CASE REPORT

Iatrogenic pseudoaneurysm of the peroneal artery

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SUMMARY

An elderly patient who presented with an acute lower limb ischaemia was managed by thromboembolectomy: this led to revascularisation of the lower limb but resulted in an iatrogenic pseudoaneurysm of the peroneal artery. Subsequent endovascular treatment was successful, and the patient has made a good recovery.

BACKGROUND

Pseudoaneurysms of the peroneal artery (PA) are a rare entity. The vast majority of reported cases have a traumatic aetiology (blunt or penetrating lower limb injury), followed by isolated cases of mycotic aneurysms and those associated with connective tissue disorders (Behcet's disease and Ehlers-Danlos syndrome).^{1 2} A review of the literature revealed only two published cases of false iatrogenic aneurysms following an embolectomy.^{1 3} Therefore, we feel it is important to report a case of the PA pseudoaneurysm developing as a delayed complication postembolectomy and its successful endovascular treatment by coil embolisation.

CASE PRESENTATION

A 78-year-old male patient presented with several hours history of the right lower limb pain and weakness. Medical history included duodenal ulcer, hypertension, deep venous thrombosis (right), rectal cancer (treated by an abdominoperineal resection of the rectum with no evidence of recurrence), total hip and elbow replacements. He was a smoker. On admission, the patient was afebrile and had normal haemodynamic parameters. Examination of the cardiovascular and respiratory systems and the abdomen was unremarkable. A peripheral vascular examination revealed the presence of all left-sided pulses. On the right side, no pulses were palpable except for the common femoral artery. The right foot was pale and had reduced sensation with preserved movement.

INVESTIGATIONS

Ankle Brachial Pressure Index measured 1.2 bilaterally; laboratory tests were normal, and an ECG revealed sinus rhythm. The patient was started on intravenous infusion of heparin, and an urgent CT angiogram (CTA) was performed. CTA revealed that the thrombus was occupying 75% of the right external iliac artery lumen (figure 1) and causing a 10 cm occlusion of the popliteal artery and tibio-peroneal trunk (figure 2). The left-sided vessels were unremarkable. All routine postcancer follow-up investigations were unremarkable including colonoscopy, carcinoembryonic antigen levels and CT scans. Therefore, an in situ thrombosis due

to an underlying peripheral vascular disease (mild calcification throughout the arterial tree demonstrated on preoperative CTA) was thought to be the cause for the patient's presentation.

TREATMENT

Subsequently, an urgent embolectomy was performed under local anaesthesia. At operation, inflow was restored with the size 4 and 5 Fogarty catheters, which delivered a large fragment of a clot from the aorta. The outflow was established with the size 3 Fogarty catheter which passed down to the ankle with no difficulty, and again a large amount of fresh clot was retrieved. This led to the restoration of the right foot pulses. The patient was started on the factor Xa inhibitor (rivaroxaban), simvastatin and was discharged home. At 10 weeks postprocedure the patient had a routine check-up. Duplex ultrasound scan (DUS) that revealed 1.3×3.6 cm PA aneurysm, confirmed on CTA. DUS also confirmed patent right external iliac arteries with a triphasic flow. The anterior and posterior tibial arteries were of good calibre down to the ankle, and the decision was made to treat the pseudoaneurysm by embolising the PA. A 5 Fr sheath was placed in the right common femoral artery via an antegrade puncture, and digital subtraction angiography (DSA) confirmed a wide-necked pseudoaneurysm (figure 3). The PA was selected using a 0.027 inch microcatheter (Progreat, Terumo) and was successfully embolised by deploying multiple 3, 4 and 5 mm diameter 0.018" fibred platinum coils (VortX Diamond-18, Boston Scientific) proximal and distal to the pseudoaneurysm (figure 4). Completion angiogram confirmed a complete exclusion of the aneurysm.

OUTCOME AND FOLLOW-UP

There were no complications related to the procedure. The patient was discharged the following day to routine surgical follow-up.

DISCUSSION

Pseudoaneurysms of the PA are rare. Aetiology includes blunt or penetrating trauma to the lower limb (fractures, ankle sprains), iatrogenic causes (post-thromboembolectomy) and isolated cases of mycotic (intravenous drug users, infective endocarditis) as well as connective tissue disorders (Behcet's disease and Ehlers-Danlos syndrome).¹⁻⁷ Regardless of the cause, pathogenesis of pseudoaneurysm is characterised by complete or incomplete arterial wall disruption. This leads to extravasation of the blood and the formation of haematoma with a surrounding fibrous pseudocapsule.¹ Subsequent lysis of the intraluminal thrombus recanalises the

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Figure 1 Thrombus (arrow) in the right external iliac artery.

vessel and persistent communication with the arterial lumen leads to an ongoing aneurysm expansion. Some aneurysms can spontaneously occlude, hence remain asymptomatic,⁶ while other aneurysms cause local pressure symptoms, ischaemia (thrombosis, embolisation) or rupture. Patients can present with a lower limb swelling, which frequently is treated as deep vein thrombosis.⁴ Additionally, the persisting and intermittent bleeding can lead to the development of an acute lower limb compartment syndrome or even life-threatening haemorrhage.⁴ Apart from the aforementioned clinical presentations, a delayed arteriovenous fistula due to penetrating trauma has also been reported.^{4 7} Diagnosis is usually established by one of the

Figure 2 An occluded (arrow) popliteal artery and tibioperoneal trunk.

Figure 3 Pseudoaneurysm of the right peroneal artery.

imaging modalities including DUS, CTA, DSA and MR angiography. Pseudoaneurysm after Fogarty catheter thromboembolectomy is caused by an over inflation of the balloon or direct catheter arterial wall perforation. PA is most commonly affected because the catheter tends to pass down the PA as the vessel has almost a straight anatomical course down to the ankle. Therefore, a gentle manipulation with Fogarty catheter is vital. This is particularly important in a vulnerable group of patients suffering from diseases with defective collagen and elastin, because of which the arterial walls can be very easily traumatised. Treatment depends on the aneurysm's size, location, extent of bone and soft tissue trauma as well as patient's comorbidities. Open surgery involves the evacuation of the haematoma after proximal and distal control has been achieved. The exact procedure is determined by the extent of the arterial damage. An arterial defect can be repaired primarily or with a

Figure 4 Postcoil embolisation: complete exclusion of the right peroneal artery pseudoaneurysm with patent run-off vessels to the foot.

vein patch angioplasty.⁷ Alternatively, an interposition bypass vein graft can be performed.⁵ This may be indicated if PA is the only run-off vessel supplying the foot. However, given the small calibre of PA, the presence of a haematoma or surrounding tissue trauma, an arterial reconstruction can be difficult if not impossible. In such circumstances, the PA can be ligated provided that the remaining crural vessels are perfusing the foot sufficiently.³ The endovascular approach has an obvious advantage of a much quicker recovery time and several case reports have described the successful use of ultrasound-guided thrombin injection, coil embolisation or stent insertion.¹ Despite the lack of any guidelines regarding endovascular treatment, some authors advocate the endovascular approach in low-velocity injuries with minimal arterial wall disruption (<5 mm), no evidence of active haemorrhage and intact distal circulation,⁵ whereas in high-velocity trauma, compromised distal limb perfusion and haemorrhage, an open surgical approach is advised.⁵

However, this should be interpreted with caution as data come from a handful of case reports only. Ultrasound-guided thrombin injection aims at elimination of an aneurysm by causing thrombus formation. In general, this technique is meant to treat small pseudoaneurysms with a narrow neck, but unfortunately it often fails.¹ Small arterial lacerations can be successfully stented with coated coronary stents or covered stents if the artery is large enough.^{4–8} Again the data are from only two case reports and as such require careful consideration. In our case, we performed successful coil embolisation given the fact that the two remaining crural vessels were patent down to the ankle. It is important to remember that the distal portion of the PA must be sealed off as well. Otherwise, it can lead to retrograde haemorrhage. One might argue that a routine postembolisation angiogram check should be considered similarly to a routine completion angiography postendovascular procedures. However, this should be balanced carefully with the potential morbidity arising from an additional contrast load in a frail group of elderly patients who often have an underlying renal impairment. Furthermore, lack of a hybrid operating theatre can significantly complicate logistics of DSA.

We have demonstrated that endovascular technique is a useful treatment option of this rare postembolisation complication. Consequently, extra care must be taken when performing a 'blind' embolisation.

Learning points

- ▶ Pseudoaneurysms of the peroneal artery can lead to serious complications.
- ▶ Postsurgical embolisation angiography check can be beneficial in selected cases.
- ▶ Pseudoaneurysms can be successfully managed with endovascular approach.

Competing interests None declared.

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