Novel treatment (new drug/intervention; established drug/procedure in new situation)

Dialysis access pseudoaneurysm: endovascular treatment with a covered stent

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Summary

Iatrogenic pseudoaneurysms of the brachial artery are rare complications of haemodialysis access procedures and can lead to substantial morbidity and mortality if not managed promptly; however, surgery is also associated with the potential risk of severe complications. We describe the clinical and radiological findings relating to a dialysed patient who developed a huge iatrogenic pseudoaneurysm of the brachial artery (due to an inadvertent artery puncture), which was successfully treated by means of the percutaneous implantation of a polytetrafluoroethylene (PTFE)-covered stent.

BACKGROUND

Iatrogenic pseudoaneurysms of the brachial artery are relatively uncommon and generally caused by interventional vascular procedures,¹ and haemodialysis patients may experience the erroneous puncture of the brachial artery during venous cannulation.² This is a rare complication but can lead to adverse consequences such as rupture, infection, haemorrhage, distal arterial insufficiency, venous thrombosis and neuropathy. Furthermore, when treatment is delayed, enlargement of the pseudoaneurysm can lead to haemorrhaging, venous oedema of the extremity,

cutaneous erosion and, particularly, adjacent neurological structure compression.³ Early diagnosis and appropriate treatment are very important because a pseudoaneurysm can lead to the loss of fingers or the entire upper extremity. Patients frequently experience painful swelling and numbness in the arm, and Doppler ultrasonography and angiography usually confirm the pseudoaneurysm accurately.^{4 5} Surgical vascular reconstitution is the traditional treatment for pseudoaneurysms but, as surgical interventions are associated with a risk of complications in dialysed patients, endovascular procedures provide an alternative and safe

Figure 1 The forearm of the dialysed patient showing a large pulsatile mass.

therapeutic option.⁶ However, as no data are available concerning the effectiveness of implanting a covered endovascular stent for the percutaneous closure of an iatrogenic brachial artery pseudoaneurysm in dialysed patients, we here describe successful endovascular treatment using a PTFE-covered stent in a haemodialysed patient.

CASE PRESENTATION

A 77-year-old man with a history of hypertension, diabetes mellitus, dyslipidaemia and end-stage renal disease received an arteriovenous fistula in the left forearm for haemodialysis in 2003. During the haemodialysis access procedure, the left brachial artery was inadvertently punctured and, 2 days after the procedure, he visited our emergency room with a painful swelling and numbness affecting his left arm (figure 1). Visual inspection showed a large pulsatile mass with a palpable thrill and a Doppler ultrasound examination revealed a left brachial pseudoaneurysm with a large hematoma (>3 cm in diameter). He was referred to our division for endovascular treatment.

TREATMENT

Digital subtraction angiography confirmed the diagnosis (video 1). An 8F introducer sheath was placed in the left main femoral artery and a 0.018-inch diameter 300 cm stiff guide wire (Steel Core; Abbott Vascular, Redwood City, California, USA) was advanced into the brachial artery. The patient received an intra-arterial bolus of heparin 5000 U and, after angiographically measuring the vessel, a 38 mm long peripheral PTFE-covered stent (Jostent Peripheral Stent Graft; Jomed GmbH, Rangendingen, Germany) was manually crimped on a 8.0 × 40 mm angioplasty balloon (Bantam; ClearStream Technologies Ltd, Moyne Upper, Enniscorthy, Co Wexford, Ireland). Using road-map guidance, the stent was appropriately positioned and implanted using a pressure of 10 atm (video 2). Control arteriography after stent deployment confirmed the correct apposition of the covered stent with the complete exclusion of the pseudoaneurysm (video 3). The femoral puncture site was sealed by means of an Angio-Seal vascular closure device (St Jude Medical, 14901 DeVeau Place, Minnetonka, Minnesota, USA). The patient's subsequent hospital course was uneventful and he was discharged the day after on dual antiplatelet treatment with 100 mg aspirin/day for life and 75 mg clopidogrel/day for 6 months.

Video 1 Digital subtraction angiography showing the brachial pseudoaneurysm draining into a large haematoma in the left forearm. 10.1136/bcr.07.2008.0477v1

Video 2 A 0.018-inch diameter 300 cm stiff guide wire was advanced into the brachial artery, after which a 38 mm long peripheral polytetrafluoroethylene-covered stent crimped on a 8.0 × 40 mm angioplasty balloon was appropriately positioned and dilated. Bolus chase angiography shows stent deployment at a pressure of 10 atm. 10.1136/bcr.07.2008.0477v2

Video 3 Control arteriography after the removal of the balloon and wire showing the correct apposition of the covered stent with complete exclusion of the pseudoaneurysm. 10.1136/bcr.07.2008.0477v3

OUTCOME AND FOLLOW-UP

At the 8-month follow-up visit, the patient was asymptomatic and Doppler ultrasonography revealed the occlusion of the pseudoaneurysm and the good patency of the covered stent.

DISCUSSION

Iatrogenic pseudoaneurysms of the brachial artery are very rare complications of haemodialysis access procedures,² whose prompt detection is clinically relevant because of the risk of adverse consequences, such as the rupture of the false aneurysm, infection, haemorrhaging, distal vascular insufficiency, neuropathy and venous thrombosis due to pressure on the adjacent nerve and veins. In 2002, Najibi *et al* reported a novel approach to the exclusion of arteriovenous graft and fistula pseudoaneurysms using a self-expanding Wallgraft stent in 10 patients.⁷ This is the first report of endovascular treatment of an iatrogenic pseudoaneurysm of the brachial artery (due to inadvertent puncture) using a balloon-expanded covered stent—a valid alternative therapeutic option to vascular surgery that allows the rapid and less invasive management of patients undergoing haemodialysis.

Learning points

- Dialysed patients are at risk of developing an iatrogenic pseudoaneurysm due to the erroneous puncturing of the brachial artery during venous cannulation for haemodialysis.
- Surgical treatment of a brachial artery pseudoaneurysm is associated with the risk of complications.
- Endovascular techniques offer an alternative to surgery.
- The implantation of an endovascular-covered stent is a safe and effective means of percutaneously closing an iatrogenic pseudoaneurysm of the brachial artery.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. Sheiman RG, Brophy DP, Perry LJ, *et al*. Thrombin injection for the repair of brachial artery pseudoaneurysms. *AJR Am J Roentgenol* 1999;**173**:1029–30.
2. Yildirim S, Nursal TZ, Yildirim T, *et al*. Brachial artery pseudoaneurysm: a rare complication after haemodialysis therapy. *Acta Chir Belg* 2005;**105**:190–3.
3. Wahlgren CM, Lohman R, Pearce BJ, *et al*. Metachronous giant brachial artery pseudoaneurysms: a case report and review of the literature. *Vasc Endovascular Surg* 2007;**41**:467–72.
4. Wongwanit C, Ruangsetakit C, Sermasathanasawadi N, *et al*. Treatment of iatrogenic pseudoaneurysm of brachial artery with percutaneous ultrasonographically guided thrombin injection (PUGTI): a case report and a literature review. *J Med Assoc Thai* 2007;**90**:1673–9.
5. Pinto F, Lencioni R, Stringari R, *et al*. [Doppler color US in the diagnosis and treatment of iatrogenic pseudoaneurysms]. *Radiol Med* 1997;**94**:198–201.
6. Criado E, Marston WA, Ligush J, *et al*. Endovascular repair of peripheral aneurysms, pseudoaneurysms, and arteriovenous fistulas. *Ann Vasc Surg* 1997;**11**:256–63.
7. Najibi S, Bush RL, Terramani TT, *et al*. Covered stent exclusion of dialysis access pseudoaneurysms. *J Surg Res* 2002;**106**:15–19.

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