

ORIGINAL RESEARCH

Assessment of outcomes of Endovenous Laser treatment of varicose veins at NIMS Hospital and Research center

¹Dr. Alisha Sheikh, ²Dr. Surendra Pal Jakhar, ³Dr. Harsh, ⁴Dr. Lalita Prasad Verma

^{1,3}PG Resident, ²Assistant Professor, ⁴Professor, Department of General Surgery, National Institute of Medical Science NIMS University, Jaipur, Rajasthan, India

Corresponding Author

Dr. Alisha Sheikh

PG Resident, Department of General Surgery, National Institute of Medical Science NIMS University, Jaipur, Rajasthan, India

Received Date: 21 August, 2024

Accepted Date: 25 September, 2024

ABSTRACT

Background: Varicose veins are a common problem and one of the most prevalent medical disorders affecting approximately 10 to 40% of the general population. The present study was conducted to assess outcomes of Endovenous Laser treatment of varicose veins at NIMS hospital and Research center. **Materials & Methods:** 73 varicose veins patients of age between 18 And 70 either sex coming to General Surgery OPD/IPD of National Institute of Medical Sciences and Research Center, Jaipur underwent Endovenous Laser Therapy [EVLT] under local anaesthesia under ultrasonography guidance using 980 nm diode laser. Patients were followed up after 1 week, 1 month, 3 months and 6 months and regression of symptoms along with occurrence of any complications were noted. **Results:** According to VAS score, the majority of the 53.4% patients had no pain at baseline, followed by 30.1% patients had mild to moderate pain, 11% patients had moderate pain and 5.14% patients had moderate to severe pain at baseline level. The mean VAS score for pain was 1.60 ± 1.846 . No pain was recorded at 1st week, 3rd months and 6th months. The majority of the patients at baseline, 1st week and 3rd months had normal wound infection. 6.8% patients had grade 2 (erythema plus other signs of inflammation) and 2.7% patients had (clear or haemorrhagic discharge) at baseline. On 1st week, 9.6% patients had recorded grade II scoring and 2.7% patients had recorded grade I scoring at 3rd months. No wound infection was found at 6th month. Hematoma was found in 27.4% patients at baseline and 4.1% patients at 1st week follow-up. Paresthesia was found in only 13.7% patients at baseline follow up. Hyperpigmentation was found in 41.1% patients at baseline, followed by 13.7% patients at 3rd month and 4.1% patients at 1st week follow-up. Pulmonary Embolism was found in only 2.7% patients at 3rd month follow-up. **Conclusion:** Endovenous laser treatment of varicose veins in the great saphenous vein with the 980 nm diode laser is safe and highly effective. Our study suggests that improved outcomes are associated with higher energy EVLA of varicose veins, 98% of cases were successfully treated and 94% of treated veins were completely eradicated.

Keywords: Endovenous laser, Great saphenous vein, Varicose veins

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Varicose veins are a common problem and one of the most prevalent medical disorders affecting approximately 10 to 40% of the general population. The lower limb venous system is classified into the superficial system, the perforator and communicating systems and the deep system. In most of the cases the varicose veins of lower limbs are due to superficial venous incompetence which results in the development of truncal varicosities. This occurs in 32% of women and 40% of men (Edinburg Vein Study).¹ Varicose veins are classified as primary and secondary varicose veins. About 60 to 70% of primary varicose vein develop due to Sapheno Femoral Junction (SFJ) incompetence and Great Saphenous

Vein (GSV) reflux while in about 10% it is due to Sapheno Popliteal Junction (SPJ) and Small Saphenous Vein (SSV) incompetence.^{2,3}

People who suffer from varicose veins often have a family history of varicose veins. This family history also increases the risk of further varicose veins developing after surgery. Surgery for recurrence is associated with more complications because; scarring from the previous operation can make the surgery more difficult, operation can take longer and there are increased risks to develop a wound infection, seroma formation and rarely permanent lymphoedema of the leg. For these reasons it might be worth considering other therapies like foam sclerotherapy,

radiofrequency ablation (RFA), and endovenous laser therapy (EVLV).⁷

Though the endovenous ablation techniques are a decade old, there are only a few studies in the international literatures comparing these procedures with that of the conventional surgical procedure. Also, the national literatures have reported only the case series in the individual endovenous procedures and no comparative study appears to be available so far.^{8,9}The present study was conducted to assess outcomes of Endovenous Laser treatment of varicose veins at NIMS hospital and Research center.

MATERIALS & METHODS

This study was conducted on 73 varicose veins

patients of age between 18 And 70 either sex coming to General Surgery OPD/IPD of National Institute of Medical Sciences and Research Center, Jaipur. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. All the patients underwent Endovenous Laser Therapy [EVLV] under local anaesthesia under ultrasonography guidance using 980 nm diode laser. Patients were followed up after 1 week, 1 month, 3 months and 6 months and regression of symptoms along with occurrence of any complications were noted. After collecting data appropriate statistics was used to analyse data. All statistical analysis was performed in SPSS and Microsoft excel software. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 73		
Gender	Male	Female
Number	47	26

Table I shows that out of 73 patients, 47 were males and 26 were females.

Table II Comparison of VAS score at different time intervals

VAS Score	Baseline		1 st week		3 rd month		6 th month	
	No.	%	No.	%	No.	%	No.	%
0	39	53.4%	73	100%	73	100%	73	100%
2	3	4.1%	-	-	-	-	-	-
3	19	26.0%	-	-	-	-	-	-
4	8	11.0%	-	-	-	-	-	-
5	2	2.7%	-	-	-	-	-	-
6	2	2.7%	-	-	-	-	-	-
Total	73	100%	73	100%	73	100%	73	100%
Mean±SD	1.60±1.846		-		-		-	

According to VAS score, the majority of the 53.4% patients had no pain at baseline, followed by 30.1% patients had mild to moderate pain, 11% patients had moderate pain and 5.14% patients had moderate to severe pain at baseline level. The mean VAS score for pain was 1.60±1.846. No pain was recorded at 1st week, 3rd months and 6th months.

Table III Comparison of surgical site infection at different time intervals

Infection Grading	Baseline		1 st week		3 rd month		6 th month	
	No.	%	No.	%	No.	%	No.	%
0	66	90.4%	66	90.4%	71	97.3%	73	100%
1	-	-	-	-	2	2.7%	-	-
2	5	6.8%	7	9.6%	-	-	-	-
3	2	2.7%	-	-	-	-	-	-
Total	73	100%	73	100%	73	100%	73	100%

According to Southampton score of surgical site infection, the majority of the patients at baseline, 1st week and 3rd months had normal wound infection. 6.8% patients had grade 2 (erythema plus other signs of inflammation) and 2.7% patients had (clear or haemoserous discharge) at baseline. On 1st week, 9.6% patients had recorded grade II scoring and 2.7% patients had recorded grade I scoring at 3rd months. No wound infection was found at 6th month.

Table IV Assessment of parameters

Parameters	Baseline		1 st week		3 rd month		6 th month	
	No.	%	No.	%	No.	%	No.	%
Hematoma	20	27.4%	3	4.1%	-	-	-	-
Paresthesia	10	13.7%	-	-	-	-	-	-
Hematoma	30	41.1%	3	4.1%	10	13.7%	-	-

Pulmonary Embolism	-	-	-	-	2	2.7%	-	-
--------------------	---	---	---	---	---	------	---	---

Hematoma was found in 27.4% patients at baseline and 4.1% patients at 1st week follow-up. Paresthesia was found in only 13.7% patients at baseline follow up. Hyperpigmentation was found in 41.1% patients at baseline, followed by 13.7% patients at 3rd month and 4.1% patients at 1st week follow-up. Pulmonary Embolism was found in only 2.7% patients at 3rd month follow-up.

DISCUSSION

Until the past few years, classic surgical methods of varicose vein removal, mainly vein stripping, were considered as the most radical and effective ways to cope with the pathology. On the contrary, traumatizing nature of these methods yielded several adverse effects, which directed surgeons' attention to less invasive treatment modalities, in particular, endovenous laser ablation (EVLA).⁸

Recently energy density utilized since the advent of EVLT has been increased and deliveries of >100 J/cm are now the norm. Studies now need to focus upon the optimal energy required to result in 100% outcome rates and achieve durable one-stop treatment, first time and every time.⁹

Therefore, the present study aimed to improve the occlusion rate in the treatment of patients with varicose veins. Additionally, the objective of this study was to demonstrate the outcome and benefits after EVLA of great saphenous vein (GSV) with a 980 nm diode laser.

In our study, majority of the 27.40% patients from the age group of more than 50 years followed by 24.66% patients from the age group of 31-40 years. This age distribution correlates well with other studies conducted by Samane et al.¹⁰, who showed the commonest age at presentation to be 31-50 years. However, other study done by Campbell¹¹ showed the commonest age at presentation to be 30-40 years. The mean±SD age of our study was 40.48±17.5 years. This finding was in agreement with a study by Aly et al.¹² who conducted 231 participants with a mean age of 34.6 years. The age range (17-80 years) in the present study is almost similar to the study done by Khan et al.¹³ and Singh et al.¹⁴ in their study.

Out of a total of 73 patients in the present study, majority of the 64.4% patients from the male category followed by female category (35.6%). This probably has a lot of similarities to other studies. Mirji et al.¹⁵ found 25% of the total patients in their study were females as compared to males who were 75% of total cases.

According to VAS score, the majority of the 53.4% patients had no pain at baseline, followed by 30.1% patients had mild to moderate pain, 11% patients had moderate pain and 5.14% patients had moderate to severe pain at baseline level. The mean VAS score for pain was 1.60±1.846. No pain was recorded at 1st week, 3rd months and 6th months. Similar results found that Oguzkurt L et al.¹⁶ and Carradice D et al.¹⁷ Incidence of infection of this study had no normal wound infection at baseline, 1st week and 3rd months. Regarding post intervention hematoma, in our study there were 27.4 cases of hematoma. Similar results

were obtained by study of Siribumrungwong et al.¹⁸ in which they had statistically significant advantage of EVLA method in hematoma appearance. Paresthesia was found in only 13.7% patients at baseline follow up.

According to the complication of hyperpigmentation, the current study revealed that hyperpigmentation was found in 41.1% patients at baseline, followed by 13.7% patients at 3rd month and 4.1% patients at 1st week follow-up. This result agreed with the study of Aly et al.¹² This finding also correlates well with other study done by Chen et al.¹⁹ with hyperpigmentation 57%.

We had no cases of DVT was recorded of patients that were confirmed by color Doppler. Low molecular weight heparin therapy with switch to oral anticoagulation according to standard protocol for DVT treatment.

CONCLUSION

Endovenous laser treatment of varicose veins in the great saphenous vein with the 980 nm diode laser is safe and highly effective. Our study suggests that improved outcomes are associated with higher energy EVLA of varicose veins, 98% of cases were successfully treated and 94% of treated veins were completely eradicated.

REFERENCES

1. Hamann SA, Timmer-de Mik L, Fritschy WM, Kuiters GR, Nijsten TE, Bos RR. Randomized clinical trial of endovenous laser ablation versus direct and indirect radiofrequency ablation for the treatment of great saphenous varicose veins. *Journal of British Surgery*. 2019 Jul;106(8):998-1004.
2. Nemoto H, Mo M, Ito T, Inoue Y, Obitsu Y, Kichikawa K, Yamaki T, Ogawa T, for Varicose JE. Venous thromboembolism complications after endovenous laser ablation for varicose veins and role of duplex ultrasound scan. *Journal of Vascular Surgery: Venous and Lymphatic Disorders*. 2019 Nov 1;7(6):817-23.
3. Tawfik AM, Sorour WA, El-Laboudy ME. Laser ablation versus mechanochemical ablation in the treatment of primary varicose veins: a randomized clinical trial. *Journal of Vascular Surgery: Venous and Lymphatic Disorders*. 2020 Mar 1;8(2):211-5.
4. Alaribi MS, Gharib OH, El Shimy WM, Sorour WA. Higher Energy Endovenous Laser Ablation Impact on Varicose Veins. *The Egyptian Journal of Hospital Medicine*. 2021 Oct 1;85(1):3194-7.
5. Li Y, Wu W, Li Y, Li J, Sun M. Efficacy and safety of endovenous microwave ablation versus laser ablation for great saphenous vein varicosis: study protocol for a multicentre, randomised controlled non-inferiority trial. *BMJ open*. 2022 May 1;12(5):e059213.

6. Cong L, Sun J, Wang L, Han Y, Dong J, Cao Y, Zhou H, Yang L. Hybrid endovenous laser ablation reduces the recurrence of varicose veins below the knee compared with radiofrequency ablation: a real-world study. *Archives of Medical Science*. 2023.
7. Baraldi C, Bissacco D. Safety and Efficacy of Combining Saphenous Endovenous Laser Ablation and Varicose Veins Foam Sclerotherapy: An Analysis on 5500 Procedures in Patients With Advance Chronic Venous Disease (C3-C6). *Vascular and Endovascular Surgery*. 2023 Jul 10:15385744231188804.
8. Uruski P, Aniukiewicz K, Mikuła-Pietrasik J *et al.* (2017): Endovenous laser ablation of varicose veins preserves biological properties of vascular endothelium and modulates proinflammatory agent profile more favorably than classic vein stripping. *BioMed Res Int.*, 17:616-22.
9. Osman O, El-Heeny A, Abd El-Razeq M (2019): Management of primary uncomplicated varicose veins, endovenous laser ablation with sclerotherapy versus traditional surgery: which is the best option? *Egypt J Surg.*, 38: 319-327.
10. Samane D, Swami G, Chandrashekar H *et al.* (2020): Clinical profile of patients with varicose vein: A cross-sectional study from Vilasrao Deshmukh Government Institute of Medical Sciences, Latur, Maharashtra. *Int Surg J.*, 7(8):2691-2695.
11. Campbell J (2003): *The hero's journey: Joseph Campbell on his life and work*. New World Library; 2003. <https://www.amazon.com/Heros-Journey-Joseph-Campbell-Collected/dp/1608681890>.
12. Aly S, Wahdan M, Ahmed D *et al.* (2020): Varicose veins: Prevalence and associated risk factors among women of childbearing age attending a primary health care unit in Cairo, Egypt. *EFMJ.*, 4(1): 58-66.
13. Khan B, Khan S, Greaney G *et al.* (1996): Prospective randomized trial comparing sequential avulsion with stripping of the long saphenous vein. *Br J Surg.*, 83:1559-62.
14. Singh S, Lees T, Donlon M *et al.* (1997): Improving the preoperative assessment of varicose veins. *British J Surg.*, 84(6):801-2.
15. Mirji P, Emmi S, Joshi C (2011): Clinical features and management of varicose veins of lower limb. *J Clin Diagnostic Res.*, 5(7):1416-20.
16. Oguzkurt L. Endovenous laser ablation for the treatment of varicose veins. *Diagnostic and interventional radiology*. 2012 Jul 1;18(4):417.
17. Carradice D, Mekako AI, Mazari FA, Samuel N, Hatfield J, Chetter IC. Randomized clinical trial of endovenous laser ablation compared with conventional surgery for great saphenous varicose veins. *Journal of British Surgery*. 2011 Apr;98(4):501-10.
18. Siribumrungwong B, Noorit P, Wilasrusmee C, Attia J, Thakkinstian A. A systematic review and meta-analysis of randomised controlled trials comparing endovenous ablation and surgical intervention in patients with varicose vein. *Eur J VascEndovasc Surg*. 2012 Aug; 44(2): 214-223.
19. Chen J, Xie H, Deng H *et al.* (2013): Endovenous laser ablation of great saphenous vein with ultrasound-guided perivenous tumescence: early and midterm results. *Chin Med J (Engl)*, 126(3):421-425.