TECHNICAL REPORT

Transcatheter Injection of Thrombin in the Treatment of an Intra-abdominal Pseudo-aneurysm

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Introduction

Routine management of non-anastomotic pseudo-aneurysms (PA) in the extremities has changed from open surgical repair to non-surgical techniques over the last 10 years. Such methods include ultrasound-guided compression1 and more recently ultrasound guided percutaneous intra-aneurysmal injection of thrombin.2

The majority of PAs occur following intra-arterial catheter-based interventions and thus the neck of the PA is small. The commonest site for such lesions is the groin3,4 and since the femoral vessels at this site are superficial this allows good ultrasound visualisation, neck assessment and direct needle puncture. These are essential prerequisites for safe and successful treatment by percutaneous injection of thrombin. Although there are several reports of success using this technique for femoral PAs5,6 there is paucity of information regarding the use of thrombin in the management of these lesions at other sites. This report describes a patient with a PA lying deep in the psoas muscle, which was successfully treated by transcatheter injection of thrombin under fluoroscopic guidance.

Technique

A 20-year-old man had suffered shotgun injuries to his mid-lumbar region 5 months previously. His care included multiple laparotomies to repair bowel injuries. Computerised abdominal tomography (CT) was performed to exclude a focal collection as a cause of his continuing pyrexia. This demonstrated a 3 cm PA within the psoas muscle at the level of the third lumbar vertebra (Fig. 1). Aortography confirmed that this arose from the left L3 lumbar artery.

Selective lumbar artery angiography (4 Fr Simmons I catheter: Tempo 4, Cordis, South Ascot, U.K.) showed numerous small branches arising distal to the PA with the potential to back fill the PA via connections with the second lumbar artery. Irregular narrowing of the third lumbar artery beyond its origin (seen on the selective images) prevented passage of the 4 Fr catheter (Fig. 2) and the PA was thus catheterised (Fig. 3) using a 3Fr co-axial system (Transit, Cordis, South Ascot, U.K.). Two doses of bovine thrombin (0.3 ml × 2, total dose 600 units; Gen Trac Inc., Middleton, WI, U.S.A.) injected over 5 s resulted in instantaneous obliteration of the PA (Fig. 4). The whole procedure took less than 30 min. Some non-occlusive thrombus seen in the third lumbar artery did not progress. Follow-up CT scan at 1 week confirmed continued occlusion of the PA.
Discussion

Ultrasound-guided puncture and thrombin injection of narrow necked PAs in the groin avoids the potential hazards of angiography and an alternative approach in this patient might have been percutaneous thrombin injection using a CT guided spinal needle. The transcatheter approach was selected because neither the precise origin of the PA nor the size of its neck were accurately defined by pre-intervention CT. Coil embolisation was also considered as a therapeutic modality. However, the demonstration of multiple small vessels distal to the PA would have made occlusion difficult by this method. Similarly, polyvinyl alcohol particles or cyanoacrylate could have been used (followed by coil embolisation of the proximal L3 trunk) but reflux into the aorta via the L2 lumbar collaterals might have occurred. Direct thrombosis of the PA with thrombin thus seemed the most appropriate treatment for this patient. There is only one report of a similar method of management for a PA arising from the profunda femoris artery.7

Whilst our patient was successfully treated by transcatheter thrombin injection some non-occlusive thrombus was noted in the third lumbar artery. This was either due to reflux of thrombin, despite gentle injection of a small volume, or withdrawal of clot from the PA when the coaxial catheter was removed. We would therefore caution the use of this technique when patency of the feeding artery is required. Other potential complications include reflux into the aorta with distal thrombosis or occlusion of the vascular bed beyond the PA. The latter might have resulted in a small risk of spinal cord ischaemia in this patient. Refilling of the PA following clot retraction is also theoretically possible, but does not seem to occur after percutaneous treatment of femoral PAs.8

In summary, transcatheter thrombin injection caused rapid thrombosis of the PA and is a useful addition to the transcatheter armamentarium. The technique may have a wider application, particularly in the management of endoleaks following endovascular aortic aneurysm repair.

References

4 Babu SC, Piccorelli GO, Shah PM, Stein J, Claus R. Incidence


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