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# **A comparative study between Trendelenburg procedure vs radiofrequency ablation for varicose vein surgery in a tertiary care hospital Chennai- A cross-sectional study**

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**Abstract**---Background, One of the most popular surgical procedures, varicose vein surgery serves as a crucial teaching technique for aspiring surgeons. The great saphenous and short saphenous systems in the lower limbs, which are tortuous and dilated, are the veins most commonly affected by varicose veins. A vessel wall disease or valvular pathology is the cause of a varicose vein. People who work all day standing up typically have long-term effects. The Trendelenburg procedure involves several phlebectomies for the dilated veins below the knee, along with the juxta femoral flush ligation of saphenous veins and vein stripping up to below the knee. The less invasive radiofrequency ablation therapy has replaced the Trendelenburg method and is growing in popularity since it has fewer drawbacks. Venous tissue is thermally damaged when a high-frequency

alternating current is employed to transmit electrical energy into the tissue. More research is needed to compare the Trendelenburg and radiofrequency in the chosen group with regard to early ambulation, early return to work, the severity of postoperative pain, recovery time, and complications. **Methods** An analytical cross-sectional study including 100 people with varicose veins was undertaken from June 2017 to July 2019 and lasted one year and eleven months. In the operating room of the Sree Balaji Medical College in Chrompet, 50 patients were receiving radiofrequency ablation, while 50 patients were undergoing the Trendelenburg technique. Patients between the ages of 18 and 70 who are healthy enough to undergo both surgical procedures should focus on choosing the best surgical procedure between Trendelenburg and radiofrequency ablation in terms of early ambulation, early return to work, the severity of postoperative pain, recovery time, and complications in the chosen group. **Results:**The majority of our patients are between the ages of 20 and 40, with a mean age of 35 in both categories. Men outnumber women 4:1, making them more powerful than women. When compared to group II, group I did not experience any significant complications such as bleeding (25:2), hematoma (10:0), inflammation (30:1), or the need for blood (2:1). In group II, we noticed earlier hospital discharge (1 day vs. 6 days), return to work (1 day vs. 3 days), and patient mobilization (1 day vs. (4 days vs. 2 weeks). **Conclusion** The research focuses on the RFA technique's safety and how it clearly outperforms the Trendelenburg method in terms of early ambulation, early return to work, less intense post-operative pain, quick recovery, and few complications. As a result, patients who arrive with varicose veins of the lower limbs should select RADIOFREQUENCY ABLATION as their first option for surgery.

**Keywords---**Varicose veins, radiofrequency ablation, endogenous technique, endogenous thermal ablation, great saphenous vein

## Introduction

Chronic venous insufficiency is condition where veins cannot pump enough deoxylood to heart, resulting in stasis due to impaired musculo-venous pump. Dilatated, elongated, tortuous and palpable superficial veins are defined as varicose veins resulting from venous hypertension. Its more common in India, particularly in male population [1,2].

A varicose vein is caused by either vessel wall or valvular pathology. It affects mainly persons who have to stand for lengthy periods of time at work. Venous pathology occurs when venous pressure rises and blood flow is impeded, such as valvular incompetence, perforator incompetence, and venous obstruction.

Most of the patients usually presents with swelling and leg pain, severe limitations in normal daily activities due to superficial venous insufficiency and a poor quality of life, because it can progress to cause complications of venous

hypertension including skin ulceration. For proper diagnosis, classification of severity and management of varicose vein it is essential to do physical examination and venous study [3,4].

Most of the patients seek surgery for either cosmetic purposes or pain not controlled by compression hose are relatively young and desire rapid return to work or daily activities. A surgery for Varicose vein surgery is one of the routine and commonest procedure and is an important for training surgeons. Principles have been increasingly challenged since the advent of new minimally invasive techniques, such as ultrasound-guided foam sclerotherapy (UGFS), endovenous laser therapy (EVLT), and radiofrequency ablation (RFA), have been introduced in the last decade, when compared to classical Trendelenburg operation which is juxta femoral flush ligation of saphenous veins and stripping of veins up to below the knee, followed by multiple (phlebotomy) for the below knee dilated veins. Radiofrequency ablation is a minimally invasive surgery which has mostly substituted the Trendelenburg approach and is becoming increasingly prevalent due to the relatively low risk of complications. It performs by using electrical energy in the form of high frequency alternating current to thermally destroy vascular tissues through the tissue. As a result, the purpose of this study is to compare the trendelenburg and radiofrequency in terms of complication, early recovery, and post-operative discomfort in the chosen group.

## **Method**

### ***Methodology***

**Study Design:** Analytical Cross-sectional study

### ***Duration***

July 2017 To June 2019

### ***Center***

Shree Balaji Medical College And Hospital, Chrompet, Tamil Nadu, India

We assessed the outcomes of endogenous radiofrequency ablation with standard surgery in patients with primary venous insufficiency in the lower extremities. From July 2017 to June 2019, this study was initiated in the DEPARTMENT OF GENERAL SURGERY at SHREE BALAJI MEDICAL COLLEGE AND HOSPITAL, Chrompet, Tamil Nadu, India.

Based on the theatre time, procedure, and time for patients between the ages of 18 and 70, Numerous variables were compared, including mobilization, discharge date, return to work date, hematoma, bleeding, postoperative pain and numbness, and blood requirement. For a full year, each patient was followed up.

Among the criteria for inclusion and disqualification were: This study combines clinical and comparative methods. Physical variables such as age, sex, height, weight, and others were comparable across the two groups. despite the ethical

committee having informed you.

***Inclusion Standards:***

- *People who are between the ages of 18 and 60*
- Clinical , Etiological , Anatomical and Pathophysiological (CEAP) , Clinical grades 2-6 (C2-6), primary(Ep) , superficial (As) and Reflux alone (Pr)

**Exclusion standards:**

- Varicose vein with previous history of deep vein thrombosis
- Concomittant peripheral arterial disease
- Patent with thormbophila, cancer and lupus .

**Sample size Calculation:**

Sample size formula for comparison of proportion was applied and sample size was calculated to be 100 with dropout rate of 12% were

$Z_{1-\alpha/2}$ = 95% level of confidence

$Z_{1-\beta}$ = power of test i.e., 80%

P1P2= Probability of event in respective groups i.e, 48% and 25%

$Q1Q2 = (1-P1), (1-P2)$

$d^2$ = expected difference in error margin i.e, 9%

**Procedure**

Radiofrequency ablation was carried out using the OLYMPUS Radiofrequency Generator. While the surgery is being carried out, the patient is placed in a reverse Trendelenburg position with GA or SA. Under ultrasound guidance over a 0.18 guidewire, a 7-F venous catheter sheath was cannulated in the GSV trunk immediately above the ankle. After being placed through the sheath, a radiofrequency catheter's tip was found to be 3 cm distant from the SFJ. According to USG recommendations, perivenous tumescent fluid was injected in the case of GA to prevent heat damage to the perivenous tissues and reduce treatment-related pain and vein diameter. The heating element was enabled with radio-frequency radiation to 120 °C with a continuous pulldown to the knee.. With a persistent pull down until the ankle, the energy supply below the knee is reduced to 60-70 °C. Manual compression was used to achieve external compression during treatment. A sterile adhesive dressing was used. Following the operation, a crepe bandage was applied from the foot to the groin. Foam sclerotherapy was used to treat below-knee varicosities in both treatment groups

in the same sitting, including varicosities caused by incompetent perforators (usually above ankle)

**Trendelenburg operation:** After ligating designated (superficial circumflex, superficial external pudendal, superficial epigastric vein), a juxta femoral flush ligation of the long saphenous vein (i.e. flush with femoral vein) is performed. Tributaries should be ligated to avoid recurrence.

**Vein stripping:** The vein is stripped using Myer's stripper. It is physically easier to strip from the bottom up. The use of a crepe bandage as soon as possible reduces the risk of bleeding and the development of a haematoma. Injury to the saphenous nerve may result in saphenous neuralgia.

The veins in the lower part of the leg are not normally stripped. It is more effective to strip the vein. The vein should be firmly attached to the stripper's end and pushed out to allow the vein to invert. Short saphenous vein stripping is more effective than ligation at the sapheno popliteal junction. To prevent damage to the sural nerve, it is performed from the top down with a rigid stripper.

## Results

Graphs and frequency provide descriptive information. The correlations between the groups and the factors are ascertained using the Chi-Square test. A P-value of 0.05 is taken throughout the inquiry to be significant.

This fairly small study only comprised two patient groups reflecting diverse therapeutic approaches. Conservative care, external laser therapy, and injectable sclerotherapy are further treatments that were not reimbursed. The distributions of age, sex, height, weight, and occupation were kept the same for both groups (Table 1). With a mean age of 35 in both categories, the majorities of patients fell into either the 20–50 age range or were in their active stage of life. Men outnumber women by 4:1, making them more powerful than women. As compared to group II, group I experienced significant issues such as bleeding (20:1), hematoma (5:0), inflammation (60:1), and the need for blood (1:0). In group II, we noticed early patient discharge from the hospital (1 day vs. 3 days), return to work (1 day vs. 5 days), and early patient mobilisation (5 days vs. 2 weeks) (Fig. 1).

The typical RFA surgical treatment takes 15 minutes as opposed to the hour-long open surgery procedure.

**Table 1**  
**Descriptive table representing frequency and p value of two groups**

| Variables                   | Group I (traditional method) | Group II (RFA) | P-Value |
|-----------------------------|------------------------------|----------------|---------|
| <b>Criteria</b>             |                              |                |         |
| Number of cases             | 50                           | 50             | -       |
| Average duration of surgery | 1 hr                         | 15 min         | 0.02    |

|                      |            |            |      |
|----------------------|------------|------------|------|
| Blood required       | 2 patients | 1 patients | 0.01 |
| <b>Complications</b> |            |            |      |
| Bleeding             | 25         | 2          | 0.04 |
| Hematoma             | 10         | nil        | 0.03 |
| Inflammation         | 30patients | 1 patient  | 0.04 |
| Discharge after      | 6days      | 1 day      | 0.02 |
| Resume duties        | 2 weeks    | 4 days     | 0.03 |

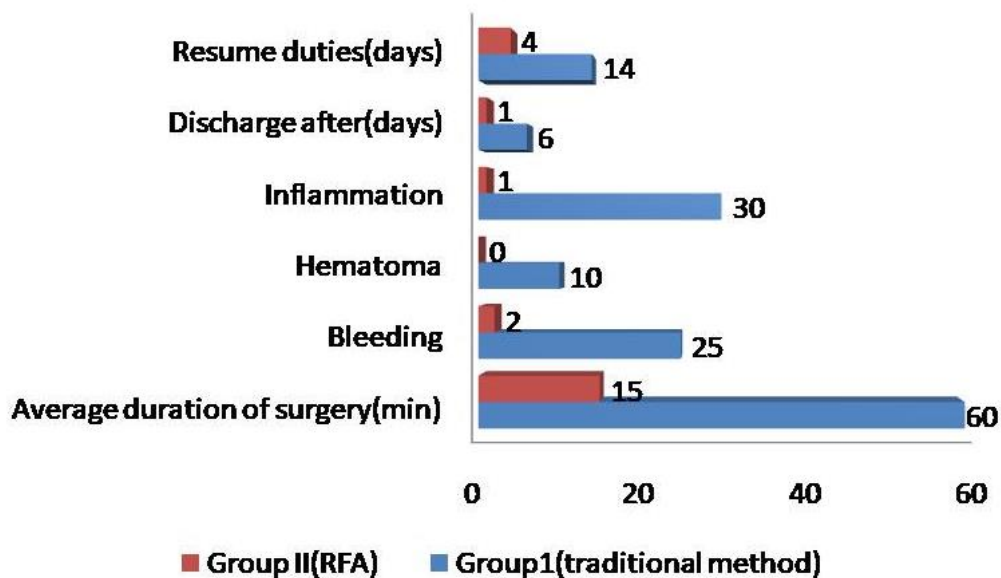


Fig 1: Distribution of complication and time

## Discussion

Varicose veins may be indicated by a heavy, aching sensation, itching or burning, and symptoms that get worse with prolonged standing [2]. Leg ulcers, modifications in stasis, infections, and thrombosis are examples of potential side effects. Men outnumbered women among the patients in our research who were in active stages of life and had jobs that required standing (4:1). The patients are between the ages of 20 and 40. 35 years old on average Greater saphenous vein ligation and stripping has been a very common surgical procedure for more than a century, however more recent investigations have cast doubt on this procedure [3,4]. Treatment options for varicose veins include surgery, endovenous treatments using RFA or LA-SER, external laser therapy, injectable sclerotherapy, and conservative maintenance [2,3]. In this research, we contrast the results of two various therapeutic philosophies. RFA, a less invasive procedure, may have advantages in terms of lessening tissue stress and dissection. They used fewer analgesics as a result, felt much less pain, and were able to get back to their normal activities faster. In the initial post-treatment period, this enhanced way of life, social interactions, cosmetics, quality of life, and contentment [5,6]. Similar

results were seen in this study regarding postoperative inflammation (60:1), discomfort, numbness, early mobilisation, date of discharge after 6:1 day, and return to work/duties (14:4 days).

In this study, it was discovered that there was less bleeding (25:2), hematoma (10:0), blood requirement (2:1), postoperative inflammation (30:1), pain, numbness, early mobilisation (6:1 day after discharge), and resuming work or chores (14:4days).

A less invasive alternative to the traditional ligation and stripping of varicose veins has been suggested: endovascular ablation of the great saphenous vein [7]. In the RFA method, a catheter electrode is used to provide a high-frequency alternating radio frequency current that causes collagen to contract and veins to spasm [8]. In a setting with limited accessibility, radiofrequency ablation is an excellent substitute for open surgery and would free up operating room time [8]. For individuals with primary unilateral GSV reflux who need therapy, endogenous ablation utilising RFA carried out as an outpatient is likely to be a cost-effective therapeutic method [9]. Unlike conventional open surgery, which requires hospitalisation and general anaesthesia, RFA can be conducted in an outpatient setting [10]. In comparison to endovenous laser ablation and stripping, radiofrequency ablation and foam are linked to a quicker recovery and reduced postoperative pain.

## Conclusion

RFA is quicker and easier than open surgery combined with venous stripping, yet it still has advantages. It is safe, simple, less intrusive, and produces pleasing cosmetic effects. Even though radiofrequency ablation is a routine treatment, the best outcomes can be achieved with the right techniques. We can face more hurdles prior to, during, and after surgery by adhering to the right protocol. Doppler ultrasonography performed by a qualified surgeon is essential for a successful and positive surgical outcome.

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