

A case of brachial artery pseudoaneurysm requiring endovascular therapy twice

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Abstract

Brachial artery pseudoaneurysm (BAP) is a complication that can result from trauma, iatrogenic injury, or drug abuse, and can have serious consequences for the limb and overall health, including hemorrhage, nerve injury, venous edema, loss of limb function, and rupture. This paper describes a case of BAP that developed following the first hemostasis procedure and required a second endovascular therapy (EVT) procedure. The patient in this case had an iatrogenic brachial artery pseudoaneurysm (BAP) that appeared 10 days after coronary angiography. The patient experienced swelling and pain in the left upper limb, prompting emergency hemostasis with EVT. Percutaneous thrombin injection was administered, along with balloon inflation, and angiography confirmed successful hemostasis. However, 16 days after the initial EVT, the patient returned to the hospital with the same symptoms, and a recurrence of BAP was observed on duplex ultrasound. Stent graft implantation was required due to vessel structure disruption detected by intravascular ultrasound imaging. Following stent graft deployment, a final angiogram showed that the pseudoaneurysm had disappeared, and the patient experienced no complications for three months. This case highlights the importance of observing vascular structure with intravascular ultrasonography (IVUS) to predict successful hemostasis, and suggests that additional therapy should be considered when the structure is disrupted.

Keywords: pseudoaneurysm, balloon tamponade, stent graft, IVUS, endovascular therapy, complication

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Informed Consent

The authors stated that the written consent was obtained from the patient presented with images in the study.

Conflict of Interest

No conflict of interest was declared by the authors.

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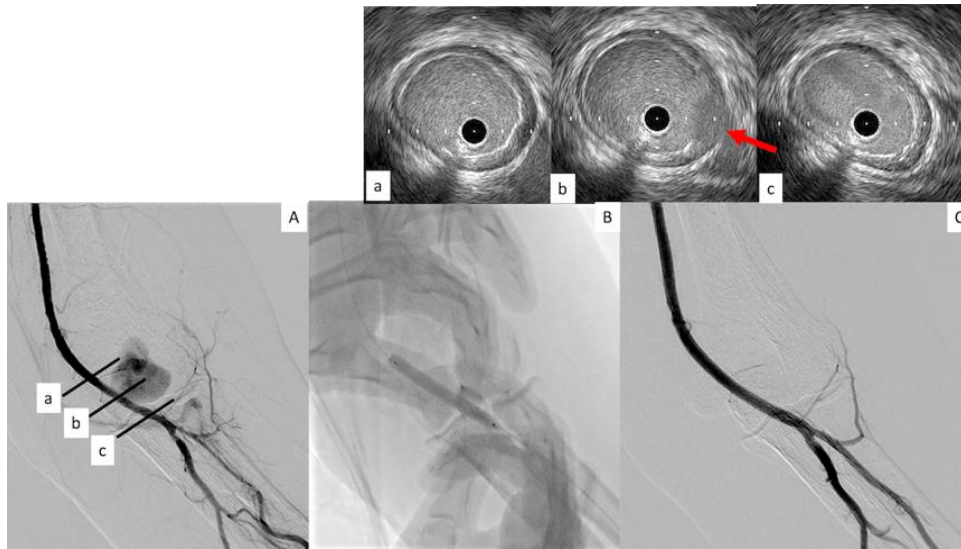


Introduction

Brachial artery pseudoaneurysm (BAP) is a complication that can result from trauma, iatrogenic injury, or drug abuse, and can have serious consequences for the limb and overall health. These consequences may include hemorrhage, nerve injury, venous edema, loss of limb function, and rupture [1,2]. Treatment options for BAP include external compression, thrombin injection, surgical treatment, or endovascular procedures. Previous clinical results have shown that a combination of thrombin injection and endovascular procedure was effective for treating femoral artery pseudoaneurysm [3], so this approach is often used for BAP as well. Pseudoaneurysm recurrence is rare.

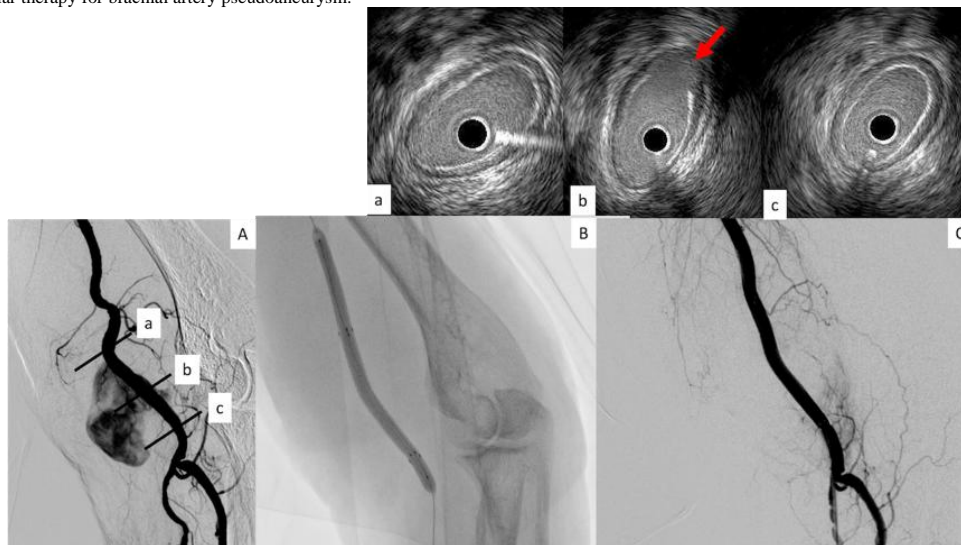
In this case study, we present a case of BAP that developed following the initial hemostasis procedure and required a second endovascular therapy (EVT) procedure.

Figure 2: First endovascular therapy for brachial artery pseudoaneurysm.



A: Initial angiography. B: Endovascular balloon inflation and percutaneous thrombin injection. C: Final angiography. a-c: Intravascular ultrasonography

Figure 3: Second endovascular therapy for brachial artery pseudoaneurysm.



A: Initial angiography. B: Treatment with deployment of a stent graft and balloon inflation. C: Final angiography. a-c: Intravascular ultrasonography

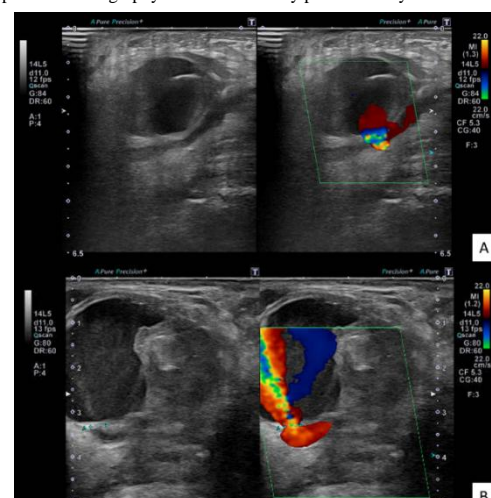
Case presentation

An 85-year-old woman with hypertension, hyperlipidemia, and diabetes was admitted for coronary angiography as part of the evaluation of severe aortic stenosis. The patient did not receive antithrombotic therapy. Angiography was carried out through the left brachial artery with a 5 Fr slender sheath (Terumo, Tokyo, Japan) and was successfully completed. The puncture site was compressed using Tometakun (Xemex, Toyama, Japan) for 4 hours, and she was discharged from the hospital without any bleeding complications. Ten days later, she returned to the hospital due to swelling and pain in her left upper limb. Duplex ultrasonography revealed a pseudoaneurysm (BAP) measuring 3.9 cm in diameter (Figure 1-A). Consequently, emergency hemostasis with EVT was decided upon.

EVT was performed through the left radial artery using a 4 Fr short introducer sheath (Terumo, Tokyo, Japan). Angiography showed a pseudoaneurysm in the neck (Figure 2-A). A 0.014" guidewire was advanced into the distal axillary artery. Vascular lumen and disruption of vascular structure were assessed using intravascular ultrasonography (IVUS) (Figure 2-B). Percutaneous thrombin injection of 2000 IU was administered, along with balloon inflation using SHIDEN HP 5.0 mm x 40 mm (Kaneka, Tokyo, Japan) (Figure 2-B). Angiography confirmed

successful hemostasis (Figure 2-C), and the patient did not experience any further bleeding episodes or complications post-procedure. She was discharged on the same day. However, 16 days later, she returned to the hospital with swelling and pain in her left upper limb. Duplex ultrasonography revealed a pseudoaneurysm measuring 4.6 cm in diameter (Figure 1-B). Consequently, she was admitted to the emergency room for urgent repeat EVT.

Figure 1: Duplex ultrasonography for brachial artery pseudoaneurysm.



A: Before 1st endovascular therapy (EVT). B: Before 2nd EVT.

The second EVT was performed through the same access site as the initial procedure, using a 6 Fr short introducer sheath (Terumo, Tokyo, Japan). Angiography revealed a pseudoaneurysm measuring 4.3 cm in diameter (Figure 3-A). Due to vessel structure disruption and the recurrent nature of the pseudoaneurysm, we determined that stent graft implantation was necessary (Figure 3-B). A 5.0 mm x 50 mm long VIABAHN stent graft (W.L. Gore & Associates, Flagstaff, AZ, USA) was deployed across the neck of the pseudoaneurysm and post-dilated with a 5.0 mm x 100 mm semi-compliant balloon (Figure 3-B). The final angiogram demonstrated resolution of the pseudoaneurysm (Figure 3-C). Follow-up duplex ultrasonography the next day confirmed closure of the pseudoaneurysm. The patient was discharged and remained free of complications for 3 months.

Discussion

We encountered a case of iatrogenic BAP that required a second EVT due to the recurrence of pseudoaneurysm after the initial combined treatment of endovascular balloon inflation and percutaneous thrombin injection.

BAP is a rare complication with a low incidence (0.3%) following transbrachial artery catheterization [4]. Surgical repair is an option for BAP but can be challenging in older patients with atherosclerotic vessels. Recent reports have shown that the combination of endovascular balloon inflation and percutaneous thrombin injection is effective in treating iatrogenic femoral pseudoaneurysms [3]. Thrombin injection with EVT is a minimally invasive procedure.

The etiology of pseudoaneurysm formation includes incomplete hemostasis, anticoagulation therapy, or coagulopathy [5]. In this case, the patient did not receive antiplatelet or anticoagulation therapy, and atherosclerotic changes were confirmed in the brachial arteries, possibly contributing to the recurrence of the pseudoaneurysm in the late phase.

In this case, IVUS confirmed the disruption of the vascular structure. An incomplete vascular wall structure may not adequately maintain hemostasis post-treatment, leading to a recurrence of the pseudoaneurysm in the late phase. Closer follow-up should have been conducted when vessel wall disruption was observed. Future studies with more cases of BAP are needed to establish optimal treatment strategies. Additionally, IVUS studies may be necessary to investigate the impact of vascular structure disruption on endovascular hemostasis for pseudoaneurysms.

Conclusion

We encountered a case of BAP that required EVT twice. Monitoring the vascular structure with IVUS may help predict successful hemostasis, and additional therapy should be considered when the structure is disrupted.

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