



Comparison of glue ablation and endovenous thermal ablation of small saphenous vein and early and midterm results

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ABSTRACT

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The aim of our study was to evaluate and compare the early and midterm post-operative outcomes of glue ablation and endovenous thermal ablation of the small saphenous vein. From January 2015 to January 2017, 26 consecutive patients who had admitted to our clinic with symptomatic chronic venous insufficiency of small saphenous vein who underwent either glue ablation and endovenous thermal ablation were included in this retrospective study. A total of 26 patients (12 males, 14 females; mean age 39.69 ± 9.88 years; range 27 to 62 years) with 30 legs who underwent either glue ablation and endovenous thermal ablation either tumescent or local anesthesia were included in this study. BMI was 25.6 ± 2.3 (range, 18.8-32.7). 20 patients (76.9%) were CEAP 2 and 6 patients (23.1%) were in CEAP 3 classification. The mean size of the treated small saphenous vein was 4.7 ± 1.6 mm (range, 2.5-6 mm). Simultaneous phlebectomy was performed to 28 limbs (93.3%) under local anesthesia. No technical failure and device-related complications were observed during procedure. The mean average follow-up was 14 ± 2.6 months (range 12-18 months). In this study, we found that glue ablation with cyanoacrylate closure was found superior results in early term however; no difference was noted on the mid-term result. To sum up, both glue ablation with cyanoacrylate closure and endovenous thermal ablation with radio frequency under either local or tumescent anesthesia can be easy, safely and effectively performed with satisfactory results.

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1. Introduction

Chronic venous insufficiency affects 21% of the population (40% of females and 17% of males, which reduces the life quality of people (Maurins et al, 2008). Small saphenous vein (SSV) constitutes 15% of chronic venous insufficiency (Almgren et al., 1990). Surgical high ligation, stripping, endovenous thermal ablation including laser and radiofrequency ablation, foam therapy, MOCA and glue ablation (cyanoacrylate closure) are the treatment modalities of small saphenous vein chronic venous insufficiency (Rutgers et al., 1994). Treatment of chronic venous insufficiency of

the small saphenous vein is still a debate. Some authors reported high recurrence and complication rates (Winterborn et al., 2004). Sural nerve present close to the small saphenous vein which potentially constitutes injury during the intervention. The saphenopopliteal junction cannot be present in 22% of patients. The studies about the treatment of symptomatic chronic venous insufficiency of the small saphenous vein are lacking in contrast to great saphenous vein. Deep venous thrombosis (DVT), nerve injury pain, bruising, superficial phlebitis, hematoma, superficial infection, and skin irritation are the major complications of

treatment of chronic venous insufficiency of small saphenous vein (Park, 2017). Endovenous thermal ablation demonstrates faster recovery compared to surgery (Park, 2017). The need of tumescent anesthesia, which may lead to pain, hematoma, and ecchymosis, is the main advantage of endovenous thermal ablation, however, glue ablation (cyanoacrylate closure) can be successfully applied under local anesthesia (Park, 2017). The aim of our study was to evaluate and compare the early and midterm postoperative outcomes of glue ablation and endovenous thermal ablation of the small saphenous vein.

2. Materials and methods

Study population

From January 2015 to January 2017, 26 consecutive patients who had admitted to our clinic with symptomatic chronic venous insufficiency of small saphenous vein who underwent either glue ablation and endovenous thermal ablation were included in this retrospective study. Preoperative symptoms were considered as pain, aching, cramping, heaviness, edema, and restless leg syndrome. Physical examination and laboratory results, medical history, comorbidities and postoperative outcomes were analyzed. Treatment indications were considered as more than 2 seconds of reflux and more than 2.5 mm and less than 6 mm in diameter of small saphenous vein. All patients were divided into two groups with respect to the type surgery as group 1 glue ablation (cyanoacrylate closure) and group 2 endovenous thermal ablation with radio frequency. Table 1 summarizes the baseline characteristics. Anatomical success was considered as the primary outcomes confirmed by Doppler ultrasound. Major complications were considered as the secondary outcomes. Sural nerve injury leads to numbness and paresthesia. Doppler ultrasound was

performed standing position to all patients before the intervention, which examines both superficial and deep venous system of the limbs. No exclusion criteria were considered. Patients were followed up on postoperative 2 weeks, first month, 6th month and annually and examined with Doppler ultrasound. The preoperative Clinical, Etiologic, Anatomic, Pathophysiologic (CEAP) classification was also applied to all patients.

Surgical technique

After introduced a 7F sheath with the guidance of Doppler ultrasound, the 5F catheter was introduced to the small saphenous vein during endovenous thermal ablation, which was positioned 5 cm distal to the saphenopopliteal junction. Compression was achieved via probe of ultrasound during thermal ablation. Tumescent anesthesia was applied to reduce the thermal injury of the procedure.

After introduced a 7F sheath with the guidance of Doppler ultrasound, the catheter was delivered to the 2 cm distal to the saphenopopliteal junction and 2 ml cyanoacrylate glue was administered during a glue ablation procedure and compression was achieved with ultrasound probe under local anesthesia. Occlusion was confirmed by Doppler ultrasound. Simultaneous miniphlebectomy were performed after the ablation was done. A compression bandage was applied to all patients after the procedure. Intravenous sedation was done in need of.

Statistical analysis

The Statistical Package for the Social Sciences Windows Version 21 (SPSS Inc, Chicago, IL, USA) was used to compare the data. The Kolmogorov-Smirnov test was used to analyze normally distributed continuous variables. Categorical variables were presented in percentages and frequencies. Continuous variables were presented in mean \pm standard deviation (SD). The continuous variables were compared using the T-test and the Mann-Whitney U test. The categorical data were tested with the Chi-square test or Fisher's exact test. A p-value of <0.05 was considered statistically significant.

3. Results

Sample sizes and demographic features

A total of 26 patients (12 males, 14 females; mean age 39.69 ± 9.88 years; range 27 to 62 years) with 30 legs who underwent either glue ablation and endovenous thermal ablation either tumescent or local anesthesia were included in this study. The clinical, demographic and laboratory features are shown in Table 1. Glue ablation with cyanoacrylate closure was applied to 19 limbs and thermal ablation with radio frequency was applied to 11 limbs. BMI was 25.6 ± 2.3 (range, 18.8-32.7). 20 patients (76.9%) were CEAP 2 and 6 patients

Table 1. Prevalence of central obesity in different smoking strata divided by participant characteristics; Iran 2007.

Baseline Characteristics			
	n	%	Mean \pm SD
Age			39.69 \pm 9.88
Gender			
Male	12	46.1	
Surgical Side			
Right	15	57.6	
CEAP 2	20	76.9	
CEAP 3	6	23.1	
Current smoking	5	19.2	
Hypertension	3	11.5	
DM	2	7.6	
BMI			25.6 \pm 2.3

The clinical, demographic and laboratory features of patients.

(23.1%) were in CEAP 3 classification. The mean size of the treated small saphenous vein was 4.7 ± 1.6 mm (range, 2.5-6 mm). Simultaneous phlebectomy was performed to 28 limbs (93.3%) under local anesthesia. No technical failure and device-related complications were observed during procedure. The mean average follow-up was 14 ± 2.6 months (range 12-18 months). No deep vein thromboses were observed. No nerve injury was detected during follow up. All patients were followed up in our study. 2 patients underwent redo surgery due to continuous reflux. The early success rate of Glue ablation with cyanoacrylate closure and endovenous thermal ablation with radio frequency were 94.7% and 54.5%, respectively ($p=0.015$). Mid term success rate of Glue ablation with cyanoacrylate closure and endovenous thermal ablation with radio frequency were 84.2% and 54.5%, respectively ($p=0.1$).

4. Discussion

In this study, we focused on the early and midterm results and comparison of Glue ablation with cyanoacrylate closure and endovenous thermal ablation with radio frequency. The main finding of this study was glue ablation with cyanoacrylate closure was found superior results in early term, however, no difference was noted on the mid-term results.

Allegra et al. (2007) reported a 132 patients study that the 5-year success rate of EVLA was in 70%. Of the 132 patients, the rate of paresthesia was 31% and the rate of DVT was 0.7%. Our results were superior that we did not observe any nerve injury or deep vein thrombosis. Allegra et al. (2007) noted that superiority was found between treatment modalities. The reported success rate of EVLA ranged 95%–100% with higher success rate compared to surgery (Allegra et al., 2007). Choosing the optimum treatment modality is scarce in the literature. Rashid et al. (2002) reported that the success rate of saphenopopliteal junction ligation was 59%. The rate of Paresthesia was 19.6% after surgery, 9.7% after RFA and 4.8% after EVLA (Allegra et al., 2007). The reported DVT rate ranged 0% to 1.2% after thermal ablation (van Eekeren et al., 2013). Glue ablation with cyanoacrylate closure reduces the rate of paresthesia; postoperative pain compared to endovenous thermal ablation and provides earlier return to work (van Eekeren et al., 2013, Morrison et al., 2015). Open surgery have reached a plateau however, newer techniques are developing (van

Eekeren et al., 2013). Endovenous thermal ablation can be preferred to foam therapy. Surgery should be preferred in terms of failure. O'Hare et al. (2008) reported a 204 leg study that included 67 stripping of small saphenous varicose vein and found that the recurrence rate of reflux after stripping was 18% and 24% after saphenopopliteal junction ligation without any statistical significance. No difference was found in terms of paresthesia between stripping and ligation of saphenopopliteal junction (O'Hare et al., 2008). They concluded that the recurrence rate after stripping and ligation of saphenopopliteal junction were 13% and 32%, respectively ($P < 0.01$) (O'Hare et al., 2008). They thought that stripping reduced the recurrence of reflux (O'Hare et al., 2008). Our perioperative complication rates were found lower rather than the literature. In addition, stripping of the small saphenous vein is thought to be dangerous due to the potential injury of sural nerve during surgery (O'Hare et al., 2008). On contrast, no sural nerve injury was observed in our study. We found reasonable mid-term results in our study. Park (2017) reported that VenaSeal system was found to be safe and efficient for the treatment of reflux of small saphenous vein with 100% patient's satisfaction. The postoperative rate of phlebitis ranged was found 11.4% to 20% by Park (2017). In contrast to the previous study we did not observe any phlebitis. Phlebitis was thought to be due to foreign body or allergic reaction (Park, 2017). Park (2017) reported that no nerve injury was found after glue ablation so does we (Park, 2017).

This study has a number of limitations worth noting. First, we conducted a retrospective study. Second, the number of patients, which were included in our study, may seem relatively small compared to other studies. Third, it's a single-center design. Fourth, perforating veins were not assessed. Confirmation of our findings will require randomized controlled prospective studies.

Conclusion

In this study, we found that glue ablation with cyanoacrylate closure was found superior results in early term however; no difference was noted on the mid-term result. To sum up, both glue ablation with cyanoacrylate closure and endovenous thermal ablation with radio frequency under either local or tumescent anesthesia can be easy, safely and effectively performed with satisfactory results.

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