Reminder of important clinical lesson

Unusual complications of arterial closure devices: a word of warning

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The authors describe two patients who underwent transfemoral endovascular procedures followed by the use of the Angio-seal arterial percutaneous closure device. In the first patient, distal migration of the device occurred with consequent occlusion of the ipsilateral popliteal artery 2 days post procedure. In the second patient, thrombotic occlusion of the femoral artery occurred and the patient presented with acute leg ischaemia 3 weeks post procedure. Surgical removal of the closure device with consequent revascularisation of the affected leg was achieved in both patients. This report aims to alert clinicians to the possibility of device-induced arterial occlusion, dislodgment and their sequelae.

BACKGROUND

Arterial percutaneous closure devices (APCDs) constitute a useful tool for securing haemostasis following endovascular procedures. We present two unusual cases of infrainguinal arterial occlusion resulting from the use of the Angio-seal APCD. We suggest this complication is a random occurrence and do not propose the device is flawed.

CASE PRESENTATION**Case 1**

A 63-year-old man with bilateral iliac occlusive disease causing bilateral intermittent claudication (IC) underwent angiographically successful bilateral common iliac angioplasty and stenting through both common femoral arteries.

Bilateral deployment of the Angio-seal device failed, with the device being successfully deployed on the left side only. Two days post procedure, the patient was readmitted with new-onset short-distance IC involving the right calf.

Physical examination revealed absent right popliteal and pedal pulses. An arterial duplex scan showed thrombotic occlusion of the distal right popliteal artery at the level of the bifurcation, which was also confirmed by peripheral angiography (figure 1). An attempt at endoluminal aspiration of the thrombus was unsuccessful and surgical exploration was undertaken. In surgery, the unsuccessfully deployed Angio-seal device was found lodged at the popliteal bifurcation. This was removed successfully with no postoperative complications.

Figure 1 Peripheral angiogram of the right popliteal artery showing a distal occlusion at the level of the bifurcation (arrow) subsequently discovered to be a dislodged Angio-seal.

Figure 2 Arteriotomy of the right common femoral artery with extensive thrombosis due to an intraluminal Angio-Seal (arrow) causing occlusion with healthy artery seen distally to site of relocation.

Case 2

A teen-aged boy presented with right calf short-distance IC approximately 3 weeks following right transfemoral percutaneous stent-graft repair for a recently discovered coarctation of the aorta. An Angio-seal device was successfully deployed at the end of the procedure. Physical examination revealed absent right lower limb pulses. An arterial duplex scan and a peripheral angiogram showed complete occlusion of the right common femoral artery (CFA) and severe narrowing of the right external iliac artery (EIA).

Surgical exploration of the right femoral artery revealed an Angio-seal device occluding the right CFA and a thrombus extending proximally into the EIA (figure 2). The occluding Angio-seal was removed, balloon-catheter thrombectomy was performed and patch angioplasty of the CFA was done using a short segment of the great saphenous vein.

OUTCOME AND FOLLOW-UP

Case 1

The patient had an uneventful recovery.

Case 2

One year postoperatively, the patient remains asymptomatic.

DISCUSSION

The use of APCDs has become commonplace in endovascular therapy despite a few, but serious, recognised complications. These include arterial pseudoaneurysms (49%), arteriovenous fistula (11%), infection (9%) and bleeding or haematoma (8%).¹

Studies of such devices that are currently in use conclude that the safety profile of closure devices is at least comparable to manual compression,² if not more efficacious.³ However, a relatively recent meta-analysis concluded that there is only marginal evidence that APCDs are effective and the increased risk of hematoma and pseudoaneurysm associated with their use should be a reason for concern.⁴

The two cases presented here highlight less well-recognised but potentially dangerous complications of APCDs. Although the mode of presentation was similar (claudication), the timing was not. In the first patient, dislodgment

of the device from the femoral artery to the popliteal artery with consequent occlusion resulted in a new-onset claudication within 2 days of the procedure. Although a presentation of acute leg ischaemia would have been expected in that patient, it is likely that the presence of good collaterals maintained the viability of the leg. The second patient, although also presented with IC, did so approximately 3 weeks post procedure. This delay in presentation may be attributed to incomplete occlusion of his femoral artery and preservation of flow into the profunda femoris artery.

Although in our patients these complications occurred with the Angio-seal device, we speculate that they may also occur with other APCDs due to the similar design and method of arterial closure of these devices. A study to compare outcomes of different APCDs is therefore recommended.

Learning points

- ▶ Both patients and clinicians should be aware of the possible risk of device-induced arterial occlusion and device dislodgment.
- ▶ A clinician should consider these two complications in the differential diagnosis of any patient presenting with unexpected IC, or perhaps acute leg ischemia, following the use of an APCD.

Competing interests None.

Patient consent Obtained.

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