

## Surgical resection for suppurative thrombophlebitis of the great saphenous vein after radiofrequency ablation

Zachary Grady, BS, Matthew Aizpuru, BA, Kevin X. Farley, BS, Jaime Benarroch-Gampel, MD, and Robert S. Crawford, MD, Atlanta, Ga

### ABSTRACT

Radiofrequency ablation has become one of the most commonly used interventions in the treatment of chronic venous insufficiency. It is performed with minimal analgesic use, tolerable postprocedural pain, and prompt return to activities of daily living. Typical complications, though rare, include failure of total venous occlusion, deep venous thrombosis, skin hyperpigmentation, infection, and skin burn. Here, we report the case of a patient who developed suppurative thrombophlebitis with methicillin-resistant *Staphylococcus aureus* bacteremia, requiring surgical resection. (J Vasc Surg Cases and Innovative Techniques 2019;5:532-4.)

**Keywords:** Suppurative thrombophlebitis; Complication; Radiofrequency ablation; MRSA bacteremia

### CASE REPORT

A 67-year-old woman with a history of hypertension and long-standing venous insufficiency presented for a second opinion of an ulcer on the right ankle. The patient had superficial and deep venous insufficiency, long-standing large varicose veins in both lower extremities, bilateral venous hyperpigmentation, and a 2- × 1-inch venous stasis ulcer near the lateral malleolus of the right lower extremity (Clinical, Etiology, Anatomy, and Pathophysiology class 6). She had no prior history of venous intervention. The patient had no history of diabetes, tobacco use, intravenous drug use, or other risk factors for infectious complications. The patient was scheduled for radiofrequency ablation (RFA) as part of a comprehensive plan including compression stockings, rest, elevation, topical antibiotics, and wound dressing changes.

The patient underwent RFA of the right great saphenous vein (GSV) approximately 3 months after her initial evaluation. The procedure was performed in the office under local anesthesia. The sterile field was prepared carefully using chlorhexidine, and the venous ulcer near the lateral malleolus was prepared out of the field. No preoperative antibiotics were given. The medial thigh and calf access sites were accessed using the Seldinger

technique under ultrasound guidance. After placement of tumescent anesthesia along the length of the vein, the GSV was segmentally ablated in 7-cm segments from 2 cm distal to the saphenofemoral junction to the midcalf. Device temperature was maintained at 120°C ± 5°C with an initial power level of 40 W and dropping to below 20 W for each treatment.

A total of seven cycles of RFA were performed, and 350 mL of tumescent anesthesia was used. Ultrasound was performed to confirm successful treatment. Hemostasis was established with direct pressure; the access site was closed with Steri-Strips (3M, St. Paul, Minn) and covered with a compression hose dressing. Compression was applied to the length of the vein (33 cm). No immediate complications or adverse events occurred.

On post-RFA day 6, a lower extremity venous duplex ultrasound scan showed Kabnick class 1 endothermal heat-induced thrombosis of the right GSV to the saphenofemoral junction but not extending into the deep venous system. There was no evidence of deep venous thrombosis bilaterally. Of note, an enlarged lymph node (4.2 × 0.6 cm) was identified in the right groin.

Post-RFA day 13, the patient presented to an outside hospital with fever and presumed cellulitis. Blood cultures were positive for methicillin-resistant *Staphylococcus aureus* (MRSA), and the patient was started on vancomycin. Her symptoms failed to resolve on antibiotics during the subsequent 7 days.

Post-RFA day 21, the patient was transferred to our facility for definitive management. On admission, her right thigh was erythematous and tender. The GSV was palpable and firm. The access site on the medial thigh had dehisced, leaving an approximately 2.0-cm defect without purulent drainage. She had a leukocytosis of 22,000 cells/μL. She was diagnosed with suppurative thrombophlebitis and taken to the operating room for resection of the infected GSV.

In the operating room, a transverse groin incision was made, and we encountered an engorged GSV with severe inflammatory reaction in the surrounding tissue (Figs 1 and 2). The inflammation appeared to extend cephalad into the common femoral

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From the Division of Vascular Surgery and Endovascular Therapy, Department of Surgery, Emory University School of Medicine.

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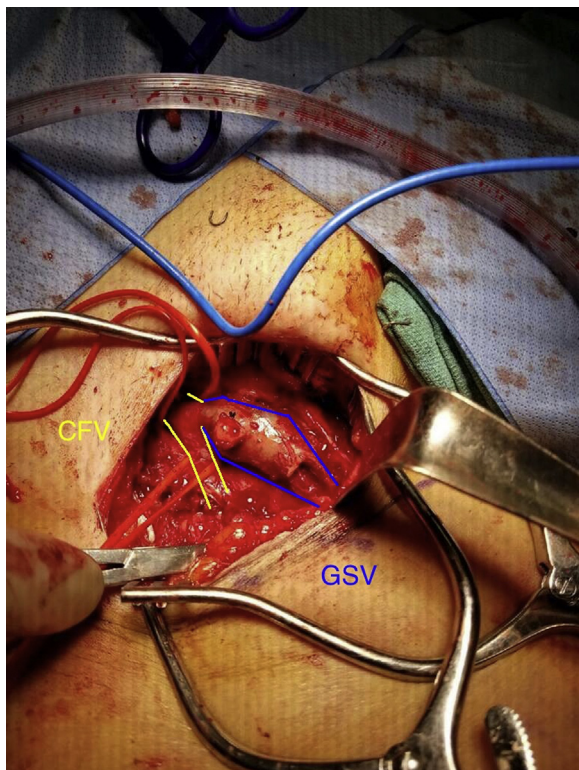
Correspondence: Matthew Aizpuru, BA, Division of Vascular Surgery and Endovascular Therapy, Department of Surgery, Emory University School of Medicine, 100 Woodruff Circle, Atlanta, GA 30322 (e-mail: [mjaizpuru@gmail.com](mailto:mjaizpuru@gmail.com)).

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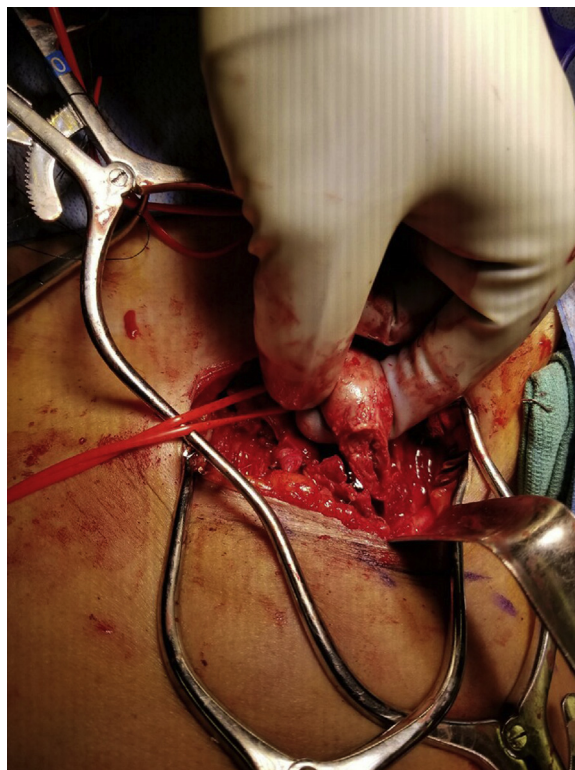
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**Fig 1.** Groin excision showing suppurative thrombophlebitis of great saphenous vein (GSV). Vessel loops are around the common femoral vein (CFV). The distal portion of the GSV has been incised and the infected clot removed.



**Fig 2.** Engorged right great saphenous vein (GSV) being lifted from the field to demonstrate diameter and degree of inflammation/suppuration. The vessel loop is around the common femoral vein. The distal portion of the vein had been transected and the clot excised.

vein and caudally to the midthigh. The inflamed and purulent GSV was transected and resected. After resection of the GSV, it appeared that the common femoral vein was also involved, and a 1-cm segment was resected and reanastomosed primarily with 5-0 Prolene. Two additional incisions, one in the upper thigh and one in the midthigh, were made over the initial RFA access sites. The GSV was ligated distally where it did not appear to be clotted or infected. A sartorius flap was performed to aid with wound healing, and the wound was closed with interrupted nylon sutures; the additional two incisions were left open for dressing changes. Venous thrombosis specimens were sent for culture and returned positive for MRSA. The infectious disease team was consulted, and transthoracic echocardiography was performed the following day, without evidence of endocarditis.

Vancomycin was continued throughout her hospital course. On day 5 after venectomy (post-RFA day 26), she was discharged home with a peripherally inserted central venous catheter line for antibiotics and with instructions to continue compression therapy. On discharge, she was afebrile and had no leukocytosis. At clinic follow-up on days 14 and 21 after venectomy, she had no signs of infection. She continued to follow up with the infectious disease team for management of MRSA. On day 38 after venectomy, she was seen in the vascular surgery clinic for follow-up. At that time, the surgical incision, access sites, and venous ulcer

had all healed. The patient decided not to pursue additional interventions for her venous disease and did not return for any additional office visits.

The patient has agreed to the publication of this case report and the contained images. This study was approved by our Institutional Review Board.

## DISCUSSION

Varicose veins affect approximately 23% of adults in the United States.<sup>1</sup> RFA has become a popular treatment because of decreased postoperative pain, less analgesic administration, and earlier return to activities of daily living compared with surgical ligation and vein stripping.<sup>1</sup> For our patient with venous ulceration, recent data from the Early Venous Reflux Ablation (EVRA) trial suggest that early RFA or endovenous laser therapy is the treatment of choice.<sup>2</sup>

Complications of RFA include recurrence, failure of complete venous occlusion, deep venous thrombosis, hyperpigmentation, skin burn, and infection including superficial thrombophlebitis.<sup>3-6</sup> There has been one previous case of suppurative thrombophlebitis reported after endovenous laser therapy.<sup>7</sup> We believe it is important for physicians to be fully aware of all potential complications of this procedure.

Classically, suppurative thrombophlebitis is the result of venous instrumentation during intravenous drug injection or catheter insertion in critically ill patients.<sup>8-12</sup> Our patient's venous ulcer may have been the source of her MRSA infection. Ulcer tissue culture and antimicrobial prophylaxis could be considered; however, because of the relative rarity of this complication, it is not clear if this is necessary for all patients with venous ulcer undergoing RFA. Even with the best aseptic techniques, there is always a risk of infection with the insertion of a foreign object into the body. In addition, RFA is commonly performed in the office, where sterile technique may not be as stringently maintained as in the operating room. Our case underscores the importance of maintaining sterility throughout the procedure to avoid infectious complications to the extent possible.

Whereas antibiotics alone may be effective in some cases of suppurative thrombophlebitis, this case highlights the importance of surgical excision as a clear, curative therapy. A 2007 systematic review found no evidence for treatment of peripheral suppurative thrombophlebitis outside of case series and case reports.<sup>13</sup> Although some authors have suggested anticoagulation in addition to antibiotics,<sup>14</sup> surgical excision remains the treatment of choice. There are no data to guide the optimal operative strategy for septic thrombophlebitis. Whereas we opted to aggressively treat the patient with an excisional venectomy, it may be reasonable to ligate the vein, to excise the septic thrombus, and to perform quality wound care. For our patient, the infection could not have resolved without adequate source control. Our patient's case can help inform providers of the many specialties performing RFA today about this potentially life-threatening complication of RFA that requires prompt vascular surgery consultation.

## CONCLUSIONS

This case highlights the importance of surgical excision for suppurative thrombophlebitis after RFA. This life-threatening complication of RFA could not be treated with antibiotics alone. To avoid this complication,

precautions should be taken to maintain sterility during RFA; prophylactic antibiotics for patients with venous ulcers could be considered.

## REFERENCES

1. Hamdan A. Management of varicose veins and venous insufficiency. *JAMA* 2012;308:2612-21.
2. Gohel MS, Heatley F, Liu X, Bradbury A, Bulbulia R, Cullum N, et al. A randomized trial of early endovenous ablation in venous ulceration. *N Engl J Med* 2018;378:2105-14.
3. Hingorani AP, Ascher E, Markevich N, Schutzer RW, Kallakuri S, Hou A, et al. Deep venous thrombosis after radiofrequency ablation of greater saphenous vein: a word of caution. *J Vasc Surg* 2004;40:500-4.
4. Wozniak W, Mlosek RK, Ciostek P. Complications and failure of endovenous laser ablation and radiofrequency ablation procedures in patients with lower extremity varicose veins in a 5-year follow-up. *Vasc Endovascular Surg* 2016;50:475-83.
5. Molloy IB, Martin BI, Moschetti WE, Jevsevar DS. Effects of the length of stay on the cost of total knee and total hip arthroplasty from 2002 to 2013. *J Bone Joint Surg Am* 2017;99:402-7.
6. Puggioni A, Kalra M, Carmo M, Mozes G, Glociczki P. Endovenous laser therapy and radiofrequency ablation of the great saphenous vein: analysis of early efficacy and complications. *J Vasc Surg* 2005;42:488-93.
7. Dunst KM, Huemer GM, Wayand W, Shamiyeh A. Diffuse phlegmonous phlebitis after endovenous laser treatment of the greater saphenous vein. *J Vasc Surg* 2006;43:1056-8.
8. Stein JM, Pruitt BA Jr. Suppurative thrombophlebitis. A lethal iatrogenic disease. *N Engl J Med* 1970;282:1452-5.
9. Irish C, Maxwell R, Dancox M, Brown P, Trotter C, Verne J, et al. Skin and soft tissue infections and vascular disease among drug users, England. *Emerg Infect Dis* 2007;13:1510-1.
10. Fah F, Zimmerli W, Jordi M, Schoenenberger RA. Septic deep venous thrombosis in intravenous drug users. *Swiss Med Wkly* 2002;132:386-92.
11. Ang AK, Brown OW. Septic deep vein thrombosis. *J Vasc Surg* 1986;4:563-6.
12. Hammond JS, Varas R, Ward CG. Suppurative thrombophlebitis: a new look at a continuing problem. *South Med J* 1988;81:969-71.
13. Falagas ME, Vardakas KZ, Athanasiou S. Intravenous heparin in combination with antibiotics for the treatment of deep vein septic thrombophlebitis: a systematic review. *Eur J Pharmacol* 2007;557:93-8.
14. Verghese A, Widrich WC, Arbeit RD. Central venous septic thrombophlebitis—the role of medical therapy. *Medicine (Baltimore)* 1985;64:394-400.

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