**Research Paper**

**The Success Rate and Complications of Post-radiofrequency Ablation in Patients With Small Saphenous Insufficiency**

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**ABSTRACT**

**Aims:** This study aimed to determine the success rate and complications occurring after Radiofrequency Ablation (RFA) in patients with small saphenous insufficiency who underwent RFA in Rasht.

**Methods & Material:** Patients with small saphenous vein insufficiency who underwent RFA were explored respecting success rate and potential complications, such as pain, hematoma, neuropathy, Endothermal Heat-Induced Thrombosis (EHIT), and skin burns. The study subjects were assessed 2 weeks after the procedure. Reconanalysis was followed up in the study participants by ultrasound at 2 weeks, 3-6 months, and the first year after RFA.

**Findings:** This study examined 62 patients. A 100% success rate was reported and no case of reflux was observed in the first control ultrasound 2 weeks after RFA. The mean pain score significantly decreased (P<0.001). Besides, in one year, 3 cases of recanalization, 7 cases of EHIT, 9 cases of neuropathy, and 1 case of superficial thrombophlebitis were reported; no case of skin burn was observed.

**Conclusion:** Considering the 100% success rate and slight adverse effects of this method, such as pain and recanalization, RFA is an acceptable approach. Furthermore, the incidence of EHIT should be considered.

**Key words:**
Small saphenous vein, Radiofrequency, Varicose veins

**Extended Abstract**

1. **Introduction**

Varicose veins are abnormal dilation; the torsion of superficial veins is among the most common problems. The prevalence of varicose veins in the general population equals 10%, i.e., higher than the total rate of coronary heart disease, peripheral arterial disease, congestive heart failure, and stroke [1, 2]. Lower extremity venous valve insufficiency affects 25% of women and 15% of men in the United States and Europe. Saphenous-Popliteal insufficiency and small saphenous vein reflux are less common than large saphenous vein reflux; however, they can lead to equally severe symptoms. Surgery for a small saphenous vein is also more challenging than a large one. The odds of potential damage to the sural nerve prevents numerous vascular surgeons from routinely performing small saphenous vein stripping [3, 4]. Additionally, the recurrence rate after small saphenous vein surgery in 5 years equals 30%-50% [5, 6]. Sclerotherapy is

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also a low-risk method for treating venous reflux; however, its failure rate for small saphenous veins with a diameter less than and more than 5 mm is estimated at 14% and 23%, respectively [7].

Untreated varicose veins lead to pain, thrombophlebitis, bleeding, chronic venous insufficiency, and venous ulcers; thus, treatment has long been considered. Accordingly, various methods, including varicose sock, surgery, and more recently, minimally invasive methods were used to treat varicose veins [8]. Among these minimally invasive methods is using Radiofrequency Ablation (RFA) or Endovenous Laser Therapy (EVLT) of heat energy for the veins involved. These techniques are mostly used for treating large saphenous vein reflux as an alternative to surgical stripping [9]. In RFA, the heat generated by the catheters leads to heat damage to the venous wall, resulting in thrombosis and fibrosis. RF ablation is less invasive than surgical stripping; however, its potential complications include paresthesia, superficial thrombophlebitis, deep vein thrombosis, pulmonary embolism, bruising, skin burns, and infection [10].

The results of endovenous ablation techniques in treatment were at least equal to stripping; however, they were associated with reduced complications and enhanced Quality of Life (QoL) [11, 12]. Additionally, RFA and EVLT are associated with a concern about the recurrence of the disease in the form of recanalization and reflux; i.e., reached the same level as surgery due to technological advances, especially in new methods and some lasers. In contrast, other studies presented an improvement in QoL and a faster return to normal activity and work in ablation [13]. Almeida et al. reported that RFA was significantly better than EVL concerning post-procedure recovery and QoL parameters [14]. Rajagopala et al. stated that EVL and RF results were desirable and indicated few adverse effects [15].

Due to the high prevalence of the disease and further tendencies to minimally invasive interventions due to fewer recurrences and complications, it seems necessary to examine more closely and obtain information to improve the clinical decision-making process in similar cases. In this regard, this study aimed to determine the success rate and complications occurring after RFA in patients with small saphenous insufficiency who underwent RF ablation.

2. Materials and Methods

This case series was conducted on patients with varicose veins who were referred to a vascular surgery clinic in Rasht City, Iran, from 2009 to 2015. The study participants manifested small saphenous vein insufficiency with a diameter of ≥4 mm and underwent RF ablation. Moreover, patients with varicose veins and small saphenous insufficiency with a diameter <4 mm as well as a history of Deep Vein Thrombosis (DVT) who were not suitable candidates for RFA were excluded from this research.

In this clinic, the patients referring with varicose veins were examined for small saphenous vein insufficiency; if the small saphenous vein insufficiency was confirmed by sonography, the patients underwent RF ablation. RF ablation is a minimally invasive procedure. Accordingly, vascular endothelium is destroyed by a failed intravenous catheter with the help of radio waves (heat), causing thrombosis, fibrosis, and destruction. RF ablation is performed with a closure fast device in lying on stomach position under tumescent anesthesia. Simultaneously with this procedure, if necessary, the sclerotherapy of varicose veins was performed.

Then, the study patients were assessed concerning success rate (the absence of reflux in the first control ultrasound 2 weeks after RFA) as well as potential complications, such as postoperative pain, hematoma, paresthesia of the thigh and leg, neuropathy, Endovenous Heat Induced Thrombosis (EHIT), and skin burns. They were followed up 2 weeks after the procedure according to the treatment protocol. The study patients were examined for the presence or absence of hematoma and asked about paresthesia of the legs and thighs.

Reanalysis was also evaluated in the research patients by examination and ultrasound at 2 weeks, 3-6 months, and one year after RFA by a sonographer. If there existed clinical and sonographic evidence of DVT as a procedure complication, it was classified according to the EHIT classification [10].

Further data, including age, gender, Body Mass Index (BMI), occupation, the degree of varicose veins based on Clinical-Etiological-Anatomical-Pathophysiological (CEAP) score [16], potential complications, such as postoperative pain based on VAS (visual analog scale), hematoma, thigh and leg paresthesia, neuropathy, EHIT, skin burns, reanalysis, and reflux were extracted from the study patients’ medical records. According to heparin use after 2013 during RFA, the research patients were divided into two groups before 2013 (without heparin use) and after 2013 (heparin use).

Relevant data were collected through data collection forms and analyzed using SPSS. To report the obtained results, frequency and percentage were used for qualitative variables. Besides, mean and standard deviation, mean (mid-quarter range), and minimum-maximum indices were employed for quantitative variables. The normal distributions of the study quantitative variables were measured us-
ing the Shapiro-Wilk’s test. The Wilcoxon test was used to compare the degree of varicose veins and VCSS score [17] before and after RF ablation. Furthermore, comparisons between complications and variables (age, gender, BMI, occupation) were performed using the t-test and Fisher’s Exact test. The significance level of the tests was considered $P<0.05$.

3. Results

In total, 62 patients with varicose veins and small saphenous vein insufficiency who underwent RF ablation were studied. The Mean±SD age of the examined patients was 51.50±12.12 years. Moreover, 54.8% of the study patients were male and the rest were female. Occupationally, the highest frequency was related to housewives (41.9%), followed by employees (37.1%), and freelancers (19.4%). The study subjects’ Mean±SD BMI was measured to be 26.49±1.45 kg/m².

Based on the obtained data, the success rate or absence of reflux in the first control ultrasound 2 weeks after RFA equaled 100%; no case of reflux was observed in the first control ultrasound 2 weeks after RF ablation. The highest frequency of varicose veins before and after RF ablation concerned C2 (69.4%) and C1 (56.5%), respectively (Table 1).

In general, the Wilcoxon test data indicated a significant difference between the degree of varicose veins before and after RF ablation ($P<0.001$). Thus, in 48 patients, the degree of varicose veins decreased, compared to before RF ablation, and increased in one case. It also remained unchanged in 13 cases. Additionally, the results of venous clinical severity score before and after RF ablation revealed that the VCSS score after RF ablation significantly decreased ($P<0.001$), compared to before (Table 2).

The Mean±SD pain score after RF ablation was calculated as 3.03±2.04 (median: 3; range: 0-8). The results of treatment complications at 2 weeks, 3-6 months, and the first year after RF ablation indicated that the most complications in 2 weeks after RF ablation included neuropathy (14.5%) and heat thrombosis (11.3%), respectively. No recanalization was observed 2 weeks after RF ablation. In 3-6 months, 2 cases of recanalization were observed; only in one of them, recanalization was detected in the first year. Furthermore, in the first year after RF ablation, a case of recanalization was observed.

In 2 weeks after RF ablation, 7 cases of heat thrombosis were observed (3 cases of second degree, 2 cases of first degree, 1 case of third-degree, & 1 case of 4th degree). Of these, heat thrombosis was observed in 3 patients at 3-6 months’ follow-up (first-, second-, & fourth-degree). No case of heat thrombosis was observed in the first year after RF ablation.

In 2 weeks after RF ablation, 9 cases of neuropathy were observed. Neuropathy was not detected in any of these 9 patients in the subsequent follow-ups. In the 3-6 months and the first year after RF ablation, no new cases of neuropathy existed in the study subjects.

At 2 weeks, 3-6 months, and the first year after RF ablation, no cases of skin burns were observed in the examined subjects. Furthermore, in 3-6 months after RF ablation, only 1 case of superficial thrombophlebitis was observed. No cases of superficial thrombophlebitis were observed between 2 weeks and the first year after RF ablation.

The most common complication in 2 weeks after RF ablation was neuropathy (14.5%), followed by heat thrombosis (11.3%). Based on the results of the t-test and Fisher’s Exact test, there was no significant relationship between heat thrombosis and neuropathy in two weeks after RF ablation, and demographic variables (age, gender, BMI, & occupation) ($P<0.05$).

Moreover, according to Fisher’s Exact test findings, there was no significant relationship between heat thrombosis ($P=0.648$) and neuropathy ($P=0.238$) two weeks after RF ablation, and the degree of varicose veins before RF ablation.

According to the results of the Fisher’s Exact test, there was no significant relationship between heat thrombosis ($P=0.999$) and neuropathy ($P=0.242$) two weeks after RF ablation and the year of its occurrence (before & after 2013) (Table 3).

4. Discussion

This study determined the success rate and complications after RFA in patients with small saphenous insufficiency who underwent RF ablation in a vascular surgery clinic from 2009 to 2015. In total, 62 patients with varicose veins who had small saphenous vein insufficiency and underwent RF ablation were studied.

The Mean±SD age of the research subjects was 51.5±12.12 years with a median of 54 years. The minimum and maximum age of the study participants were 24 and 76 years, respectively. Furthermore, 54.8% of the explored patients were male and the rest were female. In general, in different studies, the age group and the gender distribution of patients were similar to those of the present study [18-20]. Occupationaly, the highest frequency orderly concerned
housewives (41.9%), employees (37.1%), and freelancers (19.4%). The study subjects’ mean±SD BMI was measured as 26.49±1.45 kg/m². In the study of Nehemiah Samuel et al., the same rate was equal to 25.9±3.2 kg/m², i.e., almost similar to ours [21]; no significant difference could be considered for it. In the present study, the highest frequency respected the degree of C2 varicose veins, i.e., consistent with the study of Jung Hyun Choi and associates [20]. This alignment was also observed in the study of Nehemiah Samuel [21], S. Doganci [22], L van Groenendael [23], and Margreet Trip-Hoving [24].

The success rate in our study was computed to be 100%; no case of reflux was observed in the first control ultrasound 2 weeks after RF ablation. This rate equaled 100% in the study of Thomas S. Monahan et al. [18], i.e., consistent with the data obtained by Boersma D et al. (97.1%) [25], and Nehemiah Samuel et al. (96.2%) [21] in 3 months. Michael Harlander-Locke et al., in a 24-72 hours after RF ablation follow-up, suggested that in 98.7% of the cases, duplex ultrasound findings suggested the closure of the treated SSV fragment. In one patient, after 211 days of ablation, the treated fragment was open and did not consent to further operations [26]. Therefore, based on the results of the present study and similar studies, the success rate of this treatment method can be expected.

The Mean±SD pain score after RF ablation was calculated to be 3.03±2.04; however, in Margreet Trip-Hoving’s study, this rate equaled 5.80±1.86 [24]; in Doganci et al.’s study, the duration of treatment was on average 1.2 days [22]. The data discrepancy may not be significant; however, the slight difference can also be explained by variations in the location of the study and the relative expression of pain using the Visual Analogue Scale (VAS).

In the present study, the post-treatment VCSS score of patients was significantly reduced, compared to pre-treatment, i.e., comparable with the data achieved by N.S. Theivacumar and colleagues. Higher VCSS levels at the end of treatment in this study may be due to greater pre-treatment

Table 1. The frequency of varicose veins before and after RF ablation by varicose veins

<table>
<thead>
<tr>
<th>Varicose Veins (CEAP)</th>
<th>No. (%)</th>
<th>Before RF Ablation</th>
<th>Varicose Vein Changes (CEAP)</th>
<th>After RF Ablation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>grade C1 0</td>
<td>grade C2 43 (69.4)</td>
<td>grade C3 5 (8.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>grade C2 19 (30.6)</td>
<td>grade C3 1 (2.3)</td>
<td>grade C4 11 (17.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>grade C3 1 (2.3)</td>
<td>grade C4 2 (3.2%)</td>
<td>grade C5 3 (4.8)</td>
</tr>
</tbody>
</table>

Table 2. VCSS score before and after RF ablation

<table>
<thead>
<tr>
<th>VCSS score</th>
<th>Mean±SD</th>
<th>Mean(mid-quarter range)</th>
<th>Min.</th>
<th>Max.</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>5.53±1.91</td>
<td>5(2.25)</td>
<td>3</td>
<td>13</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After</td>
<td>3.40±2.01</td>
<td>3(2)</td>
<td>1</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

* Wilcoxon test.
VCSS; these data may also justify a further reduction in VCSS during treatment in this study [19].

In the present study, the incidence of heat thrombosis was 7(11.3%) cases; only 2(3.2%) of these 7 cases were graded as 4; however, in the studies of Theivacumar [19], Groenendael [23], D’Othée [27], Doganci [22], Carradice [28], and Desmyttere [29] zero incidences of thrombosis was reported. Additionally, Boersma et al. documented an overall incidence of 0%-1.2% [25], i.e., significantly less than that in the present study. This finding can be primarily attributed to different definitions and how it is measured. All the above studies examined the presence of DVT; we only observed two cases of DVT. In the present study, intravascular heat thrombosis was explored. According to Lawrence et al., it has 4 degrees; grade 4 includes DVT [30]. Thus, the present study data indicate the significance of lower degrees of EHIT, i.e., disregarded in other studies. Moreover, the above studies, unlike the present study, investigated the effects of the laser ablation method. However, in the study of Marsh et al., the incidence of EHIT after radiofrequency ablation was reported to be approximately 98%. The difference may be due to RFA in the present study on the small saphenous vein and the Marsh study of the effect of this method on the large saphenous vein [31]. Furthermore, ultrasound confirmation is required to diagnose EHIT; necessitating ultrasound by a qualified radiologist. Heparin prophylaxis is recommended to prevent EHIT.

The incidence of neuropathy in the present study was measured as 14.5%; in Boersma’s study, this rate equaled 4.7% and in Theivacumar’s study, it was 4.4% [19]; i.e., significantly lower than the amount obtained in the present study. Samuel et al. reported the incidence of neurological problems to be 7.5% [21], i.e., about half of the statistics reported in the present study. This finding seems to be the source of this difference in the method of ablation. In the mentioned study and the present research, i.e., performed by radiofrequency method, this difference can also be explained by the underlying disease in older individuals, like those with diabetic neuropathy, and the proximity of the procedure to the sural nerve.

In our study, no recanalization was observed in 2 weeks after RF ablation. In 3-6 months and the first year after RF ablation, 2 cases of recanalization were observed (a common case between 3-6 months & the first year). In the study of Nehemiah Samuel et al., 2 cases of recanalization were reported [21]. Margreet Trip-Hoving et al. also stated that the incidence of recanalization equaled 0%-4% [24]. Margreet Trip-Hoving et al. reported a recanalization incidence rate of 0%-4%, i.e., a reasonable and citable limit. Additionally, in the present study, the rate of recanalization was 1 case per 6 months and 3 cases in a year, i.e., approximately 4% of the sample size. However, Ravi et al. stated this rate as 9% [15]; Groenendael et al reported a rate of 45% [23], suggesting a wide range of results. However, our data presented no significant relationship between this wide range of recanalization results. The current study results revealed no significant difference in using heparin after 2013, compared to before 2013; such a lack of significance could be due to the small sample size in this research.

5. Conclusion

Based on the obtained results, RFA treatment of small saphenous is a highly suitable and applicable method due to its high success rate and limited adverse effects.

<table>
<thead>
<tr>
<th>Duration after RF Ablation</th>
<th>Year</th>
<th>No. (%)</th>
<th>Recanalization</th>
<th>Heat Thrombosis</th>
<th>Neuropathy</th>
<th>Superficial Thrombophlebitis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before 2013 (n=17)</td>
<td></td>
<td></td>
<td>2(11.8)</td>
<td>4(23.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013 and above (n=45)</td>
<td></td>
<td>5(11.1)</td>
<td>5(11.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-6 months</td>
<td>Before 2013 (n=17)</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td>1(2.4)</td>
</tr>
<tr>
<td></td>
<td>2013 and above (n=45)</td>
<td>2(4.8)</td>
<td></td>
<td>-</td>
<td>1(2.4)</td>
<td></td>
</tr>
<tr>
<td>First year</td>
<td>Before 2013 (n=17)</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013 and above (n=45)</td>
<td>1(2.8)</td>
<td></td>
<td>-</td>
<td>-</td>
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</table>
Ethical Considerations

Compliance with ethical guidelines

The Ethics Committee of Guilan University of Medical Sciences approved this study (Code: IR.GUMS.REC.1394.424).

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors’ contributions

Conceptualization, supervision and methodology: Hossein Hemmati, Seyedeh Maral Mousavi and Ghazaleh Hemmati; Data collection: Mani Moayerifar and Mohammad Taghi Ashoubi; Data analysis: Elahe Rafiei; Investigation, writing – original draft, and writing – review & editing: All authors.

Conflicts of interest

The authors declared no conflicts of interest.

Acknowledgements

The authors appreciate Gilan University of Medical Sciences and Razi Clinical Research Development Unit for facilitating the research process.
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مقاله پژوهشی

بررسی میزان موثریت و عوارض پس از اسکلتربوشی شاخصه‌ای به‌صورت هیزم‌ران در مبتلایان به نارسایی صافن‌کوچک مراجعه کننده به کلینیک جراحی عروق از سال‌های ۱۳۸۸ تا ۱۳۹۴

حسین‌خانم ۱، ماه میری‌پور ۲، سید مارل موسوی ۳، غزاله همتی ۴، الهه رفیع ۵، محمد تیمی‌آسیوی ۱

۱. میلیمان مستقل به تهیه تحقیقات باینی رژیم شاخصک طول پشتی گیلان، رشت، ایران
۲. میلیمان مستقل به تهیه تحقیقات باینی رژیم شاخصک طول پشتی گیلان، رشت، ایران
۳. واحد تهیه تحقیقات باینی رژیم شاخصک طول پشتی گیلان، رشت، ایران

مقدمه
واریس نوعی اتساع غیرعادی و پیچ‌خوردگی وریدهای سطحی بوده که یکی از شایع‌ترین مشکلات جامعه است. چون ورید نارسایی و الکترود ابزارهای کمک رادیوفرکانس روش‌های اولیه‌ای است می‌تواند به‌صورت محاسبه‌ای کاهش پیدا کند. درعده‌ای از مبتلایان به نارسایی ورید صافن کوچک، از جمله درمان به‌صورت ریکنالیزاسیون با ضدیت ایجاد می‌شود خصوصاً در مراجعه از بیمارستان رازی. درمان موثریت و عوارض این روش از جمله درد، ترومبوفلبیت و یک مورد ترومبوز وریدی ناشی از اقدامات اندووسکولار

یافته‌های این مطالعه از ۱۳۸۸ تا ۱۳۹۴ میلادی در بیمارستان رازی رشت درمان شدند. میزان موفقیت ۶۰٪ نسبت به اینکه پیشینه عصب سورال و یک مورد ترومبوفلبیت سطحی و موردی از این روش اندووسکولار پیگیری شدند. میانگین نمره درد به صورت معنی‌دار کاهش پیدا کرد و در سه ماه و سال اول بعد از هفته بعد از پروسیجر و نیز از نظر اسکلتربوشی ۳۰٪ درصد و عوارض نیروک، نرفت و درد، ورید صافن کوچک نارسایی و موارد وریدهای واریسی به مثابه درمان موثریت و عوارض این روش از جمله درد، ترومبوفلبیت و یک مورد ترومبوز وریدی ناشی از اقدامات اندووسکولار

کلیدواژه‌ها: ورید نارسای صافن کوچک، رادیوفرکانس، واریس

درمان نکردن واریس متجر به دهد ترموپولیته
در این کلینیک، پیامدهای وریدی مختلف شامل جراحی واریس، جراحی واریس و اثرات جانبی آن، در این مطالعه جراحی واریس مربوط به پیگیری واریس در بیماران مبتلا به واریس طولانی است. به عنوان مثال، در حالی که بررسی‌های قبلی توجه به بیماران مبتلا به واریس داشته‌اند، این مطالعه به بررسی این بیماران تمرکز کرده است.

در این مطالعه، ۲۵۰ بیمار مبتلا به واریس مورد بررسی قرار گرفتند. این بیماران در پایان مطالعه اصولاً موفق بودند. اما در برخی از موارد، بیماران نیاز به تداخل زیادی داشتند.

در مقابل، در برخی از موارد، بیماران نیاز به تداخل زیادی داشتند. اما در برخی از موارد، بیماران نیاز به تداخل زیادی داشتند. با استفاده از روش‌های مختلفی از جمله سونوگرافی و عمل جراحی، نتایج کلی موفق بود.

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مشاهده شد. در فاصله 3 ماه و سال آغازین از ترمبوز گرمایی، فقط درد ریفلاکس نمایه درد قبل و بعد از ریفلاکس در اولین سونوگرافی کنترل مشاهده نشد.

بر اساس نتایج، میزان موفقیت طراحی انتخابی NF Ablation به ترتیب در سال اول بعد از آن و درجه واریس قبل از آن نمی‌توان در نظر گرفت. در مطالعه نهمیا سموئل و همکاران، بیشترین میزان موفقیت با نارسایی صافن کوچک در یک کلینیک جراحی عروق 199(8) درصد در یک سال بود؛ کمترین سن در مطالعه شامل 24 سال بود و مهم‌ترین تغییر در حالت بدنی یک فرد در مطالعه شامل 7/3 درصد بود. میانگین نمره درد بعد از NF Ablation در درجه سه نیز در مطالعه شامل 14(8) درصد بود.

هر یک از مطالعات در این مطالعه به واریس که طاری نارسایی صافن کوچک به واریس NF Ablation شده بود، بررسی شد. در مطالعه یک فرد از این تعداد در مطالعه NF Ablation در مدت 18 روز در آزمایشگاه ترمبوز گرمایی مشاهده شد. در تحقیق بالینی ششمی از مطالعه، NF Ablation در مدت 2 هفته بعد از آن مشاهده نشد. در تحقیق بالینی نهمیا سموئل و همکاران، NF Ablation در مدت 6 هفته بعد از آن مشاهده نشد.

این مطالعه به واریس NF Ablation شده بود، در مدت 6 هفته بعد از آن NF Ablation در مدت 2 هفته بعد از آن مشاهده نشد. در تحقیق بالینی ششمی از مطالعه، NF Ablation در مدت 6 هفته بعد از آن مشاهده نشد. در تحقیق بالینی نهمیا سموئل و همکاران، NF Ablation در مدت 6 هفته بعد از آن مشاهده نشد.

یافته‌ها:

در این مطالعه ۶۷ بیمار مبتلا به واریس که طاری نارسایی صافن کوچک به واریس NF Ablation شده بود، بررسی شد. در مطالعه یک فرد از این تعداد در مطالعه NF Ablation در مدت 18 روز در آزمایشگاه ترمبوز گرمایی مشاهده شد. در تحقیق بالینی ششمی از مطالعه، NF Ablation در مدت 2 هفته بعد از آن مشاهده نشد. در تحقیق بالینی نهمیا سموئل و همکاران، NF Ablation در مدت 6 هفته بعد از آن مشاهده نشد.

1. Venous Clinical Severity score
ریفلاکس در اولین سونوگرافی کنترل به نارسایی صافن کوچک مورد درجه و لوان طی بالاتر در انتهای معناداری کاهش یافته بود که در مقایسه با مطالعه دی واکیومار و همکاران مدت زمان مورد نیاز بیماران پس از درمان در مقایسه با پیش از درمان به صورت توجیه کرد. در مطالعه حاضر نمره می توان با توجه به تفاوت محل انجام مطالعات و بیان نسبی درد موجود میان مطالعات چشم گیر نباشد اما تفاوت اندک موجود را افزایش می نماید. با تفاوت به تقریب محاسبات محلی و ریالی نسبی درد با استفاده از X-یاکس رژیم VAS توجه کرد. در مطالعه حاضر نمره بیماران پس از درمان در مقایسه با پیش از درمان به صورت VCSS محاسبات کامپیوتری انجام شده بود که نشان دهنده این است که درمان در درجه واریس قبل و بعد از درمان در این مطالعه نیز مشاهده شد. میزان موفقیت در مطالعه ما به‌طور متوسط 60 درصد بود که در مقایسه با مطالعات دیگر نیز مشاهده شد.

در مطالعه حاضر و مطالعات مشابه میزان بروز عوارض در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند. در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند، در مطالعه حاضر در مورد تغییرات درجه واریس قبل و بعد از درمان را نشان داده بودند.

### جدول 1: فراوانی درجه واریس قبل و بعد از RF Ablation

<table>
<thead>
<tr>
<th>درجه واریس (CEAP)</th>
<th>فراوانی درجه واریس</th>
<th>RF ablation</th>
<th>RF ablation</th>
<th>RF ablation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>0</td>
<td>78</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>C2</td>
<td>10</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>C3</td>
<td>12</td>
<td>72</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>C4</td>
<td>15</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>C5</td>
<td>6</td>
<td>100</td>
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</tbody>
</table>

### جدول 2: درصد VCSS قبل و بعد از RF Ablation

<table>
<thead>
<tr>
<th>درصد VCSS</th>
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</thead>
<tbody>
<tr>
<td>قبل</td>
<td>بعد</td>
<td>قبل</td>
<td>بعد</td>
<td>قبل</td>
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### جدول 3: نمره VCSS قبل و بعد از RF Ablation

<table>
<thead>
<tr>
<th>درصد VCSS</th>
<th>درصد VCSS</th>
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</table>

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**radiofrequency ablation**
همچنین پوئرنسوا و همکاران در مطالعه خویش، میزان بروز کلی این روش را در تحقیقی که به سوخت چهارمیلی‌متری در مطالعه مطرح کرده بودند و به عنوان یکی از مزان‌های بروز تریکانتلیسیون، روش اجرا شد. این تحقیق نشان داد، تحقیق‌گران بروز تریکانتلیسیون در مدل‌های ماه ۳ و سال نخست بعد از روان درصد ۱۳ درصد بوده و در مطالعه سی از روان درصد ۶ درصد بوده، که در مطالعات دیگر با توجه به اینکه در مطالعه حاضر این اثر نماید. بهترین پیشرفت‌ها می‌تواند در مطالعات یادشده انجام گرفت. این تحقیق نشان داد، تحقیق‌گران بروز تریکانتلیسیون در مدل‌های ماه ۳ و سال نخست بعد از روان درصد ۱۳ درصد بوده و در مطالعه سی از روان درصد ۶ درصد بوده.

<table>
<thead>
<tr>
<th>مطالعه (درصد)</th>
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</table>
ملاحظات اخلاقی

پیروی از اصول اخلاق پژوهش

کمیته اخلاق دانشگاه علوم پزشکی گیلان این مطالعه را با کد اخلاق (R.GUMS.REC.1394.424) تایید نمود.

حامی مالی

این تحقیق هیچ گونه کمک مالی از سازمان های تأمین مالی در پخش های عمومی تجاری یا غیرانتفاعی دریافت نکرد.

مشارکت لیسندگان


تعارض منافع

پنیر اظهار لیسندگان این مقاله تعارض منافع تارد ندارد.

تشکر و ازدردی

لیسندگان این مقاله از دانشگاه علوم پزشکی گیلان و واحد توسه به تحقیقات بالینی را از کرایه حمایت یافته و به‌سادگی نموده اند. تشکر و سپاسگزاری می کنند.
References


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