CASE REPORT

Post-traumatic pseudoaneurysm of radial artery: Percutaneous treatment with thrombin injection

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Introduction

Most peripheral pseudoaneurysms are iatrogen or, less commonly, post-traumatic. A post-traumatic pseudoaneurysm is a localized haematoma with a persistent communication with the native artery via a narrow neck. Pseudoaneurysms have typical findings such as a pulsatile palpable mass, a “yin/yang” sign on colour flow imaging and the typical “to and fro” sign on Doppler waveform analysis. Pseudoaneurysm can arise from the venous segments or from the artery. Venous pseudoaneurysms have a low complication rate, but arterial pseudoaneurysms have an unpredictable natural history and complications include expansion, rupture, arterial thrombosis and the radial steal syndrome.

The diagnosis can be easily confirmed using colour duplex ultrasound. Ultrasound-guided manual compression is the usual method for the obliteration of a pseudoaneurysm but it is often time consuming, uncomfortable for the patient and staff, and not always successful.

Percutaneous ultrasound-guided thrombin injection has been reported for femoral artery pseudoaneurysms, the commonest site of iatrogenic trauma, and has been shown to be more effective than ultrasound-guided compression.

We report a case of percutaneous ultrasound-guided thrombin injection for the treatment of pseudoaneurysms located in site different from femoral artery.

Case report

A 31-year-old man, who cut his left wrist with a piece of glass, presented to the Emergency Department 20 days later, with a painful lump on the site of trauma.

Physical examination revealed a pulsatile mass on the volar region of his wrist.

Colour duplex sonography performed at Emergency Department showed a post-traumatic pseudoaneurysm with a typical yin yang pattern, measuring 10 mm x 8 mm, arising from the main radial artery (Fig. 1). An angiography exam through left brachial artery’s catheterism showed the post-traumatic pseudoaneurysm of the radial artery (Figs. 2 and 3).

Under ultrasound control, using a 12 MHz transducer attached to an ATL HDI 5000, a solution of bovine thrombin (1000 U/mL), with 22-gauge needle was percutaneously injected into the pseudoaneurysm sac.
During the injection colour duplex sonography showed a typical mosaic pattern with complete obliteration of the pseudoaneurysm (Fig. 4), and partial thrombosis of the distal part of the radial artery, confirmed also by digital substraction angiography (Fig. 5).

At 1, 3 and 6 months, the follow-up with colour duplex sonography, showed the exclusion of the pseudoaneurysm and patency of distal radial artery.

**Discussion**

A peripheral pseudoaneurysm rarely occurs without a history of trauma or surgical intervention.\(^4\)

Ultrasound-guided localized compression has been proposed as the initial treatment but it is a time consuming technique, because it takes from 10 to 300 min\(^14\) to obtain a complete exclusion of pseudoaneurysm and only a part of peripheral pseudoaneurysms are superficial and can undergo direct compression. Thrombin ultrasound-guided injection can be considered as an alternative; it is a pain-free technique and it does not require sedation or local anaesthetic, because the needle is usually tiny.
Paulson et al. and Kang et al. made a comparison between ultrasound-guided compression technique and thrombin injection showing a 93–96% success rate for thrombin injection versus 63–74% for sonography guided compression.5,9

Thrombin is a potent thrombus-inducing agent, which acts the conversion of fibrinogen to fibrin.12 In literature, it is reported that anticoagulation status of patient does not affect the efficacy of thrombin.10

A side-effect of thrombin injection is the potential for allergic reaction to products of bovine origin. Pope and Johnston described a case of anaphylactic shock that occurred after an injection of a product of bovine origin in a patient with previous exposure to bovine thrombin for topical use.12 Some reports have also stated that patients with repeated exposure to bovine thrombin develop antibodies against bovine factor V.

These antibodies can have a hybrid reaction with human factor V, causing coagulation abnormalities. The risk of an allergic reaction is theoretically reduced by using human thrombin. Recently, the use of autologous thrombin has been introduced to avoid the risk of anaphylaxis and prions contamination.6,9,13

Other potential complications are distal embolization and direct injection into the parent artery. These cases either resolved spontaneously or could be treated with heparin or urokinase.3

In our case, we observed a partial distal embolization of radial artery that resolved spontaneously. Kang et al. described that real-time colour monitoring during thrombin injection improves the safety and efficiency of the technique, because the tip of the needle can be observed throughout the procedure.5

The tip must be located just in the centre of the pseudoaneurysm; after thrombin injection into pseudoaneurysm clot forms progressively and concentrically away from the needle tip. During thrombin injection colour shows a pattern defined “mosaic effect”.

In our experience, percutaneous thrombin injection is a safe and effective procedure that requires simple needle placement without the need of sedation, with high success rate; it can be used for pseudoaneurysms located at uncommon sites.

References