

Editorial

Unveiling a hidden complication: Vascular occlusion from repeated arterial punctures in percutaneous interventions

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Dear Editor,

The increasing prevalence of percutaneous interventions, driven by advances in interventional cardiology and endovascular procedures, has revolutionized the management of cardiovascular diseases [1]. However, as the frequency of these procedures rises, so does the recognition of their associated complications. Among these, arterial puncture-induced vascular occlusion is emerging as a critical concern, particularly in patients undergoing repeated interventions [2].

A 41-year-old female patient with peripheral artery disease had undergone repeated peripheral angiographic procedures via the right femoral artery. During another peripheral angiographic procedure performed through the right femoral artery, the patient developed acute limb ischemia due to occlusion in the right common femoral artery (Figure 1a). Despite multiple peripheral endovascular interventions, the occlusion could not be resolved. The patient was urgently taken to surgery. The right femoral region was explored, and the common femoral artery was exposed. The artery appeared traumatized (Figure 1b). Arteriotomy revealed occlusion caused by thrombus and intimal hyperplasia (Figure 1c). The thrombus and occlusive plaques were removed. Subsequently, multiple arterial wall injuries were observed on the posterior wall of the common femoral artery, likely due to repeated arterial punctures (Figure 1d). The damaged arterial segment was excised, and arterial continuity

was restored using a saphenous vein graft along with patch plasty (Figure 1e). Postoperatively, the patient's acute arterial ischemia resolved successfully.

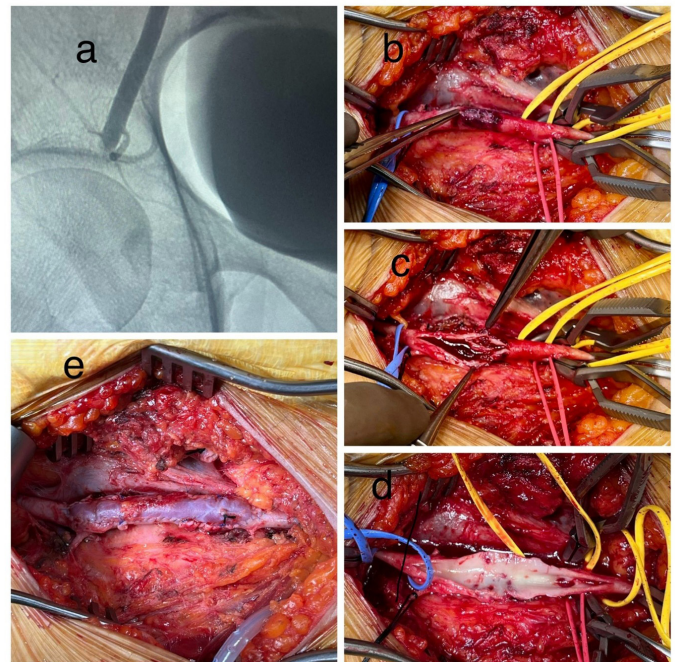


Figure 1. Preoperative and operative images

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Pathophysiology and Mechanisms

Arterial punctures during percutaneous interventions are a cornerstone of vascular access, but they inherently disrupt the integrity of the arterial wall. Repeated punctures in the same anatomical location—commonly the femoral or radial artery—lead to cumulative endothelial injury, local inflammation, and subsequent intimal hyperplasia. Over time, this repetitive trauma can predispose the artery to thrombosis, stenosis, or occlusion. Moreover, these structural changes may impair arterial compliance, exacerbate local ischemia, and increase the likelihood of further interventions, perpetuating a vicious cycle.

Clinical Implications

Vascular occlusion due to repeated arterial punctures often presents insidiously. Patients may develop symptoms of distal ischemia, claudication, or even critical limb ischemia. In some cases, the occlusion is identified incidentally during follow-up imaging. This complication is particularly relevant in high-risk populations, such as those with diabetes, peripheral arterial disease, or previous vascular interventions, where arterial health is already compromised [3].

Prevention and Management

Addressing this issue requires a multipronged approach:

- 1. Alternative Access Sites:** Diversifying access routes, such as alternating between radial and femoral arteries or utilizing the contralateral side, can minimize repetitive trauma to a single site.
- 2. Ultrasound Guidance:** The routine use of ultrasound can ensure optimal puncture site selection and reduce unnecessary damage to the vessel wall.
- 3. Arterial Closure Devices:** Proper closure of the access site can promote vascular healing and reduce long-term complications.
- 4. Vigilant Monitoring:** Regular follow-up with non-invasive imaging techniques, such as duplex ultrasonography or CT angiography, can help detect early signs of arterial occlusion.

- 5. Novel Therapeutics:** Advances in pharmacology, including the use of anti-inflammatory agents and anti-proliferative drugs, may mitigate the risk of intimal hyperplasia.

Conclusion

Arterial puncture-related vascular occlusion represents an underappreciated but significant complication of repeated percutaneous interventions. As the global burden of cardiovascular diseases continues to grow, it is imperative to balance the benefits of these life-saving procedures with the long-term vascular health of patients. Greater awareness, improved procedural strategies, and ongoing research are essential to mitigate this emerging cause of vascular occlusion and optimize patient outcomes.

This editorial aims to highlight the importance of recognizing arterial puncture-related complications and calls for a collaborative effort among clinicians, interventionalists, and researchers to address this evolving challenge.

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