

Iatrogenic femoral vein pseudoaneurysm

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ABSTRACT

Femoral vein pseudoaneurysm is a rare complication during percutaneous interventions. We report the case of a patient with common femoral vein pseudoaneurysm caused by unsuccessful manual compression. A 68-year-old woman underwent catheter ablation for atrial fibrillation at another institution. Postoperatively, she experienced right groin pain and leg edema. Doppler ultrasound examination revealed a 2-cm venous pseudoaneurysm as a compressible and hypoechoic lesion. We successfully performed venous aneurysmectomy after failed ultrasound-guided compression therapy. Appropriate procedures must be selected for patients with femoral pseudoaneurysm. The efficacy of hemostatic techniques for preventing vascular complications after venous sheath removal should not be underestimated. (*J Vasc Surg Cases and Innovative Techniques* 2020;6:285-7.)

Keywords: Femoral vein; Femoral artery; Pseudoaneurysm; Venipuncture; Catheterization

Femoral vascular complications, including hematoma, infection, arterial pseudoaneurysm, arteriovenous fistula, thrombosis, and nerve injury, are frequently noted after percutaneous interventions.¹ Fewer postoperative complications are reported with the femoral vein than those with the femoral artery. To the best of our knowledge, only two cases of femoral vein pseudoaneurysm (FVP) have been reported in half a century^{2,3}; however, femoral venipuncture and sheath insertion can cause pseudoaneurysms. Our case is rare and interesting because only venous injury and pseudoaneurysm formation were noted in our patient, with no arterial injury. Hence, we report a case of FVP after catheter ablation.

Written informed consent was obtained from the patient for publication of this case report and accompanying images. The need for obtaining ethical review board approval was waived.

CASE REPORT

A 68-year-old woman underwent catheter ablation for atrial fibrillation at another institution. B-mode ultrasound revealed her preoperative common femoral vein had normal diameter and no abnormal blood varices. Three 8F sheaths were introduced in the right common femoral vein. Manual compression for 10 minutes and compression bandage for 3 hours was used after sheath removal. After discharge, she developed groin pain on postoperative day 7 and a gradual swelling of her right

thigh. Those symptoms worsened gradually, and she was referred to our hospital on postoperative day 12. Her medical history included persistent atrial fibrillation. She took apixaban regularly. Physical examination revealed edema in the right lower extremity and swelling of the right thigh. The coagulation screen was normal. B-mode ultrasound examination revealed a 2-cm compressible and hypoechoic lesion. Color Doppler ultrasound examination showed blood inflow from the femoral vein to the lesion that had no internal hematoma (Fig 1). We diagnosed the patient with FVP. We performed ultrasound-guided compression therapy (UGCT) for the pseudoaneurysm without stopping anticoagulation owing to the risk of embolism owing to atrial fibrillation and venous thrombosis. The neck of the pseudoaneurysm was compressed using a transducer for 30 minutes and compression bandage for 16 hours. Ultrasound examination showed the blood inflow did not stop, and additional compression bandaging was used for 24 hours. However, it was not successful. Thereafter, we performed venous aneurysmectomy under local anesthesia. The pseudoaneurysm was connected to the common femoral vein via the pseudoaneurysm neck whose length was 6.6 mm and width was 3.4 mm (Fig 2), and the common femoral artery was not damaged (Fig 2). After heparinization, the FVP sac was resected by clamping the common femoral vein. The pseudoaneurysm neck was left behind on the venous side because the tissue was attached to the femoral vein. The stump of the pseudoaneurysm neck was closed using 6-0 polypropylene sutures. The results of the pathologic examination were consistent with the structure of a pseudoaneurysm (Fig 3). Elastic staining revealed an absence of the elastic fibers. The right groin pain subsided satisfactorily and leg edema gradually improved after the surgery. The patient was discharged on postoperative day 4. She could not return to our hospital for a follow-up because she lived far away. She died of cerebral hemorrhage after several months.

DISCUSSION

Here, a rare case of FVP was successfully treated by venous aneurysmectomy. In general, iatrogenic femoral arterial complications, namely, hematoma, arteriovenous

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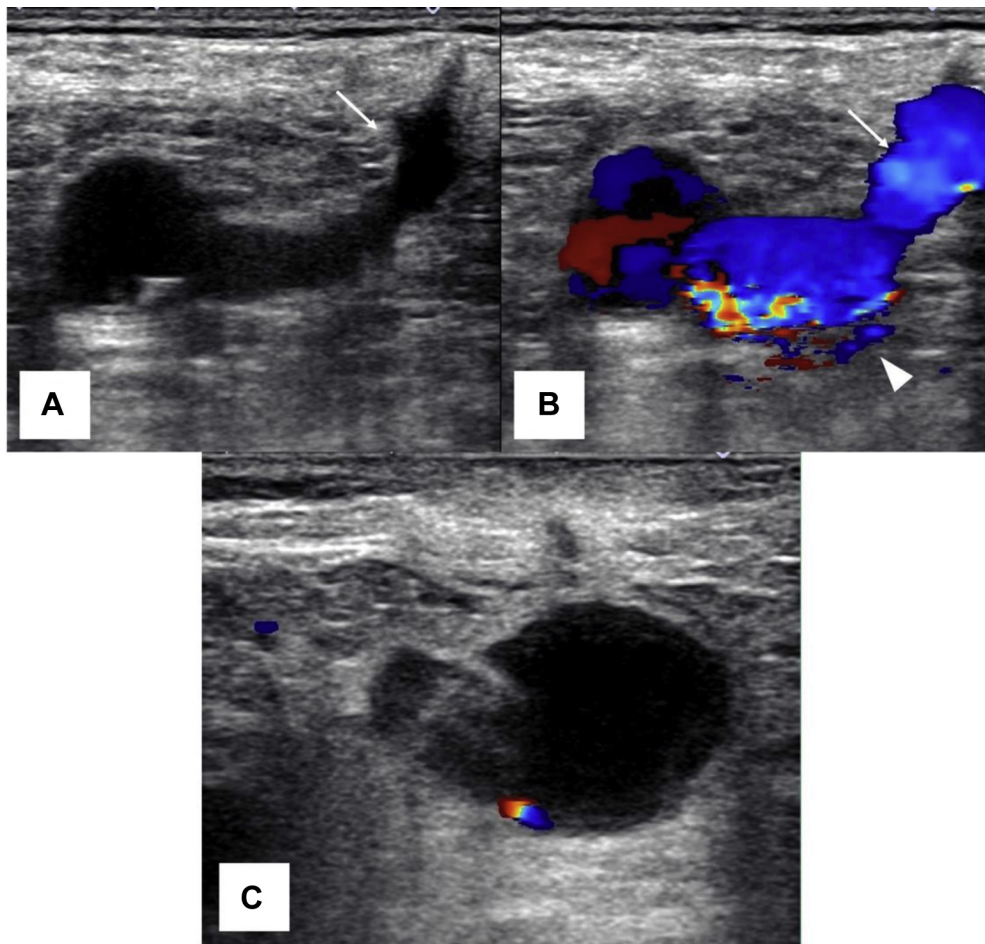


Fig 1. **A**, B-mode ultrasound image showing a 2-cm hypoechoic lesion (*arrow*). **B**, Color Doppler ultrasound image showing blood inflow from the femoral vein (*arrowhead*) to the lesion (*arrow*). **C**, Another view of the pseudoaneurysm.

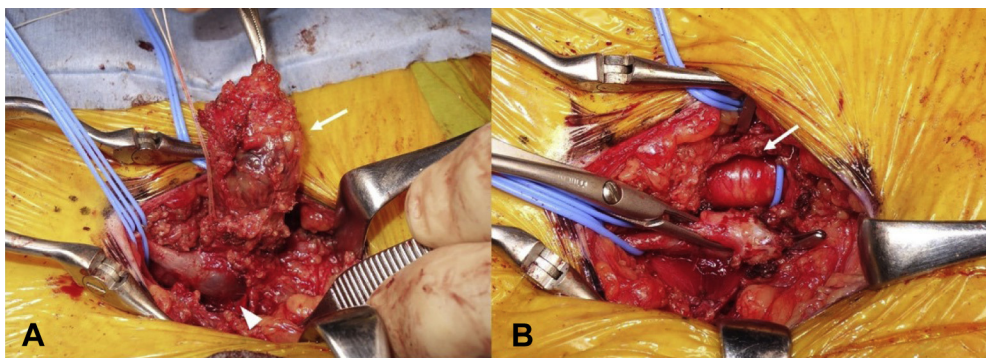


Fig 2. **A**, Pseudoaneurysm (*arrow*) connected to the common femoral vein (*arrowhead*) via the pseudoaneurysm neck. **B**, The common femoral artery is not damaged (*arrow*).

fistula, and pseudoaneurysm, often develop because of high blood pressure and several risk factors.⁴ In venous injury, vessel complications usually do not occur because of the low intravascular pressure. Recently, puncture complications, such as arteriovenous fistula and deep vein thrombosis secondary to the compression of the

femoral vein owing to femoral artery pseudoaneurysm, have been reported.^{5,6} To the best of our knowledge, only two cases similar to our case have been reported previously. The first case was reported by Roizental et al in 1994,² and the second case was reported by Salour et al in 1998.³ The patients in these reports had a medical

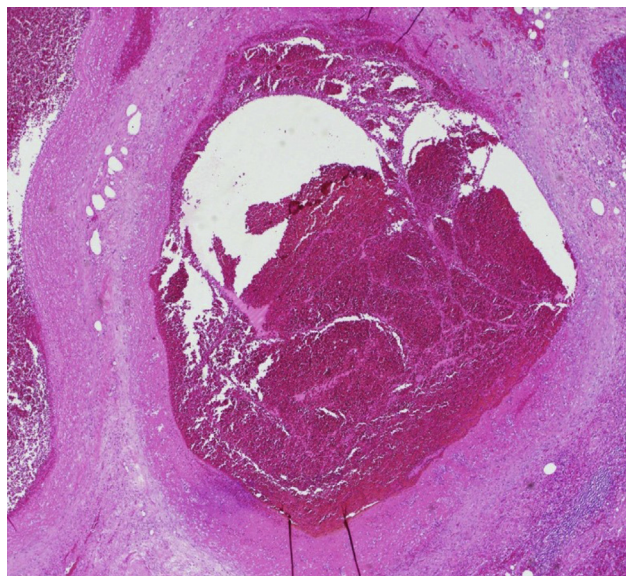


Fig 3. Results of the pathologic examination are consistent with the structure of the pseudoaneurysm (stain: hematoxylin and eosin; original magnification, $\times 40$).

history of heart failure or had chronic kidney disease and were on hemodialysis; venous hypertension was included as a cause of pseudoaneurysm formation. Our patient had no medical history associated with increased venous pressure such as pulmonary hypertension or tricuspid valve regurgitation, which were ruled out by echocardiography; however, the patient had been prescribed an anticoagulant. The possibility of pseudoaneurysm formation increases on performing venipuncture and sheath insertion; thus, hemostatic techniques must be performed with caution after venous sheath removal to avoid the formation of pseudoaneurysms. When using a large sheath, we recommend that hemostasis after compression release should be confirmed by ultrasound examination. We believe that this step can decrease the risk of pseudoaneurysm formation.

UGCT and ultrasound-guided thrombin injection (UGTI) are gold standard treatment for FAPs. These treatments have recently been introduced as safe and effective treatment strategies.^{7,8} A success rate of more than 90% is associated with UGTI,⁹ which is higher than that associated with UGCT.¹⁰ However, a risk of severe complications, such as vascular thromboembolic events,¹¹ is associated with UGTI, and surgical repair is usually performed after failed UGTI.¹² Pulmonary embolism after UGTI for FVP has not been reported previously; however, it is possible that pulmonary embolism may occur. Furthermore, there is an indication for pseudoaneurysm decompression to improve leg edema. We believed that the etiology decreased the venous return owing to

the compression of the femoral vein; therefore, we selected surgical aneurysmectomy, which is simple and more effective than UGTI in this case.

In conclusion, the appropriate procedure must be selected for a patient with femoral pseudoaneurysm. Ultrasound examination may be performed if pseudoaneurysms are suspected.

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