

Short Term Fate of Great Saphenous Vein after Radiofrequency Ablation for Varicose Veins.

Karmacharya RM, Devbhandari M, Shakya YR

Department of Surgery
Dhulikhel Hospital, Kathmandu University Hospital
Dhulikhel, Kavre, Nepal.

Corresponding Author

Robin Man Karmacharya
Department of Surgery
Dhulikhel Hospital, Kathmandu University Hospital
Dhulikhel, Kavre, Nepal.
E-mail: reachrobin773@hotmail.com

Citation

Karmacharya RM, Devbhandari M, Shakya YR. Short Term Fate of Great Saphenous Vein after Radiofrequency Ablation for Varicose Veins. *Kathmandu Univ Med J* 2015;51(3):234-7.

ABSTRACT

Background

Radiofrequency ablation of varicose vein have gained popularity compared to conventional surgery due to comparable long term results in addition to definite immediate superiorities. This modality has been started in Nepal since August 2003 and the study on short term fate of ablated vein segment confirms the anatomical benefit in addition to the clinical benefit.

Objective

To analyze short term fate of segment of great saphenous vein that has been treated by Radiofrequency ablation in terms of occlusion of saphenofemoral junction and absence of recanalisation on Doppler ultrasonography finding done at 3-6 months postoperative period.

Method

Total 81 cases subjected for radiofrequency ablation of great saphenous vein in thigh segment during August 2013 – September 2014 were followed up in between 3 to 6 months by Doppler ultrasonography. The findings were classified into type 1 to 4 results based on the anatomic closure of saphenofemoral junction and absence of recanalisation on treated segments.

Result

There were total 81 cases with 54.3% female and 45.7% male patients. Mean short term follow up duration was 4.9 months (S.D. 1.1 months). Great Saphenous Vein was cannulated most frequently in between 5 cm above knee to 5 cm below knee. Mean number of Radio Frequency Ablation (RFA) segments were 6.6 (SD=3.1). There was complete occlusion (Type 1 results) in 51 cases (63.0%). In 24 cases (29.6%) there was competent saphenofemoral junction with partial recanalisation in distal part of Great Saphenous Vein (GSV) (Type 2 results). In six cases (7.4%) there was incompetent saphenofemoral junction with partial recanalisation in distal part of Great Saphenous Vein (Type 3 results). There were no cases with incompetent saphenofemoral junction with complete recanalisation in distal part of Great Saphenous Vein (Type 4 results).

Conclusion

Radio Frequency Ablation for varicose vein, besides making clinical improvements, is also associated with good anatomical results.

KEY WORDS

Radiofrequency ablation, saphenofemoral junction, varicose vein.

INTRODUCTION

Radiofrequency ablation (RFA) of great saphenous vein (GSV) has been found to have comparable results to conventional saphenofemoral junction ligation and segmental stripping in terms of long term disease free state in addition to immediate superiorities to conventional surgery.¹ RFA works by causing target tissue destruction by causing tissue necrosis by heating of the tissue via the RFA probe.² RFA is done with catheter pull back technique with heating segment slightly longer than the pull back distance ensuring adequate overlapping. This is started about 2 cm distal to saphenofemoral junction in the groin to the level usually just below knee. This procedure which has just started in Nepal since August 2013 in the tertiary level hospital, has already attained some popularity due to prompt recovery, less pain, less hospital admission days than conventional surgical procedure.³ Despite apparent success, the fate of the treated segment of GSV hasn't been studied in our country. It has been found that the treated segment will undergo thrombosis, shrinkage and may also vanish.⁴⁻⁶

However, sometimes the segment may re-canalise which may also cause recurrence of the disease. This study aims to know the Doppler ultrasonography findings of the treated segment of great saphenous vein in short term follow up period.

METHODS

The cases subjected for RFA of Great Saphenous Vein in thigh segment with or without perforator ligation or phlebectomy at Dhulikhel hospital during August 2013 – September 2014 were asked to follow up after 3-6 months of surgery day. For RFA, VNUS Closure FAST (VNUS Medical Technologies, San Jose, California, USA) was used connected to the Radiofrequency generator of the same company. The heating segment is 6.5 cm and is heated to 120 degree Celsius for 20 seconds. All the segments in thigh are ablated once except in the first segment (which is 2 cm distal to saphenofemoral junction). The catheter are inserted into GSV by making puncture in the cannulation site using 7F needle exchanged to guide wire and venous sheath. Nearer proximity of vein, larger diameter of vein and avoidance of branching sites are taken in consideration for determining the cannulation sites. Once catheter is inserted appropriate amount of hypertonic saline is injected in perivenous region.

During the short term follow up, all the cases were subjected for venous Doppler ultrasonography visualizing the remnant saphenofemoral junction, great saphenous vein segments where radiofrequency ablation has been performed.

Acuson X300 (Siemens Healthcare Global, Germany) was used for ultrasound imaging. A linear array 7 MHz probe

was used. Patient was examined in standing position. Optimised depth, zooming and color were used for each patient. If there was color flow with Doppler signals inside the treated GSV segment, it was noted as recanalisation.

The findings were noted as type 1 results if no flow was noted in saphenofemoral junction and there was no recanalised segment in RFA performed GSV segments. Similarly it was noted as type 2 results if no flow was noted in SFJ with some recanalised segment in RFA performed GSV segments. It was noted as type 3 results if incompetent flow was noted in SFJ with or without recanalised segment in RFA performed GSV segments. If there was incompetent SFJ with complete recanalisation, it was noted as type 4 results.

All the data were recorded in Microsoft Office Access and analysed in SPSS 13.0. The study has been approved by institutional review committee.

RESULTS

There were total 81 cases that followed up after three to six months. Of them 44 were female patients (54.3%) and 37 were male patients (45.7%). Mean age was 51 years (SD 11 years). Mean short term follow up duration was 4.9 months (S.D. 1.1 months) which was found to be slightly earlier in male patients compared to female ($p < 0.05$) as shown in table 1.

Table 1. Short term follow-up pattern of patients.

Gender	Short term follow up duration in months (Mean, SD)
Male	4.4, 1.2
Female	5.2, 0.8

Most common GSV cannulation site was between 5 cm above knee and 5 cm below knee which was done in 65.4% of cases (Table 2). This was followed by more than 5 cm below knee. Measurements were taken from medial femoral condyle.

Table 2. GSV cannulation sites

Cannulation site	Number (n)	Percentage (%)
More than 5 cm above knee	11	13.6
Between 5 cm above knee and 5 cm below knee	53	65.4
More than 5 cm below knee	17	21.0

Mean number of RFA segments were 6.6 (SD=3.1). There was complete occlusion (Type 1 results) in 51 cases (Table 3). In 24 cases there was competent saphenofemoral junction with partial recanalisation in distal part of GSV (Type 2 results). In 6 cases there was incompetent saphenofemoral

Table 3. Number of percentage of cases in different types of results.

Type	Number (n)	Percentage (%)
Type 1	51	63.0
Type 2	24	29.6
Type 3	6	7.4
Type 4	0	0

junction with partial recanalisation in distal part of GSV (Type 3 results). There were no cases with incompetent saphenofemoral junction with complete recanalisation in distal part of GSV (Type 4 results). None of the cases have significant recurrence of varicose vein specific symptoms during the follow up.

DISCUSSION

Varicose vein, a common venous problem can affect 5-30% of adult population.⁷ Although open surgery has been the definitive treatment for varicose vein owing to improvement of quality of life, this has obvious immediate limitations like significant postoperative pain, prolonged admission, delayed return to work.^{3,8} These limitations have been eliminated with the change in surgical technique to minimal invasive procedures like radiofrequency ablation of Great Saphenous Vein.⁹ Earlier studies done in our center had demonstrated Great Saphenous Vein involvement in 88.2% of cases and such cases are amenable radiofrequency ablation.¹⁰

Baseline characteristics in our patients suggests varicose vein being more common in female which is similar to the study by Sergio et al. where 82.0% patients were female.¹¹ The same study had mean age of patients as 54 years which is also very similar to our study.¹¹ Male patients had earlier

follow up which can be due to easier access to health centers in our context.

Doppler ultrasonography is standard investigation for preoperative confirmation of varicose veins and also for postoperative evaluation.¹² Although, following treatment with radiofrequency ablation of great saphenous vein, there should not be any remnant flow, many studies have found limited reflux in some segments of treated GSV.^{13,14} This failure of occlusion, shrinkage and disappearance of the treated segment of vein can be due to a fact that the heating segment may not adequately touch the vein wall throughout the length. This can happen if there is inadequate instillation of perivenous fluids. In study by Sergio X. Salles-Cunha et al. it has been found that there is over 50% obstruction of treated segments during long term follow up.⁶ The same study divided the fate into five different groups that ranged from absent great saphenous vein (group I) to more than half of the segment of treated GSV partially recanalised (group V). The same study has also found a case with complete recanalisation of all the treated segment (type 4 results in our study). This type 4 results, although rare can sometimes yield especially if there is original missed double great saphenous vein where RFA can be performed in only one system.^{15,16}

Limitation of the study like short duration of follow up can be improved by continuing study of further follow up for more than two years.

CONCLUSION

RFA for varicose vein along with immediate benefits, have also good short term anatomical results. Follow up of patients for more than two years will yield information about long term anatomical results.

REFERENCES

- Merchant RF, DePalma RG, Kabnick LS. Endovascular obliteration of saphenous reflux: a multicenter study. *J Vasc Surg* 2002;35:1190-6.
- Singleton SE. Radiofrequency ablation of breast cancer. *American journal of surgery* 2003 ;69: 37-40.
- Karmacharya RM, Pradhan S, Shakya YR, Shrestha B, Batajoo H. Study of open surgical method and Radio Frequency Ablation of Varicose vein cases at Dhulikhel Hospital, a Tertiary care center of rural Nepal. *Int. J Health Science and Research* 2014;10:43-6.
- Weiss RA, Weiss MA. Controlled radiofrequency endovenous occlusion using a unique radiofrequency catheter under duplex guidance to eliminate saphenous varicose vein reflux: A 2-year follow-up. *Dermatol Surg* 2002;28:38-42.
- Rautio TT, Perala JM, Wiik HT. Endovenous obliteration with radiofrequency-resistive heating for greater saphenous vein insufficiency: A feasibility study. *J Vasc Interv Radiol* 2002; 13:569-75.
- Sergio X. Salles-Cunha, Hiranya Rajasinghe, Steven M. Dosick, Steven S. Gale, Andrew Seiwert, Linda Jones, et al. Fate of Great Saphenous Vein After Radio-Frequency Ablation: Detailed Ultrasound Imaging. *Vascular and Endovascular Surgery* 2004; 38: 339-44.
- Hemmati H, Baghi I, Talaei Zadeh K, Okhovatpoor N, Kazem Nejad E. Anatomical variations of the saphenofemoral junction in patients with varicose veins. *Acta Med Iran*. 2012;50:552-5.
- Kurz X, Lamping DL, Kahn SR, et al. Do varicose veins affect quality of life? Results of an international population-based study. *J Vasc Surg*. 2001; 34:641-8.
- Shepherd AC, Gohel MS, Brown LC, Metcalfe MJ, Hamish M, Davies AH. Randomized clinical trial of VNUS Closure FAST radiofrequency ablation versus laser for varicose veins. *British Journal of Surgery* 2010; 97: 810-8.

10. Karmacharya RM, Shakya YR, Shrestha B. Analysis of Consecutive Open Surgeries for Varicose Vein at Dhulikhel Hospital. *Kathmandu Univ Med J* 2014;47(3):190-3.
11. Sergio X. Salles-Cunha, Anthony J. Comerota, Argyros Tzilinis, Steven M. Dosick et. al. Ultrasound findings after radiofrequency ablation of great saphenous vein: descriptive analysis. *Journal of Vascular Surgery* 2004; 40: 1166-73.
12. Fonseca FP, Sarquis AL, Evangelista SSM. Surgery for primary troncular varicose veins without stripping the saphenous vein: pre and postoperative evaluation by duplex scan and photoplethysmography. *Phlebology* 1995;1: 419–21.
13. Pichot O, Kabnick LS, Creton D, Merchant RF, Schuller-Petroviae S, Chandler JG. Duplex ultrasound scan findings two years after great saphenous vein radiofrequency endovenous obliteration. *J Vasc Surg* 2004;39:189-95.
14. Pichot O, Sessa C, Bosson JL. Duplex imaging analysis of the long saphenous vein reflux: basis for strategy of endovenous obliteration treatment. *Int Angiol* 2002;21:333-6.
15. Kockaert M, De Roos K, Dijk LV, Nijsten T, Neumann M. A Definition Problem and Implications for duplication of the Great Saphenous Vein: *Dermatologic Surg* 2012; 38,77-81.
16. Waseem Al Talalwaj, Roger Soames. A duplicated great saphenous vein and clinical significance for varicosity: *Rev Arg de Anat Clin* 2014; 6:43-6.