

Thrombotic vasculopathy due to polymer coating emboli after an endovascular procedure



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INTRODUCTION

Over the past decade, there has been a rise in the use of lubricious polymer-coated devices by interventional cardiologists and vascular surgeons to facilitate access to vasculature and for assistance in placement of endovascular devices.¹ These devices enable a less invasive technique for common endovascular procedures. Some drug-eluted variants of polymer devices have the added benefit of releasing a sustained amount of targeted therapeutic agents, while reducing systemic complications.² However, a significant adverse event associated with polymer-coated devices includes coating separation during endovascular manipulation and subsequent embolism formation.³ Hydrophilic polymer emboli are an underreported iatrogenic cause of ischemia and infarct.^{4,5} Diagnosis may be challenging, as the associated vasculitis may histologically mimic granulomatous vasculitis.⁶ Additionally, this thrombotic vasculitis/vasculopathy may be an early presenting symptom and a cutaneous sign of embolization to other vital internal organs. Thus, early diagnosis is crucial in order to support patients and potentially prevent morbidity and mortality. This case demonstrates the cutaneous manifestations associated with polymer coating embolism after an endovascular procedure.

CASE DESCRIPTION

An 81-year-old man was admitted to the hospital with a 2-day history of a painful eruption on both lower extremities. His past medical history was significant for hypertension, atrial fibrillation,

coronary artery disease, chronic renal disease, and chronic obstructive pulmonary disease. The patient underwent endovascular repair of an abdominal aortic aneurysm with a polymer-coated endovascular device two weeks prior to presentation. He was discharged but readmitted for shortness of breath, abdominal pain, and skin changes. On further work up, he was found to have embolization of the right hypogastric nerve. Arterial Doppler ultrasound revealed stenosis of the bilateral anterior and posterior tibial arteries and the left dorsalis pedis artery, leading to a suspicion of embolization.

Physical exam was notable for painful violaceous, retiform macules and patches on both feet (Fig 1, A) and erythematous purpuric macules on both lower extremities, which were more prominent on the left lower extremity (Fig 1, B). The clinical differential diagnosis included cholesterol emboli, other causes of thrombotic or embolic events, and cryoglobulinemia type I. A punch biopsy of the left lower extremity was performed and revealed a serpiginous and amorphous basophilic material within the dermal blood vessels, focally associated with multinucleated histiocytes and extravasated erythrocytes in the dermis (Fig 2). These findings were consistent with a diagnosis of polymer coating emboli.

DISCUSSION

Since the 1980's, there has been a rise in the use of lubricious, hydrophilic, polymer-coated devices by interventional cardiologists and vascular surgeons to facilitate access to vasculature and for assistance in placement of endovascular devices.¹ Hydrophilic

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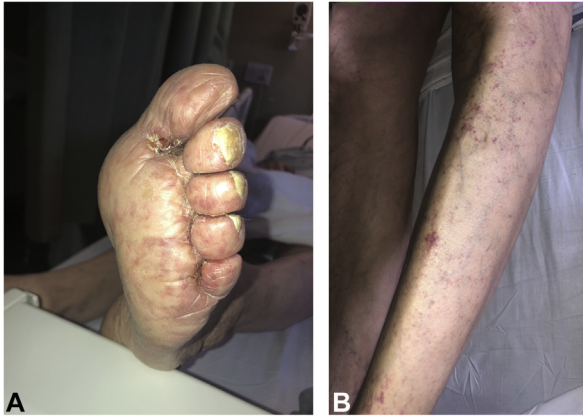


Fig 1. Clinical images. **A**, Physical exam was notable for violaceous, retiform, patches on the left foot. **B**, Erythematous purpuric macules were evident on the left proximal and distal leg.

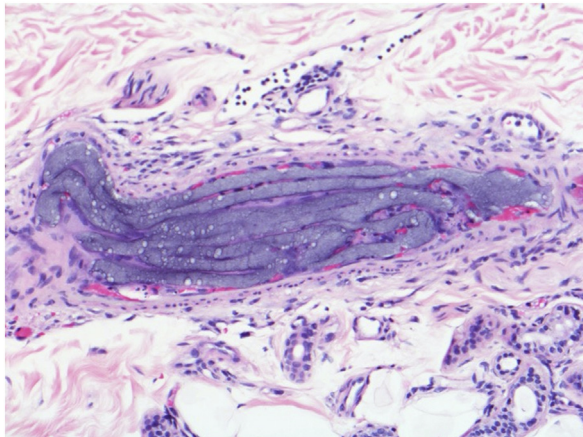


Fig 2. A punch biopsy demonstrated intravascular serpiginous and basophilic material (Hematoxylin-eosin stain; original magnification, $\times 200$.)

polymers are often used to coat vascular medical devices, as they reduce friction and ease navigation of devices into tortuous vessels. However, it has been noted that rupture, separation, and migration of the coating can result in adverse events.² Hydrophilic polymer emboli are an underreported iatrogenic cause of end-organ ischemia and infarcts.² The clinical presentation most classically involves sudden onset of nonpalpable, purpuric macules and patches, livedo reticularis, and painful nonhealing ulcers or nodules.³ The lesions are most often distributed on the lower extremities.^{3,7} Cutaneous manifestations of polymer coating emboli may occur within hours up to nine days following an intravascular procedure.³ Diagnosis may be challenging, as the associated vasculitis histologically can mimic

granulomatous vasculitis. Histologically, polymer coating emboli may exhibit a lamellated, finely granular, and basophilic serpiginous-like morphology on hematoxylin-eosin staining, similar to the current case.⁸ In a case series, eosinophilic polymer coating was rarely noted.⁸ However, biologic reactions have been shown to occur, including aggregation of foreign-body giant cells and neutrophils. Another key histologic finding may be embedment into vascular structures.⁹

Treatment is most often supportive; however, corticosteroids, antiplatelet agents, and surgical resection of necrotic wounds have been used.³ Early diagnosis is crucial, as cutaneous manifestations may serve as early signs of embolization to other vital internal organs, as in our current case, in which renal and hypogastric nerve involvement was observed. Embolization to the brain, heart, and lungs have been reported in up to 13% of all cases of polymer coating emboli, which may have dire consequences.⁴ Early recognition and familiarity with this underreported form of embolic process is important and must be considered in the appropriate clinical setting.

Conflicts of interest

None disclosed.

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