Nodules developing after radiofrequency ablation of varicosities: A potential clinical and histopathologic mimic of polyarteritis nodosa

Matthew F. Helm, MD,[a] Abigail I. Franco, MD,[b] Bryan E. Anderson, MD,[a] Klaus F. Helm, MD,[a] and Todd Cartee, MD[a]
Hershey, Pennsylvania and Syracuse, New York

Key words: polyarteritis nodosa; radiofrequency ablation; sclerotherapy; varicosities.

INTRODUCTION

Endothermal ablation is the standard of care for symptomatic saphenous reflux. This minimally invasive treatment uses thermal energy to produce irreversible damage to the vein wall, complete venous occlusion, and eventual fibrosis. We report on a woman in whom multiple regional subcutaneous nodules developed shortly after radiofrequency ablation (RFA) of her great saphenous veins. The clinical and biopsy findings mimicked cutaneous polyarteritis nodosa (PAN). Extensive laboratory evaluation failed to find evidence of systemic involvement. We bring this interesting and uncommon phenomenon to the attention of pathologists and clinicians to facilitate accurate and timely diagnosis.

Abbreviations used:

HBV: hepatitis B virus
PAN: polyarteritis nodosa
PDL: pulsed dye laser
RFA: radiofrequency ablation

CASE

A 46-year-old nurse with a history of hypothyroidism presented for evaluation of persistent tender nodules on her lower legs. Five months prior, she had undergone RFA of her bilateral great saphenous veins on 3 separate visits over 3 weeks' time. No associated sclerotherapy or microphlebectomy was performed. Tender and erythematous nodules developed on the lower legs distal to the areas of ablation within days of each treatment. She denied systemic symptoms such as fever, weight loss, or abdominal pain. Empiric treatment for suspected infection with oral trimethoprim/sulfamethoxazole, cephalexin, and topical bacitracin did not result in improvement. Oral prednisone led to some relief of symptoms and diminution of lesions, but her skin lesions persisted and worsened once her oral corticosteroid taper was complete.

Examination found scattered pink and tender indurated 1- to 2-cm nodules on the bilateral lower legs, most noticeably on the right medial lower leg (Fig 1). Biopsy found inflammation involving the wall of a medium-sized vessel at the dermal-subcutaneous junction (Fig 2). There was inflammation immediately around blood vessels but no diffuse lobular inflammation indicative of erythema induratum (nodular vasculitis). Tissue culture for fungal, mycobacterial, and aerobic organisms were negative. Thorough duplex ultrasound examinations of the legs found changes of prior venous ablation but were negative for superficial or deep venous thrombosis. A diagnosis of PAN was suspected, but findings of laboratory studies including erythrocyte sedimentation rate, comprehensive metabolic panel, complete blood count, C3, C4, anti-neutrophil cytoplasmic antibodies, hepatitis B virus (HBV), and hepatitis C virus antibodies were unremarkable.

Her lesions have improved with a 3-week prednisone taper, meloxicam, and the use of compression stockings. She subsequently opted to undergo

From the Department of Dermatology, Penn State Health Hershey Medical Center[a] and the Upstate Medical University.[b]
Funding sources: None.
Conflicts of interest: None disclosed.
Correspondence to: Matthew F. Helm, MD, Penn State Health Hershey Medical Center, 500 University Drive HU14, Hershey, PA 17033. E-mail: mhelm2@pennstatehealth.psu.edu.

JAAD Case Reports 2018;4:814-6.
2352-5126

https://doi.org/10.1016/j.jdcr.2018.03.029

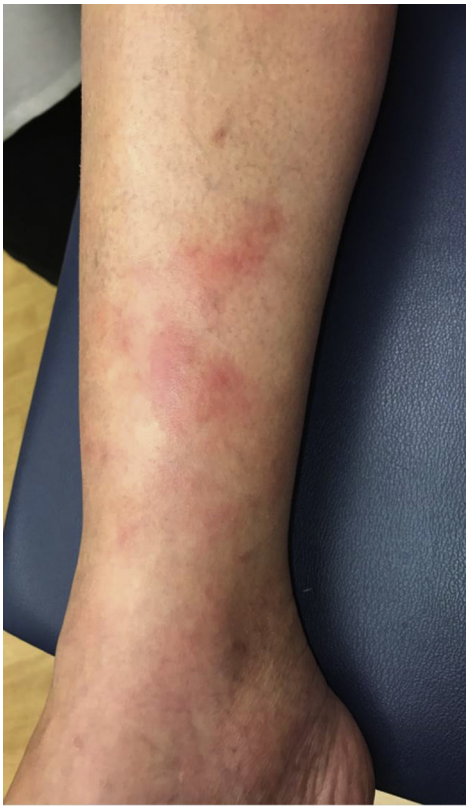

Fig 1. Tender 6-mm pink nodules on the medial right lower leg following the course of a superficial vein.

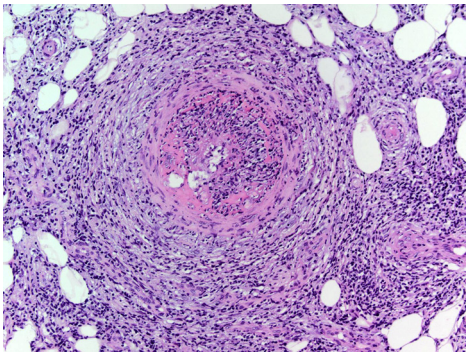

Fig 2. Transmural inflammation of a medium-sized blood vessel. (Hematoxylin-eosin stain; original magnification: ×200.)

pulsed dye laser (PDL) treatment for matted telangiectasia with no additional complications. Her legs improved after PDL treatment (Figs 3 and 4).

DISCUSSION

The development of subcutaneous nodules along blood vessels raises clinical suspicion for PAN. PAN is a systemic necrotizing vasculitis that affects medium-sized blood vessels.[1,2] PAN can impact virtually any organ, but skin involvement is most common.

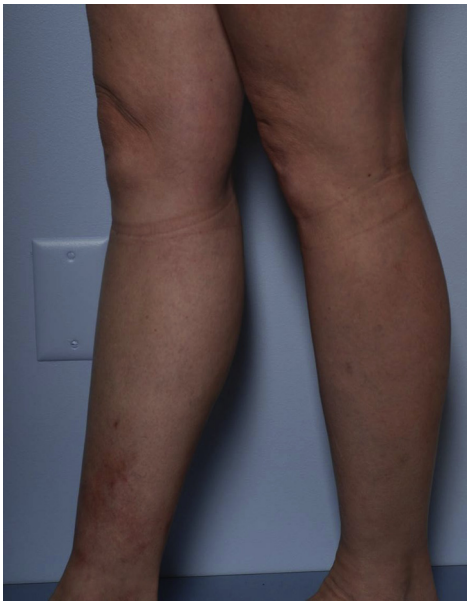

Fig 3. Matted telangiectasia on the right medial leg.

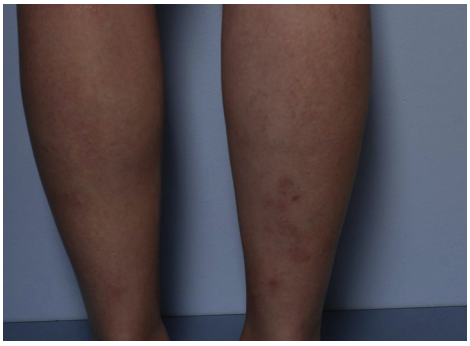

Fig 4. Matted telangiectasia on the right posterior calf, while sparing the left posterior calf.

Variants of PAN include single-organ PAN and cutaneous PAN, which lacks the systemic involvement associated with generalized disease. Although most cases of PAN are idiopathic, PAN has been reported in association with viral infections, antigen stimulation, and HBV infection.[1] Circulating immune complexes have been implicated in hepatitis B–associated PAN, but the role of immune complexes in other forms of the disease remains uncertain.[1] Current reports indicate that PAN is best considered a spectrum of disorders that range from an inherited form associated with mutations in adenosine deaminase 2, necrotizing vasculopathy associated with HBV, and vasculitis precipitated by other etiologies.[2]

Biopsy is helpful in diagnosis, but the pattern of elastic deposition in vessel walls and the pattern of inflammation in PAN can be seen in overlap with thrombophlebitis.[3,4] Considering the histopathologic

features along with the clinical scenario is essential for correct diagnosis.[4]

The nodules in our patient developed distal to access sites for her RFA. Interestingly, her left posterior calf was almost completely spared, whereas multiple nodules were present on the right calf in the distribution of the right small saphenous but not left small saphenous RFA (Fig 4). The clinical and pathologic findings in our patient indicate that RFA may have initiated regional vascular injury that stimulated an immune response mimicking cutaneous PAN. Although we theorize that tissue damage may have contributed to local immune complex deposition, C3 levels were normal as were other measures of systemic inflammation.

A diagnosis of superficial thrombophlebitis was considered, but the localization distal to ablation sites, the persistence of lesions for more than 6 months, and negative multiple ultrasound scans devoid of thrombosis in the superficial and deep veins provided compelling evidence against a diagnosis of thrombophlebitis. Further study is warranted to determine the pathogenesis of the findings we encountered. We want to alert clinicians that may encounter this phenomenon that a benign clinical course can be expected.

REFERENCES

1. Forbess L, Bannykh S. Polyarteritis Nodosa. *Rheum Dis Clin North Am*. 2015;41(1):33-46.
2. Ozen S. The changing face of polyarteritis nodosa and necrotizing vasculitis. *Nat Rev Rheumatol*. 2017;13(6):381.
3. Chen KR. The misdiagnosis of superficial thrombophlebitis as cutaneous polyarteritis nodosa: features of the internal elastic lamina and the compact concentric muscular layer as diagnostic pitfalls. *Am J Dermatopathol*. 2010;32(7):688-693.
4. Hall LD, Dalton SR, Fillman EP, Dohse L, Elston DM. Re-examination of features to distinguish polyarteritis nodosa from superficial thrombophlebitis. *Am J Dermatopathol*. 2013;35(4):463-471.