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Original article

5-YEAR CLINICAL RESULTS OF 1073 PATIENTS WITH VARICOSE VEINS TREATED USING RADIOFREQUENCY ABLATION, ENDOVENOUS LASER ABLATION AND CYANOACRYLATE EMBOLISATION

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Abstract: **Background:** There is little research on the long-term outcomes of radiofrequency ablation, endovenous laser ablation, and cyanoacrylate embolization. This study retrospectively examined the clinical results of radiofrequency ablation, endovenous laser ablation, and cyanoacrylate embolization methods.

Materials and Methods: The population of the study consisted of 1256 patients who applied to the clinic with the diagnosis of chronic venous insufficiency between the specified dates and were treated with endovenous varicose veins. Sample: 431 patients in the cyanoacrylate embolization group, 230 patients in the radiofrequency ablation group, 412 patients in the endovenous laser ablation group, a total of 1073 patients. Bilateral cyanoacrylate embolization, radiofrequency ablation, and endovenous laser ablation were not applied to the patients in the same session.

Results: When the 1-year occlusion rates were examined, it was determined as 97.57%, 98.26%, and 95.59% in the endovenous laser ablation, radiofrequency ablation, and cyanoacrylate embolization groups, respectively. There was no significant difference in Venous Clinical Severity Score scores between the groups before and after the procedure. Pain, paresthesia, ecchymosis, pigmentation, induration, burn, deep vein thrombosis, and phlebitis were significantly more common in the endovenous laser ablation group.

Conclusions: Complications were seen in the cyanoacrylate embolization group. Endovenous laser ablation, radiofrequency ablation, and cyanoacrylate embolization applications have similar long-term results. Therefore, cyanoacrylate embolization is recommended for chronic venous insufficiency patients who want to get rid of varicose veins and improve their quality of life.

Keywords: Radiofrequency ablation, Endovenous laser ablation, Cyanoacrylate embolization, Clinical results.

INTRODUCTION

Venous insufficiency and varicose veins are common conditions of significant concern for patients (1). In recent years, there have been significant advances in the diagnosis and treatment of venous insufficiency. Some of the methods that are alternative to surgical treatment are radiofrequency ablation (RFA), endovenous laser ablation (EVLA), and cyanoacrylate embolization (CAE).

Color Doppler ultrasonography (RDUSG) has been a common method for diagnosing and treating venous insufficiency. This technique has paved the way for thermal ablation methods (EVLA and RFA), which involve local anesthesia under ultrasonography (USG) guidance. Those methods have replaced surgical treatments worldwide (1).

Radiofrequency ablation and EVLA are minimally invasive procedures. Their short- and medium-term outcomes are excellent, with high occlusion rates and rare side effects (2, 3). In endovenous laser ablation, the veins causing reflux are closed up with heat (ablation) under local anesthesia by a laser fiber placed inside the lumen. Then the laser fiber is eliminated by the body through fibrosis. Some advantages of this method are that it is a painless procedure performed under local anesthesia, it leaves no scar or incision, and the patient can stand up and walk immediately after the procedure. Therefore, endovenous laser ablation has become an important option for treating venous insufficiency. Endovenous laser ablation both eliminates the cause of

varicose veins and reduces or eliminates the symptoms of venous insufficiency (pain, cramping, swelling, etc.). Involving radiofrequency (RF) or laser energy as a heat source, EVLA is an important method for treating saphenous insufficiency as well. Radiofrequency thermal ablation has largely replaced surgery because it is a safe and effective procedure with a few side effects and does not require general anesthesia and hospitalization (4, 5). New methods are being developed for high success rates, fewer complications, and higher quality of life. Cyanoacrylate embolization (CAE) has been one of the most popular nonthermal ablation methods in recent years. The advantage of CAE is that it is a short procedure that does not require tumescent anesthesia and does not cause labor loss. Cyanoacrylate embolization poses less risk for nerve damage because it does not involve thermal energy, and its mid-term results are superior to those of ultrasound-guided foam sclerotherapy (6).

Varicose veins cause signs and symptoms and serious cosmetic concerns that affect the quality of life. Invasive endovenous techniques are becoming more popular because they are easy-to-apply methods with successful results and because patients avoid surgical incisions (7). The primary objective of lower extremity varicose vein treatment is to eliminate patient complaints (pain, itching, burning, paresthesia, bleeding, ulceration, etc.) by considering aesthetic concerns and to minimize post-procedure complications (paresthesia, burn, air embolism, headache, pulmonary embolism, deep vein thrombosis (DVT), pigmentation, etc.). We should know the results of varicose vein treatment methods before informing patients about them.

There is little research on the long-term outcomes of CAE, RFA, and EVLA. This study retrospectively examined the clinical results of CAE, RFA, and EVLA methods. We think that the results will contribute to the literature.

MATERIALS AND METHODS

Research design

This retrospective study presented the outcomes of the procedures performed in the cardiovascular surgery clinic of a private hospital in Osmaniye in the south of Turkey. No sampling was performed. In the study, the results of the patients who underwent the procedure between February 2011 and April 2016 were evaluated. 1256 patients who were diagnosed with chronic venous insufficiency (CVI) and treated for endovenous varicose veins at this time constituted the population of the study. The sample consisted 431 patients in the cyanoacrylate embolization group, 230 patients in the radiofrequency ablation group, 412 patients in the endovenous laser ablation group, a total of 1073 patients. Bilateral cyanoacrylate embolization, radiofrequency ablation, and endovenous laser ablation were not applied to the patients in the same session. The inclusion criteria were as follows:

1. Aged between 18 and 70 years,
2. Great saphenous vein (GSV) ≥ 5.5 mm and vessel diameter ≤ 15 mm
3. Great saphenous vein reflux > 0.5 seconds
4. CEAP (Clinical-Etiological-Anatomical-Pathophysiological) classification between C2 and C5
5. Attending follow-up exams

The exclusion criteria were as follows:

1. History of deep vein thrombosis,
2. Deep venous insufficiency,
3. Active superficial phlebitis,
4. Great saphenous vein (GSV) aneurysm > 12 mm,
5. Lymphedema,
6. Peripheral arterial disease,
7. Pregnant or breastfeeding patients,
8. Immobility.

Data Collection

The data were recorded in patient files and then evaluated five years later.

The CEAP (Clinical-Etiological-Anatomical-Pathophysiological) classification was used to determine CVI severity. Venous Clinical Severity Score (VCSS) was used to evaluate clinical findings.

During the 5 years, patients' histories were attained from the medical records, and all patients underwent a clinical examination before treatment. Afterward, GSV deficiencies were detected using RDUSG. Venous insufficiency was assessed while the patient was standing. Operational decisions were made according to the CEAP classification and clinical complaints in addition to the GSV insufficiency and the GSV diameter at the planned level of intervention. Venous reflux flow was checked when insufficiency was suspected due to increased diameter or its association with varicose veins. Diameters exceeding 5.5 mm in the superficial femoral veins and 3.5 mm in the perforating veins while standing were accepted as criteria for venous insufficiency.

CEAP classification and VCSS were evaluated after clinical examinations in the first month, first year, and fifth-year post-intervention. Procedural success and post-procedure symptoms and complications were determined using RDUSG.

CEAP classification

The CEAP classification was developed by the American Venous Forum (1994). C0: no visible or palpable signs, C1: telangiectasias or reticular veins, C2: varicose veins, C3: edema, C4: secondary skin alter-

ations, C4a: pigmentation or eczema, C4b: lipodermatosclerosis or white atrophy, C5: healed venous ulcer, C6: active venous ulcer (8).

Venous Clinical Severity Score (VCSS)

The Venous Clinical Severity Score (VCSS) is a dynamic scoring system that evaluates ten components: pain, varicose veins, edema, pigmentation, inflammation, induration, ulcer size, the number of ulcers, ulcer duration, and compression. The components are scored on a scale of 1 to 3. (1 = Mild, 2 = Moderate, 3 = Severe). The total score ranges from 0 to 30. The VCSS is a user-friendly scoring system designed to assess the patient's clinical condition. Higher scores indicate worse clinical conditions (9).

Procedures

CAE, RFA, and EVLA were performed.

Endovenous laser ablation was performed under tumescent anesthesia. A laser with a 1470 nm radial fiber was used. After EVLA, the catheter was removed, and the puncture site was closed. The leg was wrapped with an elastic bandage. After the procedure, the patient received medical treatment and used compression stockings for three months.

Radiofrequency ablation (RA)

All patients underwent tumescent anesthesia around the saphenous vein ablation line. A sheath was inserted into the great saphenous vein (GSV) from the knee (RDUSG), and an RA catheter was placed with its tip 2-3 cm distal to the saphenofemoral junction. Following tumescent anesthesia, each 7 cm segment was exposed to 120 °C for 20 seconds. During the procedure, the patient was placed in the Trendelenburg position to apply compression to the saphenous vein line. After the operation, pressure dressing was applied to the patients, who then put on compression stockings.

Cyanoacrylate embolization (CAE)

Under the guidance of RDUSG, a puncture was performed under local anesthesia using the Seldinger technique from a suitable area at the knee level, and then a sheath was placed. InvamedVenaBLOCK embolizing agent system was used in all patients. The catheter of the system was advanced to approximately 3 cm distal to the saphenofemoral junction. The patient was placed in the Trendelenburg position and then suppressed and collapsed using a saphenofemoral junction RDUSG probe. In about 30 seconds, CA was injected continuously along the saphenous vein tracing, and external pressure was applied simultaneously. Compressions were terminated 3-4 minutes after the injection. Afterward, the reduction in vein diameter and the increase in echogenicity in the vein wall were checked using RDUSG. None of the patients received an elastic bandage and put on compression stockings.

Ethical considerations

The study was approved by the Scientific Research and Publication Ethics Committee of Osmaniye Korkut Ata University (11.11.2022/2022-9-7). Permission was obtained from the hospital.

Statistical analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) at a significance level of 0.05. Mean ± standard deviation and median (minimum-maximum) were used for continuous data. Frequency (n) and percentage (%) were used for categorical variables. A one-way ANOVA test and chi-square test were used to compare the groups.

RESULTS

Table 1 shows the participants' gender, age, GSV diameter, and CEAP classification.

Table 1. *Participants' Characteristics (n = 1073)*

Variables	Total n (%)	EVLA n (%)	RFA n (%)	CAE N (%)	p
Gender					
Woman	854 (79.59)	314 (76.21)	183 (79.56)	357 (82.83)	0.07
Man	219 (20.41)	98 (23.79)	47 (20.44)	74 (17.17)	0.06
Pre-procedural CEAP classification					
Class 2	378 (35.23)	155 (37.62)	56 (24.35)	167 (38.75)	0.11
Class 3	531 (49.49)	181 (43.93)	128 (55.65)	222 (51.51)	0.09
Class 4	141 (13.14)	68 (16.51)	39 (16.96)	34 (7.89)	0.06
Class 5	23 (2.24)	8 (1.94)	7 (3.04)	8 (1.85)	0.07
GSV diameter	6.99 ± 1.24	7.14 ± 1.07	7.23 ± 1.11	6.73 ± 1.67	0.07
Age (year)	43.36 ± 9.13	46.24 ± 11.31	41.56 ± 10.22	42.21 ± 8.02	0.08

GSV; great saphenous vein, RFA; radiofrequency ablation, EVLA; endovenous laser ablation, CAE; cyanoacrylate embolization.

Table 2. *Procedures (n = 1073)*

	EVLA n : 412	**RFA n : 230**	**CAE n : 431**	**p**
GSV ablation length (cm)	30.22 ± 5.21	31.13 ± 6.11	31.41 ± 6.24	0.82
Duration of the procedure (min)	16 (12-24)	11 (10-13)	8 (6-10)	0.01
Amount of tumescent anesthesia (ml)	300 (60-600)	260 (50-540)	–	0.08
Occlusion rate				
1. month	408 (99.02%)	229 (99.56%)	426 (98.83%)	0.12
1. year	402 (97.57%)	226 (98.26%)	412 (95.59%)	0.06
5. year	396 (96.11%)	221 (96.08%)	397 (92.11%)	0.05

GSV; great saphenous vein, RFA; radiofrequency ablation, EVLA; endovenous laser ablation, CAE; cyanoacrylate embolization.

Table 3. *Mean VCSS Scores (n = 1073)*

	EVLA (n : 412)	RFA (n : 230)	CAE (n : 431)	Anova	p
VCSS					
Before procedure	8.45 ± 1.87	8.56 ± 1.73	8.63 ± 1.81	24.45	0.07
1. month	4.53 ± 1.04	4.78 ± 1.08	4.47 ± 1.01	12.22	0.06
1. year	1.19 ± 1.06	1.26 ± 1.05	1.13 ± 1.01	11.56	0.14
5. year	1.53 ± 1.04	1.22 ± 1.03	1.88 ± 1.03	17.43	0.08

VCSS; venous Clinical Severity Score, RFA; radiofrequency ablation, EVLA; endovenous laser ablation, CAE; cyanoacrylate embolization.

Table 4. *Complications (n = 1073)*

Complication	**EVLA n (%)**	**RFA n (%)**	**CAE n (%)**	**P**
Paresthesia				
1. month	76 (18.44)	21 (9.13)	15 (3.48)	0.02
1. year	2 (0.48)	0	0	0.06
5. year	0	0	0	
Pain				
1. month	152 (36.89)	61 (26.52)	57 (13.22)	0.03
1. year	13 (3.15)	0	2 (0.46)	0.06
5. year	0	0	0	
Pigmentation				
1. month	53 (12.86)	12 (5.22)	0	0.00
1. year	1 (0.24)	0	0	0.06
5. year	0	0	0	
Phlebitis				
1. month	26 (6.31)	12 (5.22)	14 (3.25)	0.05
1. year	0	0	0	
5. year	0	0	0	
Ecchymosis				
1. month	105 (25.49)	42 (18.26)	5 (1.16)	0.01
1. year	0	0	0	
5. year	0	0	0	
Induration				
1. month	14 (3.40)	3 (1.30)	0	0.04
1. year	1 (0.24)	0	0	0.06
5. year	0	0	0	
Burn				
1. month	8 (1.94)	2 (0.87)	0	0.04
1. year	0	0	0	
5. year	0	0	0	
DVT				
1. month	7 (1.70)	2 (0.87)	0	0.05
1. year	0	0	0	
5. year	0	0	0	0.14

DVT; deep vein thrombosis, RFA; radiofrequency ablation, EVLA; endovenous laser ablation, CAE; cyanoacrylate embolization.

The majority of the participants were women (79.59%). Most participants belonged to CEAP 2 and CEAP 3 classes (84.72%). The EVLA group consisted of 314 women and 98 men (412 in total). The RFA group consisted of 183 women and 47 men (230 in total). The CAE group consisted of 357 women and 74 men (413 in total). The EVLA, RFA, and CAE groups had a mean age of 46.24 ± 11.31, 41.56 ± 10.22, and 42.21 ± 8.02, respectively ($p \geq 0.05$). The EVLA, RFA, and CAE groups had a mean GSV diameter of 7.14 ± 1.07, 7.23 ± 1.11, and 6.73 ± 1.67, respectively ($p \geq 0.05$) (Table 1).

Table 2 shows the procedures the patients underwent.

The EVLA, RFA, and CAE groups had a mean ablated vein length of 30.22 ± 5.21 cm, 31.13 ± 6.11 cm, and 31.41 ± 6.24 cm, respectively. The EVLA and RFA groups had a mean tumescent anesthesia volume of 300 ml (60-600 ml) and 260 ml (50-540 ml), respectively. The EVLA, RFA, and CAE groups had a mean procedure duration of 16 min, 11 min, and 8 min, respectively ($p < 0.01$). The RDUSG examination showed that the procedures were successful in all groups. The target vessel segments were closed entirely. In the next period, > 5 cm partial recanalizations were observed within one year. The EVLA, RFA, and CAE groups had a mean 1-year occlusion rate of 97.57%, 98.26%, and 95.59%, respectively ($p \geq 0.05$).

Table 3 shows the pre- and post-procedure VCSS values of the groups.

There was no significant difference in pre- and post-procedure VCSS scores between the groups ($p \geq 0.05$).

Table 4 shows the post-procedure complications.

While the highest number of complications was observed in the first month in all groups, there was a significant decrease over time. No complications developed in the patients in the fifth year. Paresthesia, ecchymosis, pain, pigmentation, induration, burn, phlebitis, and DVT were significantly more common in the EVLA group. The complications were least common in the CAE group ($p \leq 0.05$).

DISCUSSION

Varicose veins reduce people's quality of life because they are visually unappealing and cause physical signs and symptoms. They also cause significant workforce losses. EVLA, RFA, and CAE are the most common types of treatment for CVI.

In the present study, the majority of the patients were women (79.59%). Most patients belonged to CEAP 2 and CEAP 3 classes (84.72%). The EVLA, RFA, and CAE groups had a mean age of 46.24 ± 11.31, 41.56 ± 10.22, and 42.21 ± 8.02, respectively. The groups were homogenous in terms of age, CEAP classification, and gender, which is consistent with the literature (3, 10, 11). Güven et al. (6) reported that 318 (180 women and 138 men) patients had a mean age of 43.6 ± 12.78 years. Gücü et al. (12) recruited a sample of 48% men (mean age: 42.1 ± 13.4) and 52% women (mean age: 44.68 ± 10.6).

The EVLA, RFA, and CAE groups had a mean GSV diameter of 7.14 ± 1.07, 7.23 ± 1.11, and 6.73 ± 1.67, respectively ($p \geq 0.05$), which is consistent with the literature (10, 12, 13).

In the present study, CAE took shorter than EVLA and RFA, which is consistent with the literature (10, 14).

There was no significant difference in occlusion rates in the first month between the groups. The EVLA and RFA groups had higher occlusion rates in the fifth year than the CAE group. However, there was no significant difference in occlusion rates in the fifth year between the EVLA and RFA groups. Yang et al. (15) focused on 3-year occlusion rates in CAE and RFA patients and reported that CAE and RFA had a midterm treatment success of 100% and 99%, respectively. Ovalı et al. (16) investigated 1-year occlusion rates in CAE and RFA patients and found that the majority of the CAE (99.5%) and RFA (96.6%) groups had complete occlusion of the GSV in the twelfth month. Morrrison et al. (17) looked into 3-year occlusion rates in CAE and RFA patients and determined that the CAE and RFA groups had a GSV occlusion rate of 94.4% and 91.9%, respectively. Almeida et al. (18) observed the 3-year CAE occlusion rate as 94.7%. Lawaetz et al. (19) evaluated the 5-year outcomes of treatment with RFA, EVLA, UGFS, and high ligation and stripping (HL/S). They determined that the need for recanalization in the RFA, EVLA, UGFS, and HL/S groups were 5.8%, 6.8%, 31.5%, and 6.3%, respectively. Ay et al. (20) followed up 217 patients for a year and compared surgery, CAE, and RFA. The surgery group had a significantly higher occlusion rate than the CAE and RFA groups. Eroğlu et al. (3) followed up 525 patients for two years and compared RFA, EVLA, and CAE. The RFA, EVLA, and CAE groups had occlusion rates of 90.9%, 91.5%, and 92.6%, respectively. Morrison et al. (21) followed up 89 patients for five years. In month 60, the GSV was completely closed in 100% (33/33) veins in the RFA group and 93.6% (44/47) veins in the CAE group. In their meta-analysis, Chen et al. (22) have reported no significant difference in occlusion rates between CAE and RFA patients. El Kilic et al. (14) compared RFA, EVLA, and CAE in 232 patients. In the five-year follow-up, the RFA and CAE groups had higher occlusion rates than the EVLA

group. Koramaz et al. (10) reported similar rates of occlusion in CAE (98.6%) and EVLA (97.3%) patients. Proebstle et al. (23) observed a 98.6% occlusion rate in CAE patients. Morrison et al. (13) found that CAE and RFA had 99% and 96% occlusion rates, respectively. Güven et al. (6) determined that the saphenous vein was recanalized in 16 patients at the 6-month RDUSG. Tural et al. (5) reported an occlusion rate of 97.4% in CAE patients in month 12.

In the present study, CAE and RFA caused fewer complications than EVLA. The EVLA group had higher rates of ecchymosis, paresthesia, pigmentation, pain, phlebitis, burn, and DVT in the first month than the CAE and RFA groups. However, there was a significant reduction in complications in all groups in the first and fifth years. Koramaz et al. (10) compared EVLA and CAE and reported no paresthesia, burn marks, and pigmentation in CAE patients. Yang et al. (15) found that superficial phlebitis was the most common complication in the mid-term follow-up in the 5% and 15% of CAE and RFA patients, respectively. Ovalı et al. (16) reported skin burn only in one RFA patient (0.8%). They also found that pain, ecchymosis, and tenderness were more common in the RFA group than in the CAE group. Morrrison et al. (17) examined the three-year outcomes of CAE and RFA and observed stable improvement in symptoms and quality of life in both groups. They determined that the two groups had similar complication rates in the 24th and 36th months. Eroğlu et al. (3) found that the level of periprocedural pain was significantly lower in the SAE group than in the RFA and EVLA groups and that ecchymosis and phlebitis were more common in the RFA group than in the SAE and EVLA groups. Balcı et al. (24) compared the 6-month effectiveness of CAE and RFA (n=398) and detected that the CAE group had higher rates of ecchymosis and higher post-procedure comfort than the RFA group. Morrison et al. (21) reported sustained improvement in CAE patients' symptoms and quality of life over five years. Chen et al. (22) found that CAE patients had a lower risk of ecchymosis and paresthesia than RFA patients. In their meta-analysis, Garcia et al. (25) have concluded that CAE patients have less interventional pain and fewer minor complications than EVLA patients. El Kilic et al. (14) determined that EVLA patients had significantly higher complication rates than RFA and CAE patients. Güven et al. (6) detected thrombophlebitis in six patients and ecchymosis at the puncture site in 12 patients during early outpatient checkups.

In the present study, all groups had similar pre- and post-procedure VCSS scores during the five-year period. Ay et al. (20) reported that the surgery and RFA groups had higher VCSS scores than the CAE groups. Eroğlu et al. (3) determined that the RFA, EVLA, and CAE groups had the same mean pre-procedure VCSS scores. There was a reduction in VCSS scores in all groups in the sixth month. The drop continued in the first and second years. The CAE group had a significantly lower mean VCSS score in the sixth month and second year than the RFA and EVLA groups. Chen et al. (22) reported no significant difference in VCSS scores between CAE and RFA patients. El Kilic et al. (14) also found no significant difference in VCSS scores between EVLA, RFA, and CAE patients. Güven et al. (6) found that CAE patients had a significantly lower mean VCSS score in the post-procedure period than in the pre-procedure period. Poulose et al. (26) found that patients with CVI had a mean VCSS score of 11.47.

CONCLUSION

This study investigated the five-year results of CAE, RFA, and EVLA in 1073 patients. The results show that CAE, RFA, and EVLA are minimally invasive treatment options preferred by most patients. Patients prefer EVLA and RFA because those two methods have satisfactory long-term results despite early side effects, such as procedure site pain, ecchymosis, hematoma, and paresthesia. In recent years, CAE has become a popular treatment option because it has a high success rate in the early period, causes fewer complications, takes shorter to apply, and requires no anesthesia and no compression. CAE, RFA, and EVLA have similar long-term results. Therefore, CAE is recommended for patients with CVI who want to get rid of varicose veins and improve their quality of life.

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Sažetak

PETOGODIŠNJI KLINIČKI REZULTATI LEČENJA 1073 PACIJENTA SA PROŠIRENIM VENAMA, LEČENIH RADIOFREKVENTNOM ABLACIJOM, ENDOVENSKOM LASERSKOM ABLACIJOM I EMBOLIZACIJOM CIJANOAKRILATOM

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Uvod: Malo je istraživanja o dugoročnim ishodima radiofrekventne ablacije, endovenske laserske ablacije i cijanoakrilatne embolizacije. Ova studija je retrospektivno ispitala kliničke rezultate radiofrekventne ablacije, endovenske laserske ablacije i metoda cijanoakrilatne embolizacije.

Materijali i metode: Ukupan broj pacijenata u ovoj studiji koji su se javili u Kliniku, sa dijagnozom hronične venske insuficijencije između navedenih datuma i lečeni od proširenih vena bio je 1256. Uzorak: 431 pacijent u grupi cijanoakrilatne embolizacije, 230 pacijenata u grupi radiofrekventne ablacije, 412 pacijenata u grupi endovenske laserske ablacije, što je ukupno 1073 pacijenta. Bilateralna cijanoakrilatna embolizacija, radiofrekventna ablacija i endovenska laserska ablacija nisu primenjene kod pacijenata u istoj sesiji.

Rezultati: Kada su ispitane jednogodišnje stope okluzije, utvrđene su kao 97,57%, 98,26% i 95,59% u grupama endovenske laserske ablacije, radiofrekventne ablacije i cijanoakrilatne embolizacije. Nije bilo značajne razlike u skoru venske kliničke ozbiljnosti između grupa pre i posle procedure. Bol, parestezija, ekhimoze, pigmentacije, induracija, opekotina, duboka venska tromboza i flebitis bili su značajno češći u grupi koja je primala endovensku lasersku ablaciju.

Zaključak: Komplikacije su uočene u grupi koja je primala cianoakrilatnu embolizaciju. Primene endovenske laserske ablacije, radiofrekventne ablacije i embolizacije cijanoakrilatom imaju slične dugoročne rezultate. Zbog toga se cijanoakrilatna embolizacija preporučuje pacijentima sa hroničnom venskom insuficijencijom koji žele da se otarase proširenih vena i poboljšaju kvalitet života.

Ključne reči: Radiofrekventna ablacija, Endovenska laserska ablacija, cijanoakrilatna embolizacija, Klinički rezultati.

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