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Microcautery Evaluation for the Treatment of Leg Spider Veins

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ABSTRACT

Background: Spider leg veins represent a significant cosmetic problem; their prevalence on the lower limbs has been reported as two-thirds of patients age 25 years, between 30 and 50 years old. Bad cosmetic appearance is the leading complaint, and reason for requesting consultations. Sclerotherapy and laser therapy are the two main lines of treatment now, with the advantages and disadvantages of each line.

Objectives: This study aims to evaluate the effect of low-current voltage micrometry using the Ellman Radio Frequency as an alternative to sclerotherapy and laser in treating spider leg veins.

Patients and Methods: The design was an intervention study carried out on 20 patients who had leg spider veins selected based on inclusion and exclusion criteria for treatment using the Ellman Radio Frequency devise in the outpatient clinic of the Plastic Surgery Department of Assiut University Hospitals from September 1st, 2020, to March 31st, 2022. An online survey was carried out to identify the epidemiological community aspects of the disease.

Results: Participants characteristics found the mean age was 36.1 ± SD 9.7 years, and mean BMI 25.4 ± SD 4.2kg/m^2. The online survey findings showed that the disease was prevalent among 78.1% of the females, where only 27.2% of the participants requested treatment. After one session of Microcautery, the clinical results demonstrated complete disappearance of the spider leg veins in 25%, very good in 45%, and good in 30% of the patients.

Conclusion and Recommendation: Low voltage microcautery has a high comparable success rate in managing cases with specific selection criteria, in addition to the technique's safety, simplicity, and inexpensive COST. The study recommends planning for future research to compare sclerotherapy as the gold standard and the low-voltage micro cauterization technique.

Key Words: *Laser – Microcautery – Sclerotherapy – Spider leg veins.*

Ethical Committee: Approved by the Ethical Committee of Faculty of Medicine of Assiut University.

Disclosure: No conflict of interest.

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INTRODUCTION

Spider veins are groupings of tiny enlarged blood vessels with a central point of radiation that appears near the skin's surface, varying in color from red and purple to blue, and can develop in different body parts but are most frequent on the legs and the face **[1]**.

Leg spider veins comprise a main feeder's vessel and ectatic venous sprouts in the reticular dermis measure several millimeters in diameter and a depth between 180 micrometers and one millimeter in the skin. They can be red, purple, or blue, taking many forms as thin lines, webs, or branches, and are typically visible on the legs and face **[2]**.

The typical age of clinical presentation is between 30 and 50 years old, where most women about 88% and 79% of men had spider veins in the right leg, and the majority, about 98% of those affected, had very mild symptoms **[3,4]**.

Patients with spider veins may first present to their general practitioner, referring them to a plastic surgeon, dermatologist, or vascular surgeon, as it is considered a purely cosmetic problem. However, the treating physician must honestly discuss any treatment plan's goals, risks, benefits, and costs and allow the patient to decide **[5]**.

In the meantime, Sclerotherapy and the newer technique, laser therapy are the corner stones in the treatment of spider veins with varying percentages of success rates based on the size and site of the vessel in addition to laser equipment type. Both techniques effectively manage spider veins but with a variable success rate **[2,6]**.

The aim of this study is Evaluation of Microcautery using low voltage current using the Ellman Radio Frequency as a new line of management in replacement of Sclerotherapy and laser for leg spider veins.

PATIENTS AND METHODS

Study design:

The current study is an intervention study carried out on 20 patients suffering from leg spider veins, attended the outpatient clinic of the Plastic Surgery Department of Assiut University Hospital in the period from September first, 2020, to the end of March 2022.

The Faculty of Medicine's Ethical Committee approved this study in August 2020. All the twenty patients were females; their ages ranged between 20 and 55 years suffered from spider veins in their legs.

Only one area with leg spider veins were selected for each session to evaluate the efficacy of the Microcautery as a line of treatment.

Inclusion and Exclusion criteria:

Inclusion criteria included patients with small-sized spider leg veins with a diameter of less than 2.0mm. In addition, exclusion criteria were patients with spider leg veins associated with varicose veins, or diabetes mellitus, or hypertension, or under anticoagulation therapy, or known history of keloids.

Informed consent: Informed consent was taken from the patients who participate in this study.

The online survey:

The research team conducted an online survey to identify the epidemiological aspects of legs spider veins among females using different media platforms, including the existence of legs spider veins, unilateral or bilateral, above or below knees, how many lesions or associated with varicose veins, what age at first appeared, did legs spider veins appear in family members, and did the participant suffer from appearance.

The Technique and Instrument:

The technique of Microcautery for treating leg spider veins using an Ellman Radio Frequency device includes the following steps:

A- *Preoperative procedures:*

- The patient is lying flat in the supine position.
- Marking and photography of the area chosen with spider veins (Fig. 1).
- Disinfection of the area to be treated with povidone-iodine followed by alcohol 70% to improve visualization of the veins.
- Optimal lighting and magnification using 2.5X magnifying loupe.
- Injection of the chosen area with a local anesthesia solution of lidocaine 2% and an epinephrine concentration of 1:100000 in the periphery of the spider veins to avoid blanching (Fig. 2).

B- *Operative procedures:*

- Ellman Radio Frequency Device Specifications (Fig. 3).
- Model FFPF. Desc. Electrosurgical ESU-Cautery Device and S/N 151793.

Steps and parameters to use and adjust the apparatus:

- Turning on the device.
- Plug in the hand piece into the specific socket.
- Set the voltage into a low-power voltage equals to 2-3 guided by the scale screen on the device.
- Multiple applications of the low current voltage Microcautery by a handle connected to an Ellman Radio Frequency device along the course of the leg spider veins till blanching and disappearance of the visible spider veins.
- A modification of the Ellman Radio Frequency handle electrode tip was done by inserting a fine, sterile needle to minimize skin damage as in Fig. (5).
- In addition, Magnification loupe with good lighting is carried out, as in Fig. (6).
- After finishing the Microcautery of the area under treatment, MEBO ointment was applied (Fig. 7), and a closed dressing for the first 24 hours was placed (Fig. 8).

C- *Postoperative instructions:*

Application of MEBO ointment [MEBO 0.25% Herbal & Natural Ointment (Beta-Sitosterol) 15 gm Azuprostat Sandoz (Germany)] four times daily starting from the second day after treatment for seven days also start the oral antibiotic course [Augmentin XR (amoxicillin/clavulanate) GSK one gm for seven days twice daily for seven days] in addition to oral vitamin C (once daily for one month).

Regarding the area under treatment, no shaving, no waxing, no scrubbing, and avoiding hot baths for two weeks after the skin area treatment. Also, avoid direct sun exposure to the treated area for two weeks to avoid the possibility of hyperpigmentation.

Evaluation of the Microcautery in managing the spider leg veins.

Since there was no available standardized approved evaluation score for the Microcautery in managing the spider leg veins, the evaluation of the efficacy of the intervention will depended on the following parameters:

1- *The clinical assessment:*

A clinical improvement scale ranging from 1 to 5 (poor, fair, good, very good, excellent) was utilized to compare the pre- and post-operative photos taken immediately after treatment, after three weeks, and after three months.

2- *The patient satisfaction:*

A patient 4-point assessment scale (unsatisfied, slightly satisfied, satisfied, very satisfied) was based on the patient's satisfaction guided by the observed clinical improvement and photograph comparison during follow-up after the management.

3- *The presence of complications such as:*

The presence of post-operative complications mainly presence or absence of short-term complications (pain or ecchymosis) or long-term complications (hyperpigmentation, scar or infection).

4- *The timing of resolution:*

The duration in weeks to assess the resolution and the disappearance of treated spider leg veins.

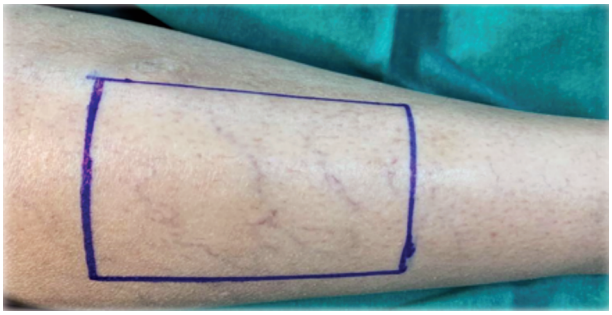
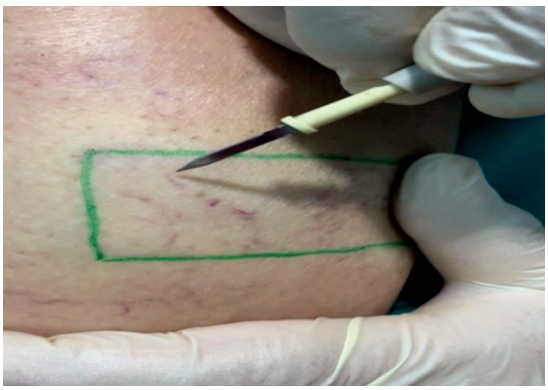


Fig. (1): Marking and photography of the area chosen with spider veins.

Fig. (2): Local anesthesia injection in the periphery of the area marked.

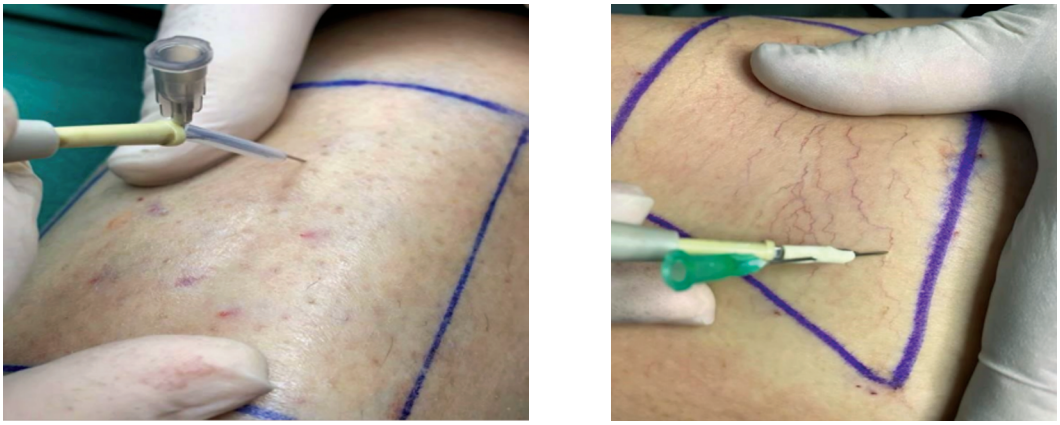
Fig. (3): Ellman Surgitron FFPF.



(A)

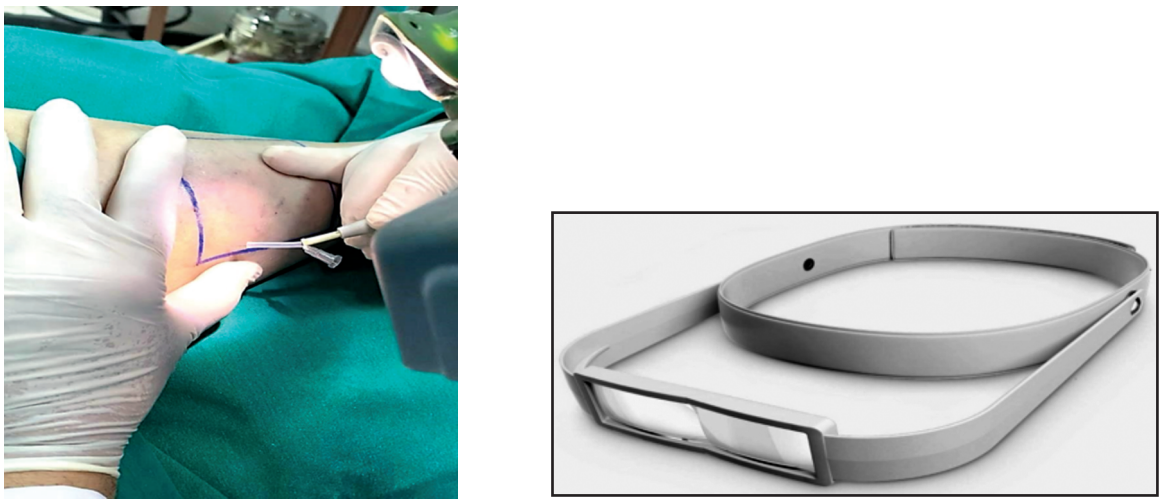
(B)

Fig. (4): (A) Multiple applications of microcautery. (B) Multiple applications until the complete disappearance of the visible veins.



(A) (B)

Fig. (5): A modification of the Ellman Radio Frequency handle electrode tip was done by inserting a fine sterile needle.



(A) (B)

Fig. (6): (A): Modified magnification loupe with good lighting. (B): A demonstrate for the loupe that been used.

Fig. (7): Application of MEBO ointment after micro cautery of leg spider veins.

Fig. (8): Use of a closed dressing for the first 24 hours.

RESULTS

Table (1) presents the participants' characteristics, showing that their mean age was 36.1 ± SD 9.7 years, and the mean BMI was 25.4 ± SD 4.2kg/m^2. The married participants were 65%, 60% of patients working different jobs, and the spider veins were mainly bilateral in 90% of cases.

The online survey results showed that spider veins were prevalent among 78.1% of the participant females, appeared in half (49.4%) between 20 and 30 years, with a distribution above and below knees in 40.9%, 28.1% were only below the knee, and 31% above the knee. About half (47%) suffered from the spider veins had bad cosmetic appearance, while only 27.2% of the participants requested medical consultation for the leg spider veins.

Table (2) Demonstrates the evaluation parameters of the Microcautery in managing the spider leg veins.

The clinical assessment results after one session of Microcautery using Ellman Radio Frequency showed excellent results as the complete disappearance of the spider leg veins was seen in 25% of the patients, very good improvement was observed in 45%, and good improvement in 30%.

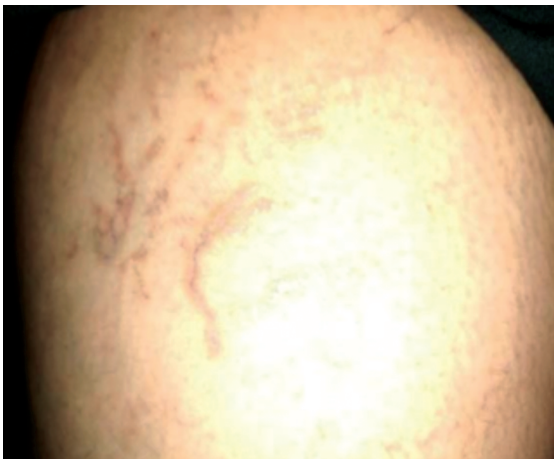
Figures from (9-15) showed the different post-intervention results of the Microcautery for spider leg veins over different follow-up periods.

Table (1): Characteristics of Spider Veins Cases under Microcautery.

Characteristics of Spider Veins Cases	Details of Characteristics	Frequency	Percent
Marital Status	Single	7	35
	Married	13	65
Mean age ± Standard Deviation	X=36.1 ± SD 9.7 years		
Age range	20-55 years		
Occupation	House wife	8	40
	Employee	3	15
	Student	3	15
	Nurse	2	10
	Teacher	2	10
	Banker	1	5
	Med. Representative	1	5
Grades of obesity	Obesity	3	15
	Over weight	8	40
	Normal weight	9	45
Mean Body Mass Index (BMI) ± Standard Deviation	X=25.4 ± SD 4.2kg/m^2		
Contraceptives use	Use	12	60
	Not use	8	40
Distribution of Spider Veins	Unilateral	2	10
	Bilateral	18	90
Number of Spider Veins	Less than ten	8	40
	More than ten	12	60
Sites of Spider Veins	Below Knee	4	20
	Above Knee	5	25
	Above and below	11	55

Table (2): Evaluation of the Microcautery in managing the spider leg veins.

Parameters of evaluation	Details of evaluation	Frequency	Percent
Clinical assessment after Micro Cautery	Excellent	5	25
	Very good	9	45
	Good	6	30
	Poor	Zero	0
	Fair	Zero	0
Patient satisfaction after Micro Cautery	Very satisfied	6	30
	Satisfied	12	60
	slightly satisfied	2	10
	Unsatisfied	Zero	0
Presence of complications	Pain	4	20
	Ecchymosis	3	15
	Hyperpigmentation	Zero	0
	Scar	Zero	0
	Infection	Zero	0
The timing of resolution	After 3 weeks	4	20
	After 3 months	14	70



(A)

(B)

(C)

Fig. (9): (A) Spider veins of the posterior aspect of the left thigh in a 45 years old female. (B) Photo after three months. (C) More than one year showing excellent improvement. (photo sent by the patient).

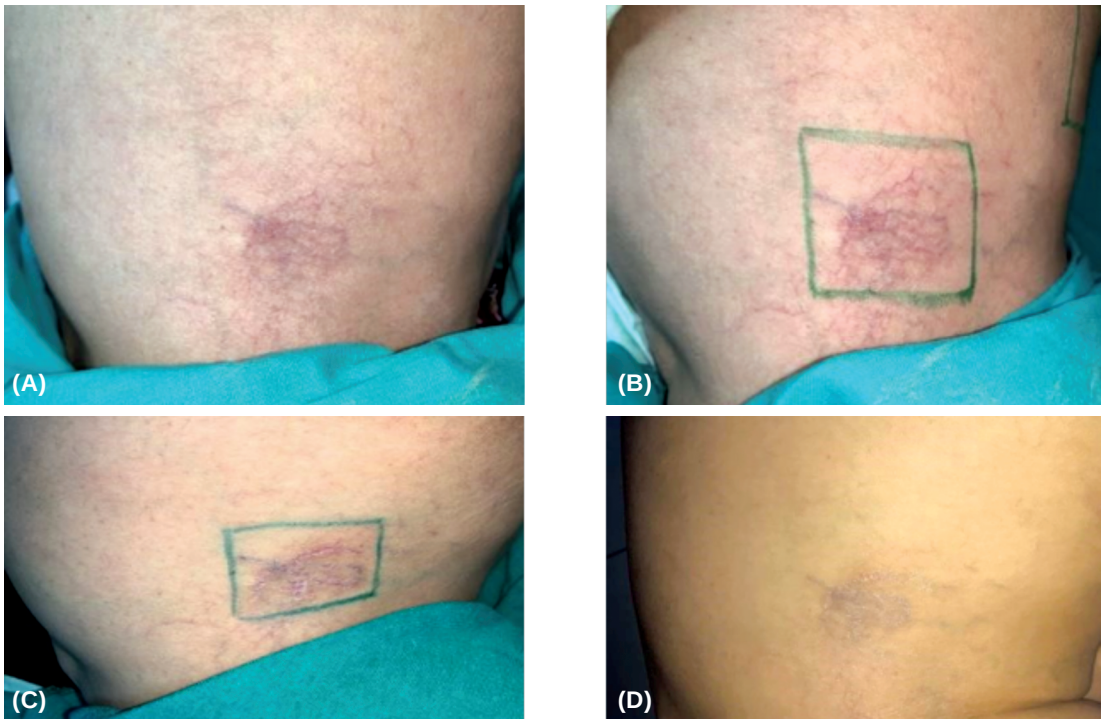


Fig. (10): (A) Spider veins in the posterior aspect of the right thigh in a 44 years old female patient. (B) Immediate after marking. (C) One week after. (D) After three months, showing good improvement.

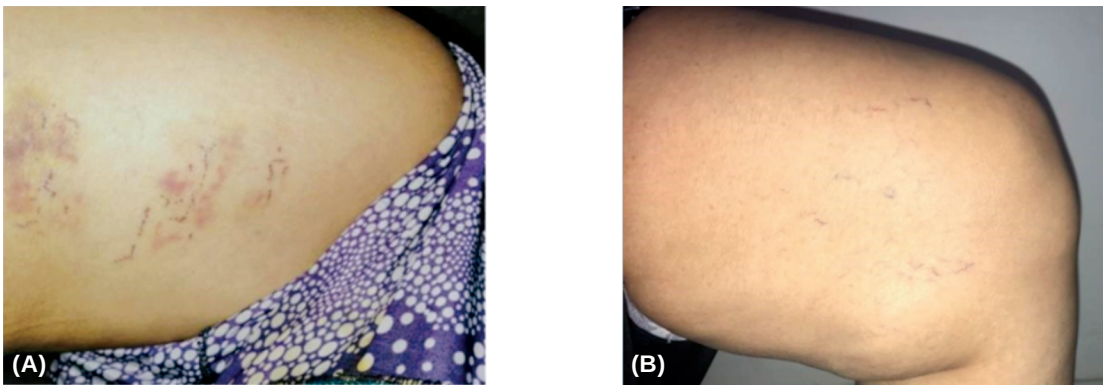


Fig. (11): (A) Spider veins medial aspect of the left thigh in a 50 years old female patient. (B) More than one year after, showing good improvement.

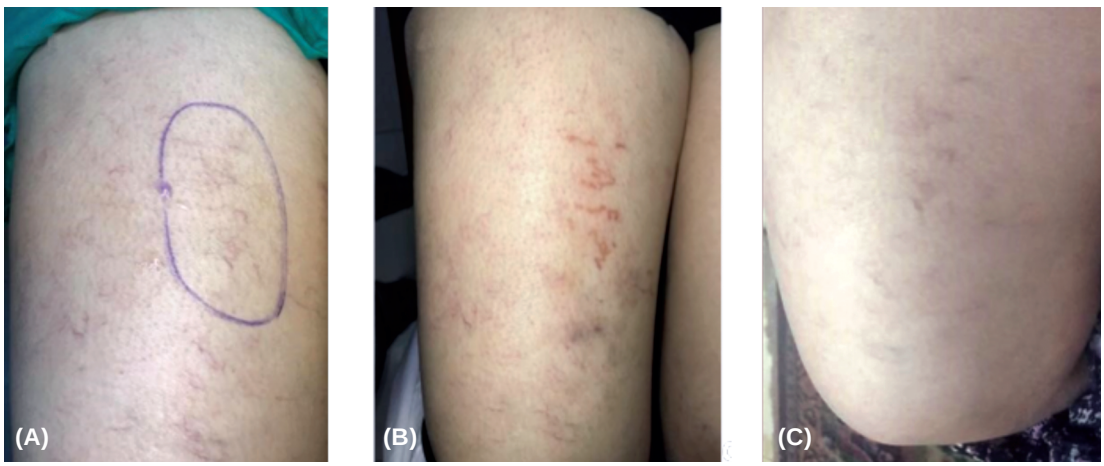


Fig. (12): (A) Spider veins of the right thigh in a 26 years old female patient. (B) One week after showing an inflammatory reaction. (C) Three months after, showing good improvement. (photo sent by the patient).

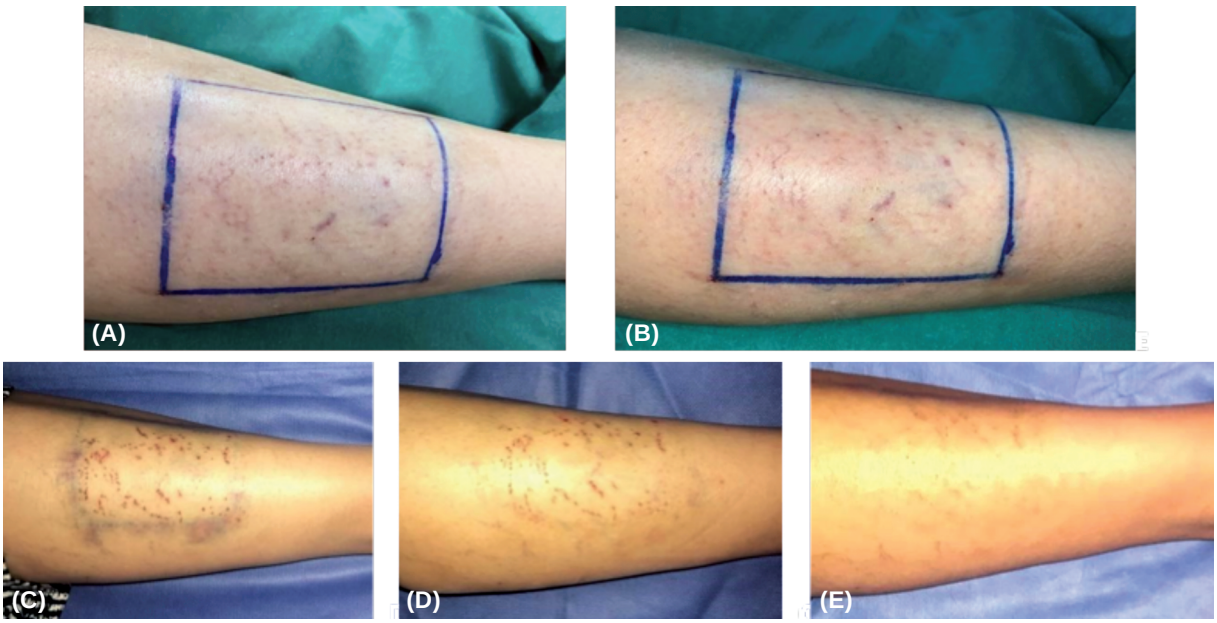


Fig. (13): (A) Spider veins anterior aspect of the right leg in a 35 years old female patient. (B) Immediately after. (C) One week after with ecchymosis at the sites of local anesthesia. (D) Two weeks after 1st session showing clearance of ecchymosis. (E) Three months after, showing very good improvement.

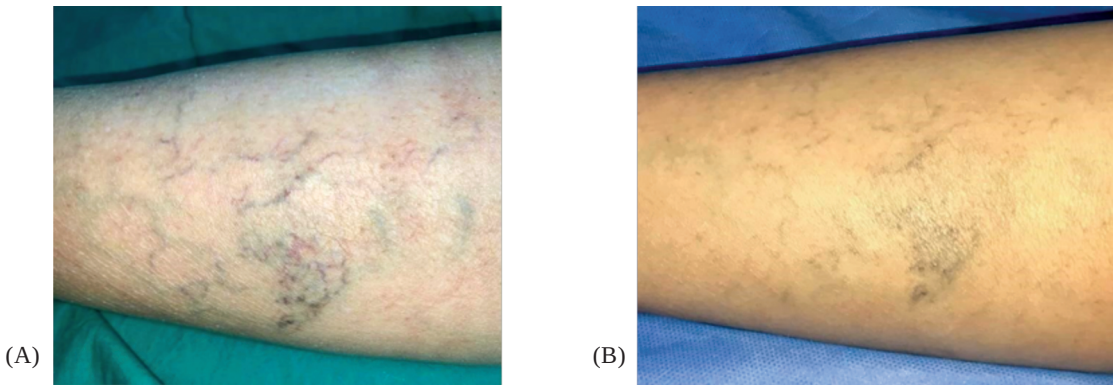


Fig. (14): (A) Spider veins lateral aspect of the left leg in female patient 30 years old. (B) After three months, showing good improvement.

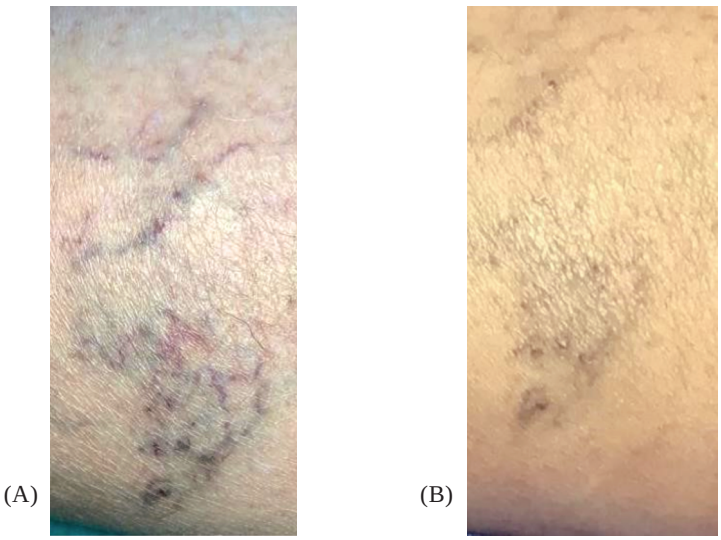


Fig. (15): Magnification of the previous case in Fig. (14) showing: (A) The smaller, superficial, purple spider veins and the deep bluish spider veins (before). (B) Near complete disappearance of the superficial purple spider veins with punctate hypo pigmented good scar of the Microcautery (after).

DISCUSSION

Lower extremities spider veins are prevalent in the USA and Europe, where millions of women and men are affected on their legs and faces, the actual prevalence of legs spider veins is not known. Nonetheless, few studies have reported an incidence of more than 50 percent among women **[7]** and the development of spider veins increases with obesity and in jobs needing prolonged sitting or standing **[3]**.

To learn more about the epidemiological characteristics of the patients suffering from leg spider veins, the research team designed an online questionnaire survey to update the epidemiological aspects of leg spider veins patients, which contributed to learning more about its prevalence and seeking new treatment modalities.

Findings showed that the prevalence of leg spider veins among the participating females in the survey was 78.1%, which was higher than the prevalence reported as 41% of women had spider leg veins over the age of 50 years in the United States **[2]**.

The survey revealed a large scale of females aged between 30 and 50 years when spider veins first appeared; this was consistent with the report that the classic age of presentation of spider veins is between 30 and 50 years old **[6]**. The survey indicated that 89.1% of the participant's relatives had spider veins in their legs, indicating a familial link with spider veins among parents and siblings. This finding was in line with the result that suggests a possible genetic factor since 90% of the participants reported a history of spider veins among their families **[8]**.

Only 27.2% of the female patient with spider veins in the legs are looking for treatment; this could be explained as reported by Schwartz and Maxwell, where the majority of patients are asymptomatic; however, the minority of patients who do have symptoms often complain of burning, itching, pain, cramps, or leg fatigue **[9]**.

Although a variety of treatments exist for spider veins, no consensus has yet been reached on the ideal treatment, the traditional treatment for spider veins is considered sclerotherapy, which involves injecting a small amount of a sclerosing solution into the target vein. Unfortunately, the ideal sclerosant that induces venous fibrosis without adverse effects has yet to be developed **[10]**. Nevertheless, chemical agents cause damage to the vessel wall with subsequent fibrosis **[2]**.

The most common complications include tissue necrosis, ulceration, scarring, hyperpigmentation, hypopigmentation, matting, and allergic reactions to the sclerosant. Many sclerosant agents have been used, but a perfect, complication-free, and 100% effective sclerosant has yet to be developed **[11]**.

There has been a longstanding interest in finding an effective alternative to sclerotherapy that would guarantee comparable or better efficacy with more safety and ease of performance **[12]**.

Consequently, the introduction of lasers in this field was enthusiastically accepted. A wide variety of lasers has been employed with different levels of success. However, the higher cost of lasers with lower efficacy relative to sclerotherapy and the significant complications such as hyperpigmentation, scarring, pain, and ulceration have resulted in limited laser popularity for spider veins. Therefore, sclerotherapy has stayed the preferred treatment **[13]**.

The study findings revealed that microcauterization after one session using Ellman Radio Frequency showed an excellent result in 25%, a very good improvement in 60%, and a fair improvement in 15% of the female patients with spider veins in the legs. These results are comparable with sclerotherapy and laser, fast, less painful, and represent an effective alternative treatment; it has lower side effects.

Similarly, the low voltage current delivered via an insulated microneedle with a beveled tip has minimized adjacent tissue damage and improved efficacy. The low cost, low level of complications, and comparable results offer a valuable alternative to sclerotherapy and laser treatment **[2]**.

The high comparable success rate of the microcauterization in managing the cases of the leg spider veins in the current study may be explained by the technique properties, the selection criteria of the participating patients where cases with any risk factor that may affect the outcome were excluded.

In addition to the use of MEBO for post micro cauterizing sites that known to be effective in treating thermal burns and preventing bacterial infection **[14]**.

The study results showed that none of the treated patients developed hyper-pigmentation at the end of the three months' follow-up. However, the hyperpigmentation, mainly secondary to sclerotherapy, persisted for months **[15]**.

Micro-cauterization treatment takes around 15 minutes, one session is usually sufficient to see instant results, but a top-up treatment is required a few weeks later for the optimum outcome.

The study has a limited number of cases, due to the impact of the COVID-19 pandemic on the continuity of health services delivery.

The study suggests a comparative study between sclerotherapy as the gold standard for spider leg veins with micro cauterization as an alternative management line with low cost, low level of complications, and comparable results.

Finally, there was no relevant financial or non-financial aid or support for competing interests; this disclosure and no conflict of interest were added regarding commercial materials and the manufacturing company.

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