CASE REPORT

A rare complication of endovenous laser ablation: intravascular laser catheter breakage

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SUMMARY

During endovenous laser ablation, which is performed as an alternative to surgery for the treatment of superficial venous insufficiency of lower extremity and associated varicose veins, it was realised that the distal end of the catheter protecting the fibre sheared off; the retained catheter fragment in the saphenous vein was removed by a mini incision. Herein, we aim to present a rare complication of endovenous laser ablation.

BACKGROUND

Varicose veins of the lower extremity that are developed because of chronic venous insufficiency (CVI) are a common health problem.¹ Varicose veins may either be asymptomatic or cause serious symptoms. Varicose veins of the lower extremity may lead to pain, itching, burning, tingling, night cramps and oedema, as well as skin changes and venous ulcers in chronic cases. Varicose veins of the lower extremity also limit the daily activities of individuals and cause loss of time and workforce.² In the past, surgery was the primary treatment for superficial venous insufficiency and varicose veins. Nowadays, vein stripping is not performed routinely and supplemented by an endovenous laser ablation (EVLA) of varicose veins secondary to saphenofemoral junction (SFJ) insufficiency.³ Recently, EVLA, radiofrequency ablation (RFA) and foam sclerotherapy are being used as alternatives to surgery in the treatment of superficial venous insufficiency.⁴ Among these minimally invasive methods with low complication rates, EVLA, in particular, is the most current method. Herein, we aimed to present a rare complication during EVLA procedure, which was catheter breakage in the saphenous vein.

CASE PRESENTATION

EVLA was planned to be performed in a 32-year-old female patient owing to enlarged vena saphena magna (VSM) and reflux in the SFJ. EVLA was performed using a diode laser source (Biolas—15D) with a wavelength of 980 nm and a power of 12 W by an experienced cardiovascular surgeon. The saphenous vein, in which reflux was detected, was accessed via percutaneous route from the caudal aspect, which was appropriate for treatment, using a 21 gauge (G) needle under local anaesthesia and ultrasound (US) guidance. Tumescant anaesthetic solution, which was prepared using 20 ml of 2% prilocaine, 500 ml serum physiological (+4°C), 20 ml of 8.4% sodium bicarbonate and 0.5 mg adrenalin, was administered around the saphenous vein using 19–21 G needles under US guidance. Before

administration of tumescant local anaesthesia, a bare-tip laser fibre, which was attached to the 980 nm diode laser source, was advanced through the catheter and placed at a distance of 1.5 cm from the SFJ under US guidance. Laser energy, being higher at the regions close to the SFJ, was delivered in the pulsed mode (0.2 s intervals) by adjusting the laser parameters (12 W, withdrawal speed of 1.2–1.8 mm/s) according to the vessel diameter and depth of the saphenous vein from the skin. At the end of the laser procedure, approximately a 7 cm distal segment of the catheter was observed to be missing.

INVESTIGATIONS

Control superficial US revealed that the 7 cm catheter segment was at the level of the SFJ and approximately 2 cm segment was in the femoral vein (figure 1). Accessing through a mini right femoral incision, the saphenous vein was suspended at the level of SFJ and catheter segment was removed as one piece by saphenectomy (figure 2).

OUTCOME AND FOLLOW-UP

The patient was monitored for 24 h in the clinic. She was discharged, as she did not develop any additional problems. On control colour Doppler US performed 1 month after discharge, the saphenous vein was observed to be completely occluded and fibrotic.

DISCUSSION

CVI and associated varicose veins of the lower extremity are important clinical conditions in terms of socioeconomic outcomes, which may significantly affect a patient's quality of life.¹ Surgery is performed under either general or spinal anaesthesia. It approximately takes 2–3 weeks for the patients to return to their normal activities after surgery. Moreover, surgical treatment has potential complications including nerve injury, wound infection, bleeding, superficial thrombophlebitis, haematoma, deep vein thrombosis (DVT) and pulmonary embolus.² Recently, surgery has been replaced by EVLA, RFA and foam sclerotherapy for the treatment of CVI and associated varicose veins in most cases.⁵ In their meta-analysis, Van den Bos *et al*⁶ reviewed 119 studies, assessed 12 320 limbs, and reported success rates to be 78% with classical surgical stripping, 77% with foam sclerotherapy, 84% with RFA and 94% with EVLA. Van den Bremer *et al*⁷ performed EVLA in 323 patients (403 limbs) and determined complete occlusion by 93.7%, partial occlusion by 4% and recanalisation by 2.3% in the VSM 6 weeks after the operation.

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Figure 1 Grey scale ultrasonography shows broken catheter segment in the saphenous vein (arrow).

They reported that EVLA is an effective, safe and easily applicable method, and well accepted by patients in the treatment of VSM refluxes.⁷ Theivacumar *et al*⁸ performed EVLA in 644 limbs and reported complete occlusion in the VSM in 599 (93%) limbs within a 3-month follow-up period; complications such as transient thrombophlebitis by 10.2%, paraesthesia by 1.1% and DVT by 0.2% were also reported. To the best of our knowledge, laser catheter fragmentation has not been reported in the comprehensive literature of EVLA series. In another study by Van den Boss *et al*,⁹ laceration in the saphenous vein caused by laser fibre was reported as a serious complication. EVLA is successfully performed in our clinic, and we obtain clinical outcomes and complication rates consistent with the literature. We are in the opinion that breakage of the catheter in the present case resulted from thermal injury after a few initial pulses, probably owing to sliding of the fibre in the catheter during locking. Realising that the distal segment of the catheter was missing at the end of the procedure, we observed the catheter segment in the saphenous vein. Thereafter, the catheter segment in the saphenous vein was removed by a mini incision. Because, if the broken catheter segment is left in the saphenous vein, it may cause some serious complications such as vein thrombosis, migration of the catheter

to the heart, bacterial endocarditis, pancarditis and sepsis.¹⁰ Theivacumar *et al*¹¹ reported arteriovenous fistula as a rare complication after EVLA in three patients. Agus *et al*¹² performed EVLA in the saphenous veins of 1076 limbs of 1050 patients using 810 nm and 980 nm diode laser devices and detected complete occlusion by 97% in a 3-year follow-up period but reported no major complication. Despite this complication observed in our clinic, we think that EVLA is a minimally invasive, effective and safe method with successful outcomes. We are also in the opinion that EVLA would considerably substitute for traditional surgical procedures in the treatment of superficial venous insufficiency and associated varicose veins in the near future.

Learning points

- ▶ Catheter fragmentation complication may be encountered even if it is very rare. A total of 500 endovenous laser ablation procedures were performed in our clinic in the 3 years. Among those cases, laser catheter fragmentation was seen just in one case. Frequency of laser catheter fragmentation was 0.2% in our clinic.
- ▶ If the broken catheter segment is left in the saphenous vein, it may cause some serious complications such as vein thrombosis, migration of the catheter to the heart, bacterial endocarditis, pancarditis and sepsis.
- ▶ Broken catheter segment should be localised with superficial ultrasonography and removed by mini incision.

Contributors OB and MFI were involved in conception and design. OB and BM drafted the manuscript. OB, MFI and EE revised it for intellectual content. OB, BM, MFI and EE were involved in the final approval of the completed article.

Competing interests None.

Patient consent Obtained.

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Figure 2 Broken catheter segment.

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