Case Report

Venography and Selective Ablation for Recurrent Varices after Surgery Using Radiofrequency Ablation Catheter

Yusuke Enta,1 Makoto Saigan,1 Akiko Tanaka,1 Masaki Hata,2 and Norio Tada1

1Department of Cardiovascular Internal Medicine, Sendai Kousei Hospital, Sendai, Miyagi, Japan
2Department of Cardiovascular Surgery, Sendai Kousei Hospital, Sendai, Miyagi, Japan

Correspondence should be addressed to Yusuke Enta; y.enta0414@icloud.com

Received 8 October 2020; Revised 20 February 2021; Accepted 1 March 2021; Published 11 March 2021

Academic Editor: Hiroyuki Nakajima

Copyright © 2021 Yusuke Enta et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Recurrent varices after surgery (REVAS) is a common problem with no established treatment. Ultrasonography is a hard method to identify the source of veins that cause REVAS, especially in obese patients with thick thighs. Herein, we report the case of an obese patient with REVAS whose original veins were unclear on ultrasonography. The patient successfully underwent endovenous thermal ablation (EVTA) for target veins using the venography and selective ablation (VSA) technique with a radiofrequency (RFA) catheter. The steps taken for VSA technique are presented in Figure 1. The patient with REVAS had a history of surgery for varicose veins due to great saphenous vein (GSV) insufficiency (Figure 1(a)). The patient was put in Fowler’s position. We used a ClosureFAST™ (originally manufactured by VNUS Technologies Inc, California, USA, now by Medtronic, USA) RFA catheter. The RFA catheter had a lumen and could accordingly introduce the 0.025-inch wire to select and cross the target vein, advance the catheter over the wire, and flush a contrast agent from the lumen. The contrast agent was diluted 5 times with saline. We introduced the sheath to the axial vein at the knee and performed venography to identify the original veins associated with REVAS (Figure 1(b)). Thereafter, we confirmed the presence of reflux in the perforator through ultrasonography. The wire was crossed to the femoral vein (FV) via the IPVs under venography and fluoroscopy guidance (Figure 1(c)). The RFA catheter was advanced over the wire to the FV (Figure 1(d)), after which the wire was pulled out. We slowly withdrew the RFA catheter and adjusted its tip to the border between FV and the perforator vein, while contrasting from the catheter lumen (Figure 1(e)). We performed tumescent local anesthesia (TLA) under ultrasonography guidance, ablated the target vein selectively, and finally pulled the catheter and sheath out.
(Figure 1(f)). This procedure was performed by cardiovascular physicians at a catheterization laboratory. We performed this technique with local anesthesia and mild sedation.

2. Case Presentation

A 64-year-old female (height: 155 cm, weight: 120 kg, BMI: 50 kg/m², and thigh circumference: 78 cm) with hypertension and type two diabetes mellitus presented in November 2017 with right-leg recurrent varicose veins, swelling of the ankle, pigmentation, and a history of right lower thigh venous ulceration (clinical, etiological, anatomical, and pathological clinical classification C5EpApPTPVr [7]). Her medications were a calcium blocker, an angiotensin converting enzyme inhibitor, and insulin. Previously, in 2010, she had presented with symptomatic varicose veins in the same leg. Ultrasonography had shown reflux in her right GSV without reflux in other veins. She underwent EVTA for her GSV and stab phlebectomy for the surface varicosities at another hospital. She had worn elastic stockings after the first procedure, but she stopped wearing it since 2012. In 2017, she presented with a 1-year history of recurrent varicose veins in her leg. Ultrasonography showed the previously ablated GSV had atrophied. There appeared to be reflux in her axial vein at the knee, but the source of the recurrent varicose veins from the ultrasonography assessment was unclear due to her thick thighs. Therefore, we performed venography to identify the source of REVAS. Venography showed the IPV connected to her axial vein (Figures 2(a) and 2(b)), and thereafter, ultrasoundography confirmed the reflux in the IPV. Therefore, we decided to ablate the IPV which caused the REVAS. We crossed a 0.025 wire from axial vein to the FV (Figure 2(c)) and advanced RFA catheter to the FV over the wire (Figure 2(d)). We withdrew the RFA catheter and adjusted its tip to the border between FV and IPV, while contrasting from the catheter lumen under fluoroscopy guidance (Figures 2(e) and 2(f)). We performed TLA and subsequent ablation from the IPV to the axial vein. The patient was discharged the day after the procedure with no deep vein thrombosis, renal damage, or any other complications. She had worn elastic stockings for a year after the procedure. After 2 years, she continued to have no symptoms, and there had been no recurrence of her varicose veins. Ultrasonography at 1-year and 2-year follow-ups showed that the ablated IPV had atrophied, and there were no deep vein thrombosis and reflux in any veins.

3. Discussion

Venography enabled visualizing the complex communicated veins that caused the REVAS. Selective ablation of the IPV that caused REVAS under the guidance of venography was an effective option in the case of our obese patient.
The venography allowed the complex veins communicated with REVAS to be clearly visible. A common cause of the recurrence, following the treatment of incompetent superficial veins, is IPVs. Perforator veins run near the arteries, but their anatomy is variable. This variability is more evident after significant dilatation and tortuosity caused by insufficiency, and it may render perforator veins difficult for identification through ultrasonography and hard to access by EVTA through ultrasonography assessment [8]. A previous study showed that morbid obesity (body mass index > 50) predicted the failure of perforator closure in all modalities, including USGS and EVTA [9]. It may imply that the ultrasonography images did not provide adequate assessment because the veins were obscured by the patient’s thick thigh. In obese patients, using venography to diagnose the source of the REVAS offered better clarity compared with ultrasound. In absence of ultrasound experts and ultrasonography equipment, venography is a helpful alternative for diagnosing the origin of veins that cause the REVAS. Contrast computed tomography (CT) is useful for assessment of the origin of IPVs as another assessment device, but venography can visualize IPVs by fewer amount contrast agent compared to contrast CT. Moreover, procedural venography enables us to assess vessels in real time.

VSA technique has been suggested as a treatment option for REVAS caused by IPVs. IPVs play an important role in the development of chronic venous sufficiency and ulceration [10, 11]. However, redo surgery to treat REVAS caused by IPVs has not been established because it can be technically challenging, time-consuming, and is associated with a higher risk of complications [12]. As the RFA catheter has a lumen, it is possible to advance the RFA catheter toward the target veins over the wire to the FV (d). The RFA catheter was pulled back and adjusted at the border between the FV and the perforator vein, while contrasting from the catheter lumen (e, f). GSV: great saphenous vein.

4. Conclusion

We successfully performed selective ablation for the IPV causing REVAS using an RFA catheter under venography guidance. Venography was especially effective in obese REVAS patients when assessing the structure of REVAS with ultrasonography was not possible. VSA technique should be
considered a treatment option for the diagnosis and treatment of REVAS.

**Consent**

Written permission was acquired from the patient for publication of photographs.

**Conflicts of Interest**

The authors declare that there is no conflict of interest regarding the publication of this article.

**Acknowledgments**

We would like to thank Keisuke Ishida, Mari Taira, Miki Kon, Aya Kasahara, Yuki Kikuchi, Moe Saito, and medical coworkers at Sendai Kousei Hospital for useful supports.

**References**

[1] L. Jones, B. D. Braithwaite, D. Selwyn, S. Cooke, and J. J. Earnshaw, "Neovascularisation is the principal cause of varicose vein recurrence: results of a randomised trial of stripping the long saphenous vein," *European Journal of Vascular and Endovascular Surgery*, vol. 12, no. 4, pp. 442–445, 1996.

[2] R. J. Winterborn, C. Foy, and J. J. Earnshaw, "Causes of varicose vein recurrence: late results of a randomized controlled trial of stripping the long saphenous vein," *Journal of Vascular Surgery*, vol. 40, no. 4, pp. 634–639, 2004.

[3] S. Dwerryhouse, B. Davies, K. Harradine, and J. J. Earnshaw, "Stripping the long saphenous vein reduces the rate of reoperation for recurrent varicose veins: five-year results of a randomized trial," *Journal of Vascular Surgery*, vol. 29, no. 4, pp. 589–592, 1999.

[4] L. Blomgren, G. Johansson, A. Dahlberg-Åkerman et al., "Recurrent varicose veins: incidence, risk factors and groin anatomy," *European Journal of Vascular and Endovascular Surgery*, vol. 27, no. 3, pp. 269–274, 2004.

[5] N. S. Theivacumar and M. J. Gough, "Endovenous laser ablation (EVLA) to treat recurrent varicose veins," *European Journal of Vascular and Endovascular Surgery*, vol. 41, no. 5, pp. 691–696, 2011.

[6] M. R. Perrin, N. Labropoulos, and L. R. Leon Jr., "Presentation of the patient with recurrent varices after surgery (REVAS)," *Journal of Vascular Surgery*, vol. 43, no. 2, pp. 327–334, 2006, discussion 34.

[7] F. Lurie, M. Passman, M. Meisner et al., "The 2020 update of the CEAP classification system and reporting standards," *Journal of Vascular Surgery. Venous and Lymphatic Disorders*, vol. 8, no. 3, pp. 342–352, 2020.

[8] G. Kuyumcu, G. M. Salazar, A. M. Prabhakar, and S. Ganguli, "Minimally invasive treatments for perforator vein insufficiency," *Cardiovascular Diagnosis and Therapy*, vol. 6, no. 6, pp. 593–598, 2016.

[9] E. Hager, A. Steinmetz, C. B. Washington et al., "Factors that influence immediate perforator vein closure rates with radiofrequency ablation, laser ablation, or foam sclerotherapy," *Journal of Vascular Surgery. Venous and Lymphatic Disorders*, vol. 3, no. 1, p. 125, 2015.