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## Case Report

# A cost effective endovascular approach for management of post-catheterization profunda femoris artery pseudoaneurysm using thrombin



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## ABSTRACT

Post-catheterization PSA is one of the most commonly encountered vascular complications of cardiac and peripheral angiographic procedures. We report the case of patient who developed deep-seated profunda femoris artery pseudoaneurysm (PSA) following cardiac catheterization. Despite, repeated ultrasound guided compressions the PSA failed to close and instead produced local site pressure ulcers. The secondary infection followed which precluded use of percutaneous thrombin injection. The PSA was finally closed via a total endovascular technique combining intravascular thrombin injection and coil embolization, thus obviating the need for expensive measures like cover stents or invasive surgical repairs.

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## 1. Introduction

As the name suggests pseudoaneurysm (PSA) is a contained rupture whose walls are formed by the extravasated blood and surrounding tissue.

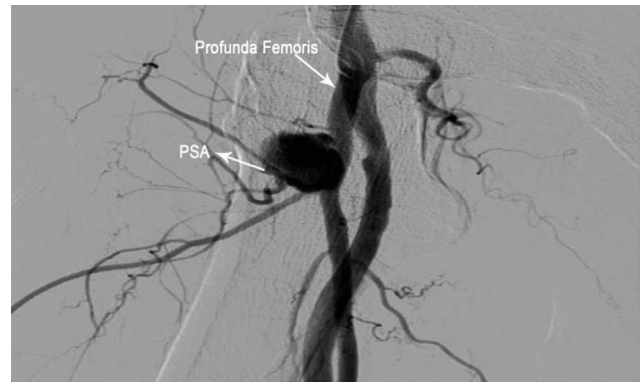
Post-catheterization PSA is one of the most common vascular complications of cardiac and peripheral angiographic procedures.

The incidence of PSA after diagnostic catheterization ranges from 0.05% to 2%. When coronary or peripheral intervention is performed, the incidence increases to 2%–6%, especially when aggressive antiplatelet and anticoagulant strategies are used.<sup>1</sup>

According to the published studies, rate of spontaneous closure varies from 52% to 85%, and is mainly influenced by the size. Thus in the absence of severe pain, observation of small PSAs (<2.0 cm) is reasonable.<sup>2</sup> However, if the patient has severe pain, treatment is indicated irrespective of size. One of the most catastrophic complications of PSA is rupture. Although the exact rate is unknown, the risk of spontaneous rupture of PSA is related to size >3 cm, presence of symptoms, large hematoma, continued growth of the sac or infection,<sup>3,4</sup> thus calling for immediate closure of PSA if the above mentioned attributes are present. We describe a difficult case of post-catheterization PSA arising from branch of profunda femoris artery. Having been deemed inappropriate for closure via ultrasound guided compression (USGC), or ultrasound guided thrombin injection (UGTI), the PSA was closed via endovascular intervention.

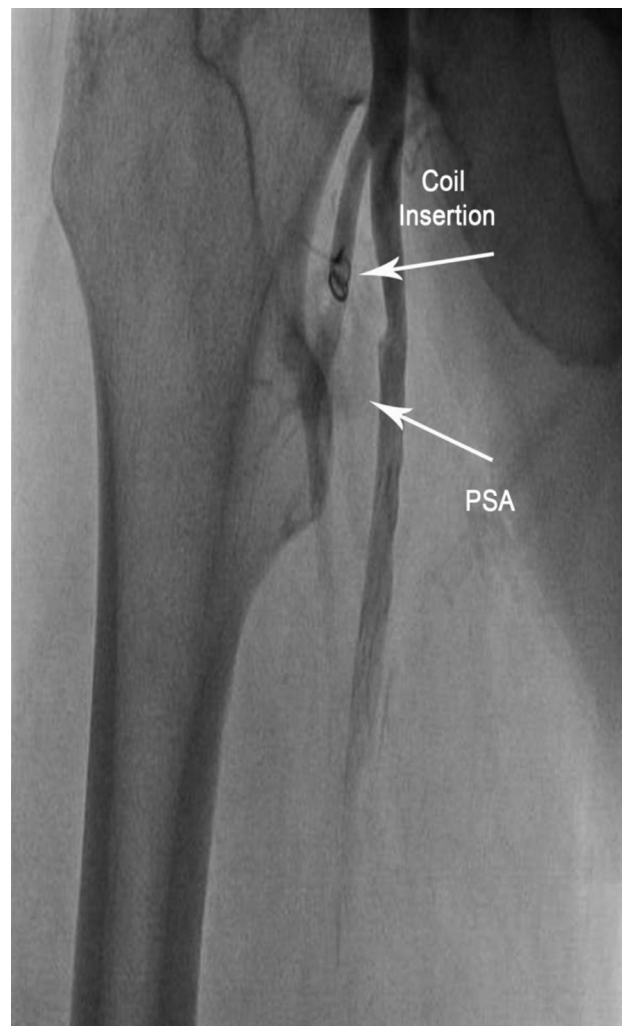
## 2. Case

75 years old man, known case of type II diabetes and hypertension with recent history of acute coronary syndrome, presented to our institute. He had undergone a percutaneous coronary intervention and drug eluting stent implantation, following which within days he started experiencing pain and swelling at the site of vascular puncture. Patient underwent an ultrasound and Doppler interrogation, which revealed a small deep-seated hematoma with communicating PSA tract. As per our institutional practice, ultrasound guided manual compression consisting of 10 min cycles was tried. However, despite repeated attempts successful closure of the PSA could not be achieved, instead local site skin necrosis and subsequent secondary infection of the area developed. Due to local site infection closure via USGTI was not contemplated for the fear of introducing infection into the PSA. A less invasive and cost effective alternative to surgery/cover stent, closure of PSA was planned via endovascular approach using thrombin. Arteriography revealed 5 × 7 cm PSA arising from branch of profunda femoris artery (Fig. 1). Using the contralateral site, a 6 French JR 3.5 guiding catheter (Cordis) was advanced over 0.025-inch guidewire (TERUMO) to reach the branch of right profunda femoris artery. Deep intubation of this guiding catheter into the feeding branch of pseudoaneurysm was done to ensure no back reflux of the dye into the main vessel. At this point, 0.025-inch guide wire was exchanged by 0.014-inch double length PTCA guidewire (BMW, Abbott Laboratories). Super selective catheterization of PSA tract was done



**Fig. 1 – Digital subtraction angiogram showing PSA arising from branch of profunda femoris artery.**

by passing 2.2 French micro catheter (COOK) over the PTCA guidewire and was further advanced deep into the hematoma sack. Contrast was injected to reconfirm the final position of the micro catheter and to ensure that there was no back flow into the PSA tract and the main vessel. Aliquots of 0.2 mL of

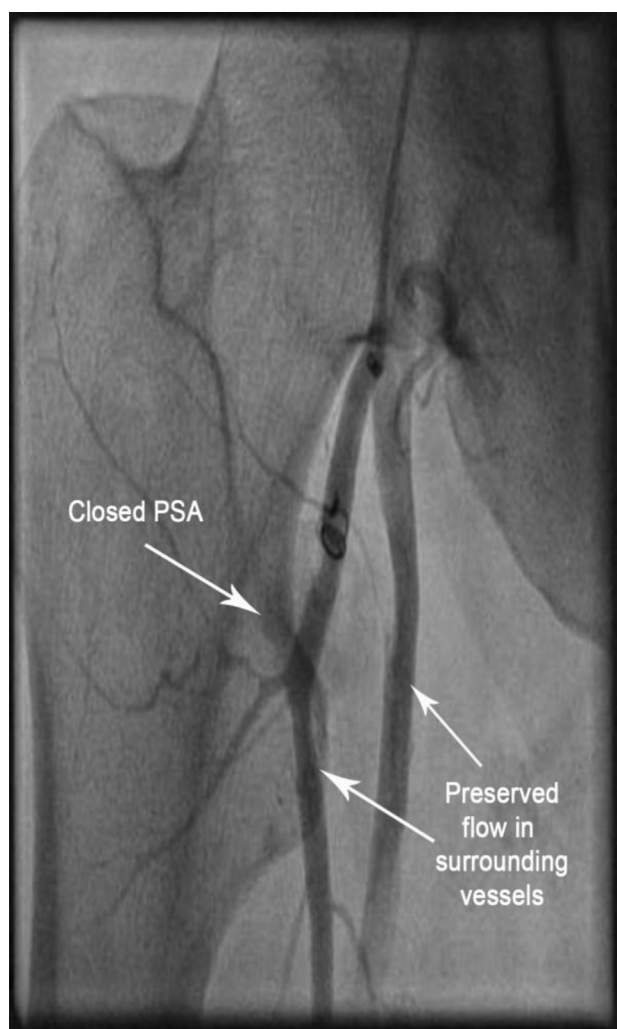


**Fig. 2 – Angiogram showing coil insertion following thrombin injection into the PSA.**

bovine thrombin (at a concentration of 1000 U/mL) were injected into the PSA chamber and visualized with fluoroscopy and color Doppler until no flow was observed (Fig. 2). To minimize the chances of recurrence<sup>5</sup> with thrombin injection, we decided to close the feeding artery by embolizing the same with micro coils 6 mm × 5 cm (COOK, MReye embolization Coil) insertion (Fig. 3). Final angiogram revealed no flow into the PSA or the feeding vessel with normal flow into the profunda femoris artery. Preservation of distal pulses and normal flow in deep veins was documented immediate post-procedure with the help of Pulsed-wave and color Doppler flow. A follow-up duplex ultrasound was obtained at 24 h and then repeated at 72 h after thrombin injection both of which revealed no signs of deep venous thrombosis or PSA. A mid-term follow up Doppler scan at 3 months showed resolution of the hematoma and no residual pseudoaneurysm.

### 3. Discussion

Until the early 1990s, the only treatment available for PSA was surgery. Since that time, USGC repair, UGTI, compression



**Fig. 3 – Final angiogram showing complete closure of PSA and good flow in profunda femoris and superficial artery in distal vasculature.**

devices, coil insertion, fibrin adhesives, or balloon occlusion have been used with variable success.<sup>6,7</sup> Apart from certain conditions where surgical repair has been shown to be superior, currently the noninvasive nature and high cost effectiveness, has made USGC repair or UGTI as treatment of choice for management of PSA.<sup>8,9</sup>

In our patient, deep-seated location and well below the bifurcation and femoral head made it difficult for effective compression. These are the common sites for such pseudoaneurysm and AV malformation. This explains not only the failure to close the PSA but also generation of pressure ulcers and secondary cellulitis of the local area. This precluded USGTI for fear of extending infection into PSA. We not only effectively closed down the PSA via a total endovascular approach using thrombin, but also made sure that distal arterial thrombosis, which can follow thrombin injection did not happen.<sup>10</sup> The combined use of endovascular intervention and USGTI<sup>11</sup> have been described in the literature, but under aforementioned difficult circumstances the use of percutaneous intervention would have been hazardous. By employing this technique of using bovine thrombin and coils insertion totally via endovascular approach we were successful in closing down PSA, thus preventing use of covered stent and more invasive measures like surgical repair.

### 4. Conclusion

Sometimes the USG guided approach may not be feasible or rather hazardous to close down PSA. Endovascular technique using coils and bovine thrombin can be successfully used to treat PSA, obviating the need for expensive measures like covered stents and surgical repair.

### Conflicts of interest

All authors have none to declare.

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