

Effect of Radiofrequency Ablation (RFA) on Cutaneous Manifestations of Varicose Vein

ShakyaYR¹, Karmacharya RM²

ABSTRACT

Introduction: The varicose vein is a common chronic vascular disease affecting people with predisposing factors like restricted mobility, pregnancy, obesity, and long-standing jobs. According to CEAP (Clinical, Etiological, Anatomical, and Pathological) classification, there are six categories of CEAP ranging from C0 or no sign to C6 or active ulceration of the vein. Radiofrequency Ablation (RFA) is the minimally invasive procedure to manage varicose vein. This study aims to assess cutaneous manifestation and quality of life among participants who underwent RFA in the Dhulikhel Hospital. **Methodology:** This study is retrospective review of the clinical and surgical report of 171 consecutive number of patients admitted with varicose veins and treated with Radio Frequency Ablation from January 2015 to December 2016. The cutaneous manifestation of all the patients were noted prior to surgery and were followed up in two months to note the manifestation again. **Results:** The total number of patients were 171 with 79 male (46.2%) and 92 female (53.8%). The mean age was 48.9 years (S.D. 6.8). In pre-ablative stage, there were 42.1% patients in C4 stage, 30.4% patients in C3 stage, 16.4% in C2 stage. In post-ablative stage, there were 39.8% patients in C4 stage, 16.4% in C1 and 11.7% in C2 stage. In 53.8% of patients, there was a decrease in C stage postoperatively. Findings of this study are encouraging in terms of C staging after RFA, and it paves the way for further exploration of RFA.

Key Words: CEAP Classification of Varicose vein, Chronic Venous Disease, Radiofrequency Ablation, Varicose veins

1. Dr. Yagya Ratna Shakya
2. Dr. Robin Man Karmacharya

Address for Correspondence:

Dr. Yagya Ratna Shakya
Lecturer
Department of General Surgery
Dhulikhel Hospital Kathmandu University
Dhulikhel, Kavre

INTRODUCTION

Varicose veins are prominent dilated tortuous veins usually seen in a lower limb due to reflux of blood from deep venous system to the superficial venous system¹. The disease affects one or both of the superficial venous system of lower limb namely Great Saphenous Vein or Lesser Saphenous Vein¹. The disease occurs due to defective valves inside these connections and usually is found in people who need to stand for a long time in their occupation^{1,2}.

Cutaneous manifestation of the varicose vein can range from a few slightly dilated reticular veins to multiple ulceration². CEAP (Clinical, Etiological, Anatomical and Pathological) classification of chronic venous diseases (CVD) classifies cutaneous manifestation of varicose vein into seven subtypes namely; C0, C1, C2, C3, C4, C5 and C6²⁻³. In detail, C0 presents no cutaneous signs and C1 consists of telangiectasias and reticular veins². Progressively, C2 has a large varicose vein, and C3 shows edema with no skin changes, whereas C4 has visible skin changes like pigmentation, eczema, and lipodermatosclerosis². C5 and C6 are advanced forms of C4 with healed (C5) and active ulceration (C6) respectively². Worldwide acceptance and dissemination of the CEAP classification significantly improved the management of cutaneous manifestation of chronic venous disorders classification³. This classification serves as an important landmark in the field of venous disease

because it provides uniformity in understanding the cutaneous manifestation of the venous disease which allows comparative assessment of varicose vein before and after the intervention, for instance, RFA⁴.

Varicose vein is commonly found among 23% of American populations, however, there is a lack of prevalence study of varicose vein among Nepalese population⁴. A study from India among railway workers found 26% of prevalence of varicose vein among south Indians and 7% among north Indians⁵.

There are high ligation and vein stripping procedure, foam sclerotherapy of veins, and catheter-assisted procedures using radiofrequency or laser energy, known as radiofrequency ablation (RFA) to treat varicose vein⁶. Traditionally, high ligation and stripping is a standard procedure to treat varicose vein in resource limited settings like Nepal, but RFA is emerging in recent years because of its benefits like minimal pain, short hospital stay, early restoration of productivity of the patients^{5,6}.

In RFA, radiofrequency energy is directed through a thin catheter inserted through a small incision in the vein to close off the vein, as shown in Figure 1⁶.



Figure 1: RFA catheter along with RF generator that is used in Varicose Vein intervention

RFA is an emerging practice in Nepal, and Dhulikhel Hospital is the one of the first institution to initiate this alternative procedure to high ligation and open surgical stripping of the incompetent saphenous vein. This study aims to assess the outcome of RFA among patients attending Dhulikhel hospital in relation to cutaneous manifestation change.

METHODOLOGY

This study is an observational study in which we did a retrospective review of the clinical and surgical report of 171 consecutive numbers of patients admitted in a single institute, Dhulikhel Hospital, with varicose vein and treated with RFA from January 2015 to December 2016. Cases, where RFA was done in both legs, were taken as two patients for ease in the analysis.

All the cases subjected to Radiofrequency ablation of varicose vein had a clinical examination for cutaneous manifestation. The cutaneous manifestation was measured as per the CEAP classification. For RFA, VNUS closurefast catheter (60 or 100 cm depending upon the height of the patient) along with the RFA generator of Covidien was used. Double segment RFA was done in the first and last segment and in a segment where there are significant perforators or major branches (>4mm diameter branches or perforators). Each RFA segment was 7cm with the pullback of at most 6.5cm. Following RFA, crepe bandage was applied on the treated limb and was elevated by about 25-30cm overnight. Patients were discharged after they can walk for more than 20feet unassisted. The patient was followed in two months to note the change in Clinical staging.

Analysis was done in SPSS in which scalar variables were interpreted using mean and standard deviation; and the categorical variables by using frequency and percentage.

RESULTS

Study Subjects

The total number of patients were 171 with 79 male (46.2%) and 92 female (53.8%). The mean age was 48.9 years (S.D. 6.8).

CEAP Classification

Clinical Staging	Pre-ablative (number)	Pre-ablative (Percentage)	Post-ablative (Number)	Post-ablative (Percentage)
C0	0	0	24	14
C1	0	0	28	16.4
C2	28	16.4	20	11.7
C3	52	30.4	16	9.4
C4	72	42.1	68	39.8
C5	10	5.8	14	8.2
C6	9	5.3	1	0.6

Table I: Number of cases in different clinical staging in the preoperative and postoperative stage

The number of cases in different clinical staging in the preoperative and postoperative stage is shown in Table I. In the pre-ablative phase, the most common clinical stage was C4 (42.1%) followed by C3 (30.4%). Thus about three fourth of all the patients were in stage C3 or C4. None of the patients were in C0 or C1. Patient with ulceration was 11.1% with that in C5 is 5.8% and in C6 5.3%. In terms of postoperative finding, the most common clinical stage is also C4 which was present in 39.8% which was followed by the C1 stage which was present in 16.4%. Even in C0 stage, there were 14% patients. Percentage of patients in C5 stage was 8.2. Increase in C5 stage in postablative stage can be seen which is due to change in C6 stage patient in pre-ablative stage to C5 stage post procedure. There was a decrease in C6 stage with only one patient with active ulceration (0.6%). Table II shows the number of patients in the distinct difference in the C stage between preoperative and postoperative status.

There were no patients with an increase in the C stage in the postoperative period. There were 79 patients (46.2%) with no change in the C stage. There were 48 patients (28.1%) with a difference (decrease) of 1 stage in the C stage. There were 44 patients (25.7%) with a difference (reduction) of 2 stages in the C stage. There were none patients with a difference of more than two stages in the C stage. Thus in 53.8% of patients, there was a decrease in C stage postoperatively.

C stage difference	Number	Percentage
0	79	46.2
1 (Decrease)	48	28.1
2 (Decrease)	44	25.7

Table II: C stage difference in preoperative and postoperative status



Preoperative Postoperative
(with markings)

Figure 2: The preoperative and postoperative outcome of a case following radiofrequency ablation of varicose veins



Preoperative Postoperative

Figure 3: Healing of ulceration and a decrease in pigmentation



Figure 4: Size of scar in Radio Frequency Ablation: Usual size is 3-5mm

DISCUSSION

Varicose veins and Chronic Venous Diseases (CVD) is one of the frequent cardiovascular problems presented in surgical clinics in the world and Nepal as well⁵⁻⁶. Approximately 23% of US adults have varicose vein.⁵ There is limited prevalence study in the context of Nepal and India; 26% South Indian and 7% north Indian, railway workers have a varicose vein⁵.

The varicose vein can affect all genders. However, prevalence among women is disproportionately higher than men⁷⁻⁸. Also in our study, 53.2% of participants were female. Our finding in this regard is comparable to a study conducted in Bulgaria (64%)¹⁰. However, a study in Canada found a remarkably higher prevalence of varicose vein among women (83%)⁶. Women are prone to varicose vein because of their physiological conditions like pregnancy, menopause, hormonal fluctuation and alteration of the viscosity of blood because of oral contraceptive pills^{5,7}.

Increased age is another crucial predisposing factors of the varicose vein^{1,6}. Mean age of our participants is 48.9 ± 6.8 years. This finding is comparable to the mean age of studies by Tonev et al. (48.3 years)⁸ and Casanaet al.⁹, (48.5 years). Aging causes wear and tear on the valves, and results flow back into our veins where it collects instead of flowing up to the heart⁷.

In our study, about three fourth of all the patients are in stage C3 or C4. None of the patients were in C0 or C1. As a patient is usually asymptomatic in C0 or C1, they typically do not present for consultation. Patient with ulceration was 11.1% with that in C5 is 5.8% and in C6 5.3%. This relatively high percentage of patients with ulceration might be because of good referral to a vascular specialist by different specialties. In terms of postoperative finding, the most common clinical stage is also C4 which was present in 39.8% followed by the C1 stage which was present in 16.4%. Even in C0 stage, there were 14% patients. This improvement in stages indicates beneficial cosmetic results as well as physiological correction in these improved groups. Patients with ulceration are 8.8% (C5 or C6) in the postoperative period.

In our study in 53.8% of patients there was decrease in C stage postoperatively. In a study done at Italy to see the results of radiofrequency ablation of varicose veins, improvement in the clinical stage was noted in 36.1% at the first month of follow-up which increased to 61.1% in six months follow-up which is comparable to our study findings¹⁰.

Despite our attempt to achieve methodological rigor in this study, this study consists of limitation such as only two months follow up for our participants¹⁰. However this is one of the pioneer studies among Nepalese population in terms of improvement in clinical classification and it paves the way for further studies related to RFA and its prognosis.

CONCLUSION

The initial result in relation to Clinical classification of varicose veins after RFA is promising and comply with global standards.

REFERENCE

1. Williams NS, O'Connell P. Venous Disorders. In Bailey and Love's Short Practice of Surgery (pp. 969–994);2018.
2. Eklöf B, Rutherford RB, Bergan JJ, Carpentier PH, Gloviczki P, Kistner RL, et al. Revision of the CEAP classification for chronic venous disorders: Consensus statement. *Journal of Vascular Surgery*. 2004;40(6):1248–52.
3. Rabe E, Pannier F. Clinical, Aetiological, Anatomical and Pathological Classification (Ceap): GoldStandard and Limits. *Phlebology: The Journal of Venous Disease*. 2012;27(1_suppl):114–8.
4. Hamdan A. Management of varicose veins and venous insufficiency. *JAMA* 2012; 308:2612–2621<https://doi.org/10.1503/cjs.014914>
5. Shah S, Koirala S, Pradhan S, Pradhan A. Surgical Outcomes of Varicose Veins at Universal College of Medical Sciences, Bhairahawa, Nepal. *Journal of Universal College of Medical Sciences*. 2018;4(2):14–6.
6. Kayssi A, Pope M, Vucemilo I, Werneck C. Endovenous radiofrequency ablation for the treatment of varicose veins. *Canadian Journal of Surgery*. 2015;58(2):85–6.
7. Beebe-Dimmer JL, Pfeifer JR, Engle JS, Schottenfeld D. The Epidemiology of Chronic Venous Insufficiency and Varicose Veins. *Annals of Epidemiology*. 2005;15(3):175–84.
8. Tonev AO, Genadiev SG, Dimitrov SG, Zahariev TT, & Nachev GK. A retrospective study of 100 patients with varicose veins treated with radiofrequency ablation and stripping. 2013. *Phlebolympology*.
9. Casana R, Tolva VS, Otero A, Malloggi C, Parati G. Three-year follow-up and quality of life of endovenous radiofrequency ablation of the great saphenous vein with the ClosureFast™ procedure: Influence of BMI and CEAP class. *Vascular*. 2018;26(5):498–508.
10. Giuseppe G, Silvia R, Galbiati A, Camelo T, Bruno S. Endovenous Radiofrequency Ablation for the Treatment of Varicose Veins: A Single Centre Experience. *World Journal of Vascular Surgery*. 2018;1(1):1-4