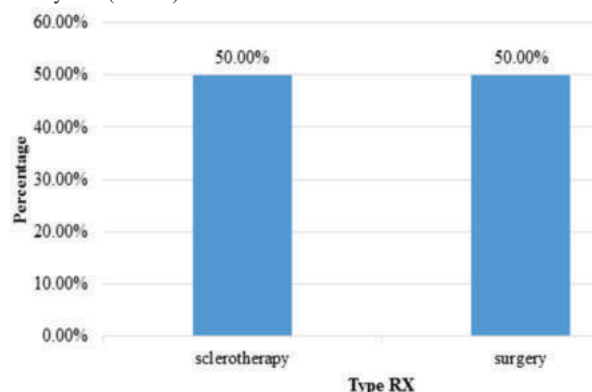


Figure 1: Bar chart of type treatment in study population (N=66)

A total of 33 sclerotherapy and 33 surgery were included in both the groups.

Table 2: Comparison of mean of baseline parameter between study groups (N=66)

Base line parameter	Sclerotherapy	Surgery	P value
Age(mean±SD)	58.64 ± 10	56.91 ± 8.44	0.451
AOU Baseline(mean±SD)	29.94 ± 15.97	28.97 ± 12.35	0.783

Pain Baseline	7.12 ± 1.41	6.91 ± 1.42	0.545
Limb circumference Baseline	31.91 ± 2.18	31.18 ± 1.79	0.144

The mean age of subjects in sclerotherapy group was 58.64 ± 10 years and in surgery group, it was 56.91 ± 8.44 years. The difference in the age between the two groups was statistically not significant (P value=0.451). The mean area of the ulcer of subjects in sclerotherapy group was 29.94 ± 15.97cm² and in surgery group, it was 28.97 ± 12.35cm². The difference in the area of the ulcer between the two groups was statistically not significant (P value=0.783). The mean pain score of subjects in sclerotherapy group was 7.12 ± 1.41 and in surgery group, it was 6.91 ± 1.42. The difference in the pain between the two groups was statistically not significant (P value=0.545).

Table 3: Comparison of mean of area of the ulcer between study groups (N=66)

Area of the ulcer	Area of the ulcer (Mean ±SD)		P value
	sclerotherapy (N=33)	surgery (N=33)	
Baseline	29.94 ± 15.97	28.97 ± 12.35	0.783
1month	17.45 ± 10.72	19 ± 11.88	0.581
2months	11.64 ± 7.94	12.24 ± 9.03	0.773
3months	5.39 ± 5.56	6.03 ± 8.41	0.718
4months	4.24 ± 6.43	4.85 ± 10.32	0.776
5months	2.27 ± 5.47	2.21 ± 6.26	0.967
6months	1.39 ± 2.51	2.94 ± 9.87	0.387

The mean baseline area of the ulcer of subjects in sclerotherapy group was 29.94 ± 15.97cm² and in surgery group, it was 28.97 ± 12.35 cm². The difference in the area of the ulcer between the two groups was statistically insignificant (p value=0.783). No statistically significant association was found between the groups on comparison every month till the end of 6 months(p value 0.387)

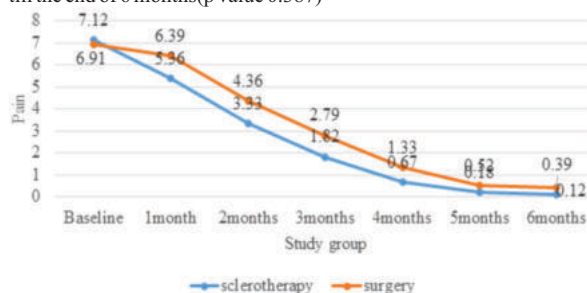


Figure 2: Comparison of pain between two groups (N=66)

The mean baseline pain score of subjects in sclerotherapy group was 7.12 ± 1.41 and in surgery group, it was 6.91 ± 1.42. The difference in the pain score between the two groups was statistically not significant (P Value=0.545). The mean 6month pain score of subjects in sclerotherapy group was 0.12 ± 0.42 and in surgery group, it was 0.39 ± 0.79, the difference is statistically insignificant (p value=0.083).

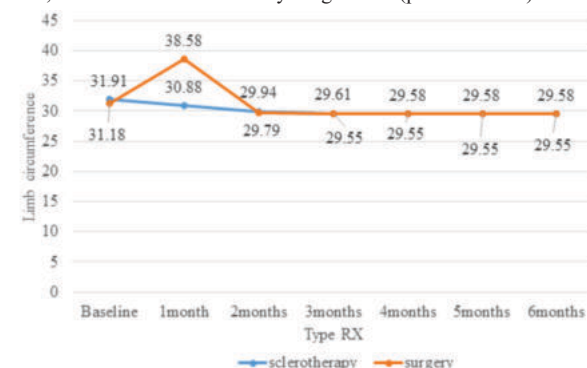


Figure 3: Comparison of mean of limb circumference between study groups (N=66)

Limb circumference was found to be higher in the surgery group post one month of the procedure when compared to the sclerotherapy group. But both groups had similar limb circumference at the end of 6 months. But the difference was not statistically significant.

Table 4: Comparison of type of treatment with edema of study population (N=66)

Edema	Type of RX		Chi square	P-value
	Sclerotherapy(N=33)	Surgery(N=33)		
Baseline	4 (12.12%)	7 (21.21%)	0.982	0.32
1month	21 (63.63%)	18 (54.54%)	0.564	0.45
2months	13 (39.39%)	9 (27.27%)	1.091	0.30
3months	2 (6.06%)	2 (6.06%)	0.000	1.00
4months	1 (3.03%)	1 (3.03%)	0.000	1.00
5months	1 (3.03%)	1 (3.03%)	0.000	1.00
6months	1 (3.03%)	3 (9.09%)	1.065	0.30

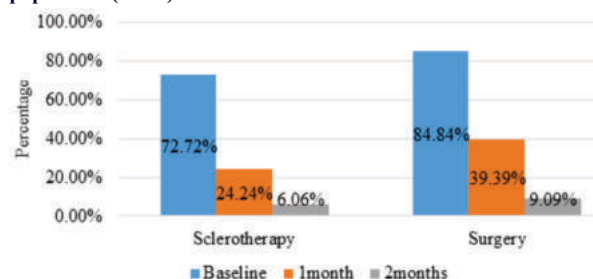
Among the people with sclerotherapy group 4 (12.12%) had edema. The number of 1month,2month,3month,4month,5month and 6month was 21 (63.63%),13 (39.39%),2 (6.06%),1 (3.03%),1 (3.03%) and 1 (3.03%) respectively. Among the people with surgery group 7 (21.21%) had edema. The number of 1month, 2month, 3month, 4month, 5month and 6month was 18 (54.54%),9 (27.27%),2 (6.06%),1 (3.03%),1 (3.03%) and 3 (9.09%) respectively. The difference between two groups was statistically not significant.

Table 5: Comparison of type of treatment with Pigmentation of study population (N=66)

Pigmentation	Type of RX		Chi square	P-value
	Sclerotherapy(N=33)	Surgery(N=33)		
Baseline	20 (60.60%)	19 (57.57%)	0.063	0.80
1month	20 (60.60%)	19 (57.57%)	0.063	0.80
2months	20 (60.60%)	19 (57.57%)	0.063	0.80
3months	20 (60.60%)	19 (57.57%)	0.063	0.80
4months	20 (60.60%)	19 (57.57%)	0.063	0.80
5months	20 (60.60%)	19 (57.57%)	0.063	0.80
6months	20 (60.60%)	19 (57.57%)	0.063	0.80

Among the people with sclerotherapy group 20 (60.60%) had pigmentation at the baseline. All the 20 continued to have pigmentation, till the end of 6-month treatment period. Among the people with surgery group 19 (57.57%) had pigmentation. All the 19 continued to have pigmentation, till the end of 6-month treatment period. The difference between two groups was statistically insignificant.

Figure 4: Bar chart of type of treatment with eczema of study population (N=66)



Among the people with sclerotherapy group 24 (72.72%) had eczema, the number of 1month and 2month was 8 (24.24%) and 2 (6.06%) respectively. Among the people with surgery group 28 (84.84%) had eczema. The number of 1 month and 2months was 13 (39.39%) and 3 (9.09%) respectively. The difference between two groups was statistically insignificant.

DISCUSSION

Sclerotherapy is the injection of a chemical solution (sclerosant) into a vein, damaging the endothelial lining and causing vessel occlusion and subsequent formation of fibrosis of the vein. It also helps to locate the points of abnormal flow from the deep to the superficial veins that can be permanently obliterated. The principle objective of the treatment is to reduce local venous hypertension by interrupting the leaking points via perforating veins into the superficial network. This technique yields more precise results to the tune of 9 out of 10 cases by localization of the incompetent perforating veins(11).

The mean age of study population was 53.27 $\pm$ 9.86 with the range 39 to 80 years. Contrastingly the mean age of the subjects in the study Cerrati S et al.(12) was 61 years, while Darvall KAL et al.(13) reported a median age of 69 years.

In contrast Cerrati S et al. (12) had investigated a smaller sample of 18

subjects in their single arm study without a control group. Having a control group as employed in this study aids in controlling the variables and increasing the magnitude and precision of the effect of the experimental treatment (sclerotherapy).

The study subjects showed tremendous improvement in the form of reduction in the mean ulcer area from baseline (sclerotherapy group 29.94 $\pm$ 15.97cm² vs. surgery group 28.97 $\pm$ 12.35 cm²) to the end of sixth month (sclerotherapy group 1.39 $\pm$ 2.51cm² vs. surgery group 2.94 $\pm$ 9.87 cm²). The findings also point that these changes are equally evident in both the groups, with the sclerotherapy group showing a higher reduction in the area of the ulcers but the differences are not statistically significant at each month of assessment.

Leg ulcers are debilitating and painful, greatly reducing patient's quality of life and are often difficult to treat. Labas et al.(11) found 78% of patients showing improvement in pain while Subba Rao NT et al. (13) reported pain reduction in 76 patients who underwent sclerotherapy. The present study found a significant difference mean pain scores between subjects in sclerotherapy group was (5.36 $\pm$ 1.34) and in surgery group (6.39 $\pm$ 2.22) at the end of first month; second month (sclerotherapy group 3.33 $\pm$ 1.91 vs. surgery group 4.36 $\pm$ 1.69); third month (sclerotherapy group 1.82 $\pm$ 1.49 vs. surgery group 2.79 $\pm$ 1.73); fourth month (sclerotherapy group 0.67 $\pm$ 0.96 vs. surgery group 1.33 $\pm$ 1.29). However, at the end of fifth and sixth month, though, the pain scores gradually reduced, it was not statistically significant. Regular monitoring of patients for pain associated with leg ulcers is necessary. It is important to formulate individual management plan, which may consist of simple physical methods such as leg elevation and exercise, compression therapy, and analgesia.

In study by Subbarao NT et al. ulceration reduced in 10 (66%), pigmentation responded poorly with 8 cases showing response out of 42 cases, eczema showed a good response with 33 (82.5%) out of 40 patients showing improvement. Oedema is commonly associated with venous leg ulcers it may therefore be an important factor in the failure of venous leg ulcers to heal. In their study on 50 patients followed upto 18 months, they observed 7 of 15 patients (46%) showing reduction in oedema. In comparison, in the present study, among people with sclerotherapy group 4 (12.12%) had edema. Among the people with surgery group 7 (21.21%) had edema. The difference between two groups was statistically insignificant. Prasad A et al.(14) found that edema was more likely to be associated with chronicity of leg ulceration hence its management can crucially enhance better recovery of the leg ulcers.

Among the people with sclerotherapy group 20 (60.60%) had pigmentation at the baseline. All the 20 continued to have pigmentation, till the end of 6-month treatment period. Among the people with surgery group 19 (57.57%) had pigmentation. All the 19 continued to have pigmentation, till the end of 6-month treatment period. The difference between two groups was statistically not significant. Chronic Venous Insufficiency can trigger skin pigmentation frequently noticed in the gaiter region of the leg. The exact nature and pathogenesis of this is poorly understood till date. One of the possible mechanisms could be that for the initial phases of skin changes due to venous disease, pigmentation is attributable to melanin and Haemosiderin is likely to contribute to the darkening of more severe pigmentation (15). Patients with venous leg ulcers show a greater tendency towards allergy than the general population. Venous eczema may precede ulceration and early identification of skin changes and prompt treatment may prevent ulceration occurring or deterioration of an existing ulcer(16).

Kulkarni SR et al. (2013) in their ESCHAR trial treated 200 legs (186 patients) with chronic venous leg ulcers (CEAP clinical, aetiological, anatomical and pathological elements 5 and CEAP 6) with superficial venous reflux between March 2006 and June 2011 with ultrasound-guided foam sclerotherapy and compression. They concluded that foam sclerotherapy is effective in abolition of superficial venous reflux and may contribute to similar ulcer healing and long-term recurrence rates to superficial venous surgery. Foam sclerotherapy is an attractive alternative to surgery in this group of patients(17).

Sclerotherapy is highly safer procedure, when performed with adequate precautions with fewer minor complications (18,19). Whilst the new treatments may be popular with both surgeons and patients, it is important that they are carefully evaluated not only for their clinical benefits and complications when compared to existing treatments but

also for their cost prior to their wider acceptance into clinical practice.

CONCLUSION

The study findings indicate that sclerotherapy is a simple, safe, procedure for the treatment of varicose veins of the lower limb, equally effective and sometimes better than the conventional surgical treatment. The technique is predominantly useful for management of early and smaller varicosities, which may help in preventing the further appearance unwanted skin changes and the presence of residual varicosities after surgery. As an outpatient procedure, it reduces the cost and morbidity associated with surgical treatment.

Recommendations and future perspectives:

Further larger studies can be taken up for the evaluation of this technique as it can be an efficient tool to manage patients with varicose veins and its related complications.

Limitations

This is a single centered study at a tertiary care hospital hence sample size was less. So the generalizability of the conclusions may not be applicable on a large scale.

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