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Original Research Article

Comparative Study of Perforator Ligation versus Ultra Sound Guided Sclerotherapy for Varicose Veins

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Abstract

Background: The prevalence of varicose veins is quite common among professionals who persistently stand for longer times, thereby making venous return from the lower limb against gravity difficult due to the incompetency of the valves of the veins, and leading to varicosity of veins.

Method: Out of 40 (forty) patients, 20 patients were treated with perforator ligation and 20 (twenty) patients with an ultrasound-guided sclerotherapy method. Venous clinical severity score (VCSS) and VDS (venous disability score) were compared.

Results: The mean values of UGFS in the VCSS and VDS were lower than perforator ligation studies due to early healing of varicose veins by the UGFS method.

Conclusion: It is proved that the UGFS method is safe, reliable, and quite economic and affordable to middle socio-economic patients because of easy administration, no hospital stay, and no risk of anesthesia. Early returns to daily work.

Keywords: SSV, GSV, VDS, VCSS, UGFS.

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Introduction

Valvular incompetency of the great or small saphenous vein is the most common cause of varicosity of the vein. Removal of such a refluxing vein relieves the patient from its signs and symptoms [1].

Surgery is the ideal treatment of truncal varicose veins. The great saphenous vein (GSV) with an incompetent valve at the saphenofemoral junction (SFJ) is treated by high ligation followed by short stripping to the knee, while the varicose short saphenous vein (SSV) is addressed by ligation at the saphenopopliteal junction only [2].

Although successful, its invasive nature is associated with postoperative morbidity and delay in return to normal activities. There are minimally invasive newer endoluminal treatment modalities that have been developed to treat great saphenous varicose veins, which include ultrasound-guided foam sclerotherapy, radiofrequency ablation (RFA), and endovenous laser therapy (EVLT) with a goal of achieving equal or better efficiency than conventional surgery with reduced postoperative morbidity and faster recovery [4]. Ultrasound-guided catheter-directed foam sclerotherapy (UGFS) has been introduced recently, and its medium-term efficacy has been noted as superior or equal to ultrasound-guided sclerotherapy [4]. Hence, an attempt is made to compare the perforator ligation versus ultrasound-guided sclerotherapy.

Material and Method

40 patients aged between 25 to 65 years visiting the surgery department of Surabhi Institute of Medical Sciences, Mittapally-502375, Telangana, were studied.

Inclusion Criteria: Clinical grade-2 to grade-5 (CEAP) varicose veins. The patients who gave their consent in writing for study were selected.

Exclusion Criteria: DVT (Deep Venous Thrombosis), concomitant arterial disease, pregnancy, morbid obesity, diabetic foot, local site

infection, or cellulitis were excluded from the study.

Method: 20 patients were selected for the perforator ligation (or surgical) approach method. The previous history of every patient was noted in detail, and they were informed about the procedure in advance.

The ligation (surgical) procedure was saphenofemoral (Trendelenburg) flush ligation, combined with saphenous stripping and phlebectomy for varicose saphenous tributaries and ligation of incompetent perforators.

UGFS: A preoperatively Doppler study done to mark the incompetent sapheno-femoral junction, sapheno-popliteal junction, and course of the great saphenous vein and short saphenous vein and incompetent perforators

Patient was asked to stand. The parts were cleaned, accessory veins were cannulated using 23-25 gauge butterfly needles, and they were secured in position.

After this, the patient was asked to lie in a supine position on the table, and parts were draped. A great saphenous vein (GSV) or short saphenous vein (SSV) ureteric catheter is inserted up to the saphenofemoral junction (SPJ) after being placed in Trendelenburg's position. Tessaris' method was used to produce the foam (the foam was made from polidocanol 3% with room air at 1:4 ratios).

Now the catheter is withdrawn up to 2-3 cm so that the tip of the catheter lies about 2-3 cm away from the SFJ or SPJ and compressed the SFJ in marked areas.

Foam was injected, and at the same time, the catheter was withdrawn so that about 1-1.5 ml of foam was injected per 5 cm of vein. After complete removal of the catheter, the vein was ligated, and gentle massage was given along the vein. A catheter can be inserted in the reverse direction and a needle with about 1 ml of foam per needle. Any incompetent perforators that were not in the course of the main vein were injected using a 22-gauge, 1.25-inch needle directly with 1% polidocanol.

Maximum 10-12 ml of foam was injected per session. At the same time, the patient was asked to perform ankle dorsiflexion to prevent foam from entering deep veins. Manual compression of SFJ or SPJ: the limb was bandaged using a crepe bandage, and the patient was asked to walk a minimum of 30-35 minutes before discharge. The crepe bandage was replaced by graduated elastic compression stockings with a compression of 30-40 mm Hg after 7 days.

All patients were followed on 7th day, 1st month, and 3rd month postoperatively with CEAP (Comprehensive Energy Assistant Program). Score, VCSS (Venous Clinical Severity Score). VDS (venous disability score) was noted.

The duration of the study was from May 2024 to March 2026.

Statistical Analysis: Both procedures were compared statistically, mainly VCSS score and VDS score in both groups. The statistical analysis was carried out using SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table 1: Study of profession of varicose vein patients: 10 (25%) were formers, 9 (22.5%) were Hotel or Bar waiters, 7 (17.5%) were shop keepers, 6 (15%) were Bus conductors, 8 (20%) were Traffic Police/Security gaurds.

Table 2: Study of involvement of lower limbs: 21 (52.5%) left lower limb, 12 (30%) right lower limb, 7 (17.5%) had bilateral lower limbs had varicosity of veins.

Table 3: Comparison of perforating (Surgical) groups and UGES groups VCSS mean values.

a) (1) Perforating (surgery) group on 7th day: VCSS mean value before surgery was 7.12 (SD±2.0). After 7th day mean value 4.03 (SD±1.22), t test value was 5.89 and p value was highly significant.

(2) In UGFS before 7th day mean value VCSS score was 7.42 (SD±1.75), t test was 7.6 and p value was highly significant ($p<0.001$).

b) (1) In first month before mean value in perforating group was 7.12 (SD±2.0) after one month mean value was 1.8 (SD±1.0), t test value was 10.6 and p value was highly significant ($p<0.001$) of VCSS score.

(2) In UGFS group mean value was at month 7.42 (SD±1.75) before and 3.8 (SD±1.18) after treatment t test value was 7.6 and p value was highly significant ($p<0.001$).

c) (1) At 3rd month: In perforating ligation (surgical) group before treatment mean value was 7.12 (SD±2.0) after treatment mean value 1.72 (SD±8.6), t test value was 11.09 and p value was highly significant ($p<0.001$).

(2) In UGFS group before treatment (follow up) mean value was 7.42 (SD±1.75) and after treatment mean value was 1.36 (SD±0.1), t test value was 15.4 and p value was highly significant ($p<0.001$).

At different interval of study mean values of VCSS score was much lower in UGFS than perforating group.

Table 4: Comparison VSD scores in both group

In pre-operative VSD score in perforator ligation (surgery) group mean value was 1.36 (SD± 0.46). Mean value UGFS was 1.32 (SD±0.44), t test was 0.14, p value was highly significant.

On 7th day VSD score in perforating group was mean value 0.92 (SD±0.1.0) and 0.55 (SD±0.40), t test was 3.84 and p value was highly significant ($p<0.001$).

Table 1: Distribution of occupation in prevalence of varicose vein

Sl. No	Occupation	No. of patients (40)	Percentage (%)
1	Agriculture (farmer)	10	25
2	Hotel or Bar water	9	22.5
3	Shopkeeper	7	17.5
4	Bus conductor	6	15
5	Traffic police/security Gaurds	8	20

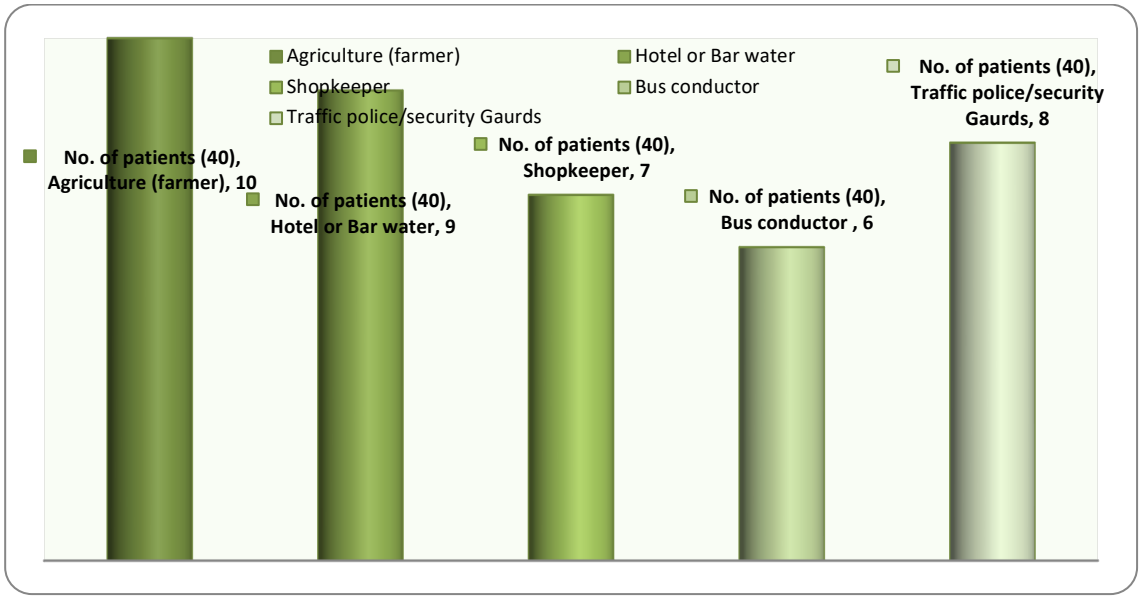

Figure 1: Distribution of occupation in prevalence of varicose vein

Table 2: Study of Involvement of limbs

Sl. No	Involvement of limbs	No. of patients (40)	Percentage (%)
1	Left leg	21	52.5
2	Right leg	12	30
3	Bilateral	07	17.5

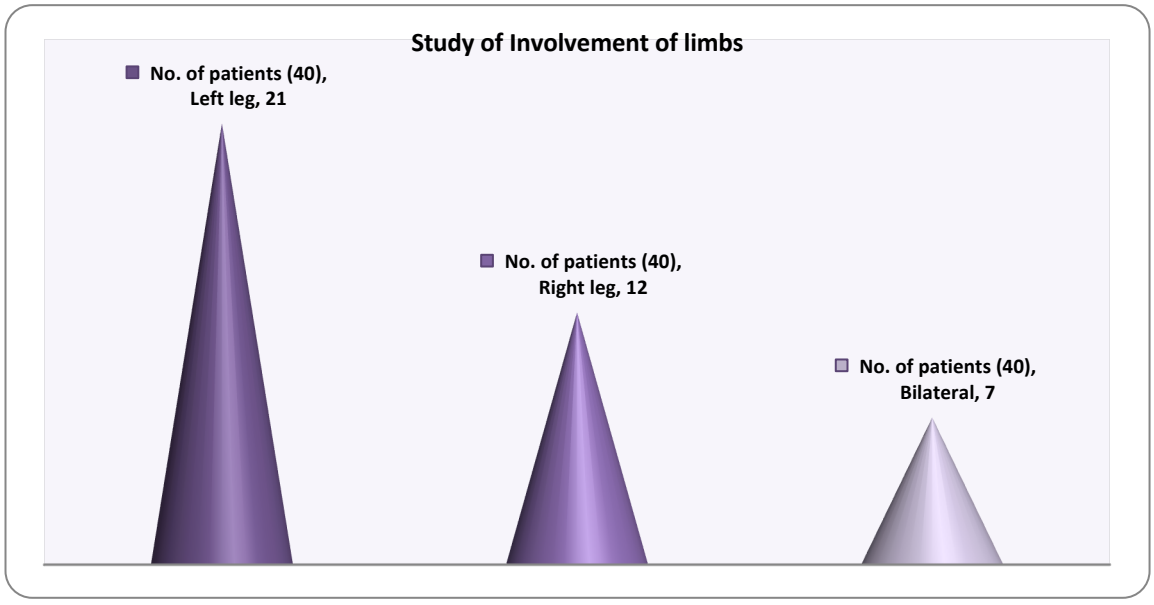

Figure 2: Study of Involvement of limbs

Table 3: Comparison of both perforator ligation (surgical) and UGFS in mean values VCSS scores

Observation	Before	After	t test	p value	Before	After	t test	p value
7th day	7.12 (SD±2.0)	4.03 (SD±1.22)	5.89	P<0.001	7.42 (SD±1.75)	3.8 (SD±1.18)	7.6	P<0.001
1 month	7.12 (SD±2.0)	1.8 (SD±1.0)	10.6	P<0.001	7.42 (SD±1.70)	1.65 (SD±0.20)	14.6	P<0.001
3 month	7.12 (SD±2.0)	1.72 (SD±0.86)	11.9	P<0.001	7.42 (SD±1.75)	1.36 (SD±0.11)	15.4	P<0.001

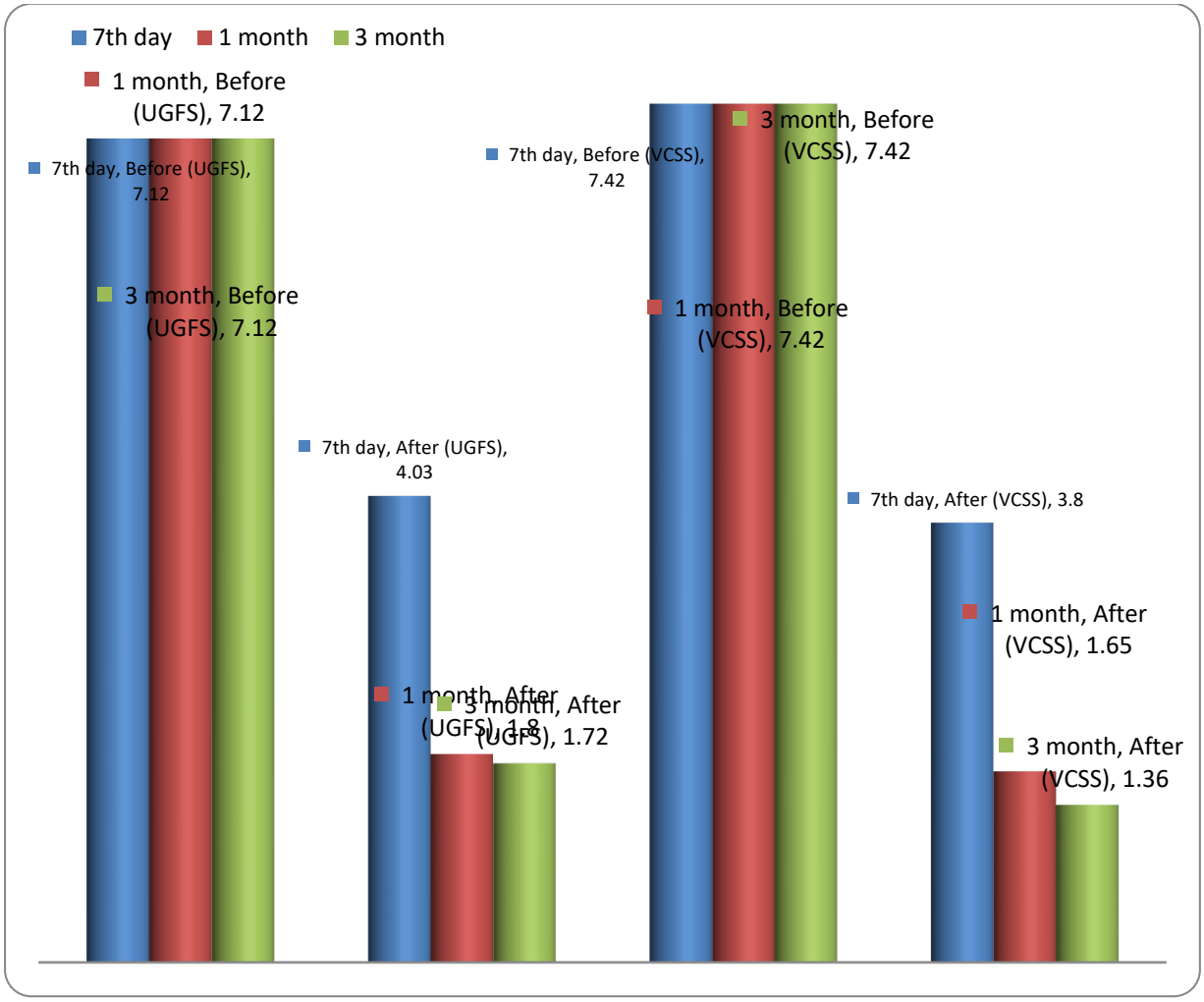

Figure 3: Comparison of both perforator ligation (surgical) and UGFS in mean values VCSS scores

Table 4: Comparison of VSD in both groups

VDS score	Perforations (surgery group) (No. of patient 20)	UGFS group (No. of patients 20)	t test	p value
Preo-op	1.36 (SD±0.46)	1.32 (SD±0.42)	0.14	p>0.78
7th day	0.92 (SD±0.16)	0.55 (SD±0.40)	3.84	P<0.001

In first and third no significant venous disability was observed

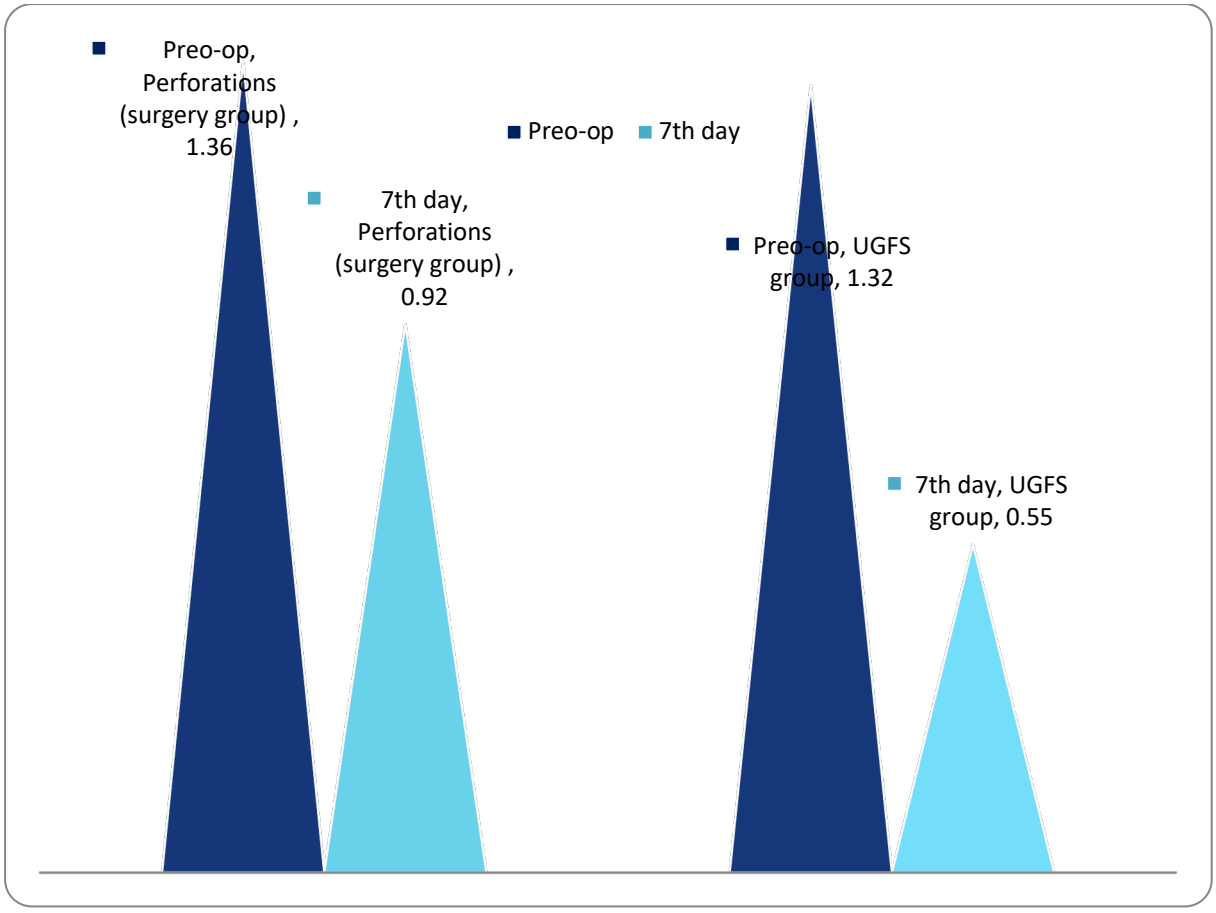

Figure 4: Comparison of VSD in both groups

Discussion

Present comparative study of perforator ligation versus ultra sound guided sclerotherapy for varicose veins.

The distribution of occupations and the prevalence of varicose veins. The highest in agriculture (farmers) is 10 (25%), followed by hotel or bar waiter, 9 (22.5%), and the least in bus conductor, 6 (15%) (Table 1). Involvement of limbs: 21 (52.5%) left leg, 12 (30%) right leg, and 7 (17.5%) bilateral (Table 2).

On 7th Day:

a) Perforator ligation group before treatment mean value was 7.10 (SD±2.0); after treatment mean value VCSS score was 4.03 (SD±1.22), t test was 5.89, p<0.001.

b) In the UGFS group, the VCSS score before treatment was 7.42 (SD ±1.75); after treatment, it was 3.8 (SD ±1.18), the t test was 7.6, and p < 0.001.

On First Month:

a) The VCSS score in the perforator ligation group mean value before treatment was 7.12 (SD±2.0), and after treatment it was 1.8 (SD±1.0); the t-test value was 10.6, and p<0.001.

b) In UGFS, the score before treatment was 7.42 (SD±1.75); after treatment, it was 1.65 (SD±0.20), the t-test value was 14.6, and p<0.001.

On 3rd Month:

a) VCSS score in the perforation ligation group mean value before treatment was 7.12 (SD±2.0); after treatment, the mean value was 1.72 (SD±0.86), the t test was 11.09, and p<0.001.

b) In the UGFS group, the mean value before treatment was 7.42 (SD±1.77), and after treatment, it was 1.36 (SD±0.11); the t-test value was 12.9, and p<0.001. The mean values of UGFS were quite lower than the perforator ligating group. In the compaction of VSD scores in both groups (Table 3).

Pre-operatively:

a) In the perforator ligation group, the value was 1.36 (SD±0.46), and in the UGFS group, it was 1.32 (SD±0.42); the t-test value was 0.14, and the p-value was highly significant.

On 7th day VSD score:

a) In the perforator ligation group it was 0.92 (SD±0.16), and in the UGFS group it was 0.55 (SD±0.40); the t test was 3.84 and p<.001 (p value was highly significant). In 1st and 3rd months, no

significant VSD was observed (Table 4). These findings are more or less in agreement with previous studies [5,6,7].

Varicose veins constitute a chronic, frequently relapsing event that develops secondary to valvular failure. It is, therefore, unrealistic to expect the complete and constant removal of superficial reflux in all patients subjected to a single treatment, whether it was operative, UGFS, or another minimally invasive alternative [8].

However, there is very little data available in the literature directly comparing UGFS with perforating ligation (surgery) on the basis of VCSS, but UGFS has the least VCSS, and VCD scores were observed [9]. It was also reported that UGFS treatment had minimum follow-up as compared to other approaches to varicose vein treatments, although some complications were exclusive to surgery and not found in the UGFS group, but 2.5% pain and pigmentation complications were observed in foam of sclerotherapy, which could be an excess infusion of foam [10].

It was observed that 16% of patients in Egypt had an allergy to foam [11]; hence, it is unwise to test the foam before injecting.

As far as outcomes of therapy are considered in terms of the immediate post-operative complications, improvement of severity or disability scores, recurrence, and overall clinical and radiological reports. The ultrasound-guided sclerotherapy is highly satisfying and acceptable to middle and lower socio-economic patients.

Summary and Conclusion

Present a comparative study of perforator ligation versus ultrasound-guided sclerotherapy for the treatment of varicose veins. It is noted that the UGFS technique was quite effective in achieving anatomical obliteration and yielding relief to complications of varicose veins.

UGFS can be done as an outpatient under local anesthesia; hence, there is no economic burden on the patient for a hospital stay. The present study demands that a large number of such patients must be treated with proper follow-up to declare that UGFS technique is a gold standard treatment for varicose veins.

Limitation of study: Owing to remote location of research centre, small number of patients and lack of latest techniques, we have limited findings and results.

This research work was approved by the ethical committee of Surabhi Institute of Medical Sciences, Mittapally-502375, and Telangana.

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