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Percutaneous thrombin injection for the treatment of a post-pancreatitis pseudoaneurysm

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Abstract Visceral artery pseudoaneurysms are often treated surgically or by transcatheter embolisation. We report a case of a pseudoaneurysm in a patient with chronic pancreatitis, which was successfully occluded by percutaneous injection of thrombin into the pseudoaneurysmal sac as a first-line management.

Keywords Percutaneous · Thrombin injection · Pseudoaneurysm · Pancreatitis · CT

Introduction

Sixty-eight percent of visceral artery pseudoaneuryms are secondary to pancreatitis and pseudocyst formation. Surgical intervention and transcatheter embolisation have been the accepted modes of treatment for these pseudoaneurysms [1].

More recently, percutaneous thrombin injection has been widely used as a safe, atraumatic and effective treatment for femoral artery pseudoaneurysms [2, 3]. Its use has also been described for the management of pancreatic head pseudoaneurysm [4]. We report a successful case of percutaneous thrombin injection in the management of a pseudoaneurysm secondary to pancreatitis.

Case report

A 62-year-old man known to have severe emphysema presented to the clinic with a 3-month history of abdominal pain and reduced appetite. Clinical history and examination suggested chronic pancreatitis. Laboratory investigations revealed the haemoglobin to be 10.8 g/dl, white cell count 13.1×10.9/l and normal amylase levels. Liver function tests were mildly deranged. Helical CT of his abdomen identified a 5.0-cm pseudoaneurysm anterior to the tail of the pancreas in the lesser sac (Fig. 1). An area of focal inflammation in relation to the tail of pancreas was identified consistent with focal pancreatitis. The spleen was normal in size. The feeding artery to the pseudoaneurysm was splenic as determined by CT vascular reconstructions. In view of his underlying emphysema, the patient was deemed to be a high anaesthetic risk and was therefore unsuitable for surgery. A percutaneous injection of Beriplast P (Centeon Pharma, Marburg, Germany) was planned. The Beriplast P package contains two combisets: one containing human thrombin and the other containing fibrinogen. We only used human thrombin, which was reconstituted using calcium chloride provided in the kit. An initial attempt to inject the pseudoaneurysm was made using ultrasound, but this was felt to be unsafe due to obscuration by bowel gas. The injection was therefore performed under CT guidance. In the supinal position and under local anaesthesia 1000 IU (2 ml) of human thrombin was injected percutaneously into the pseudoaneurysmal sac using a 21-G spinal needle. Complete occlusion of the lumen was demonstrated on CT scan immediately following the injection (Fig. 2). A follow-up CT scan at 4 weeks revealed partial recanalization of approximately one-third of the

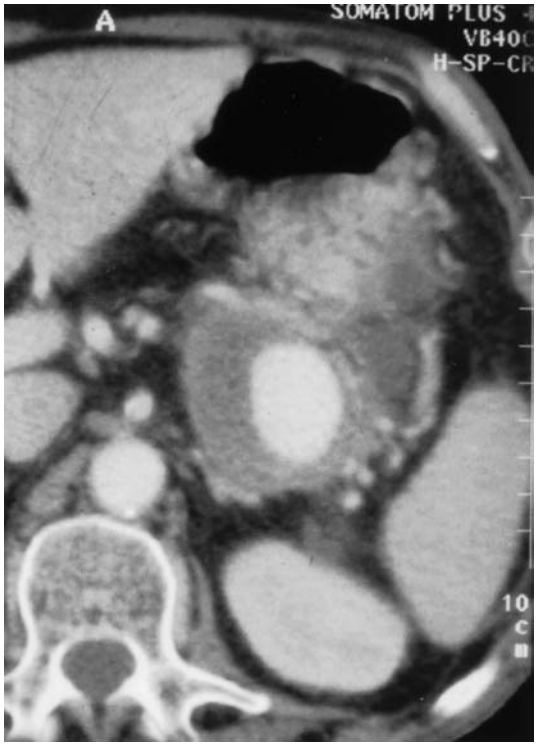

Fig. 1 Pre-treatment CT scan demonstrates a 5.0-cm splenic artery pseudoaneurysm in the lesser sac

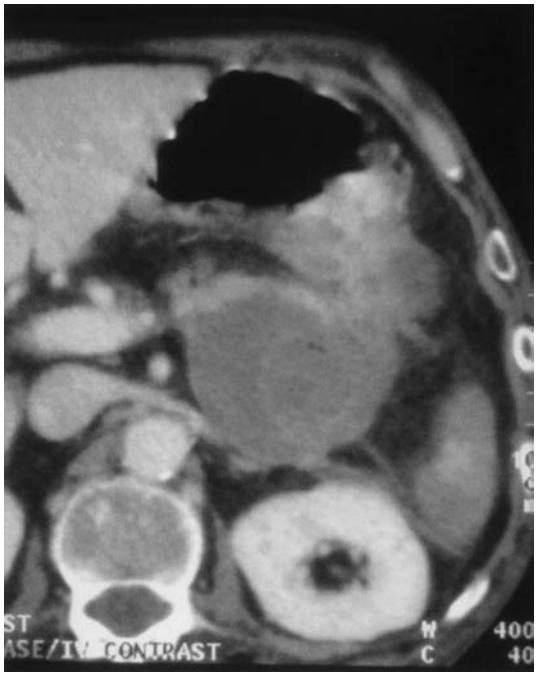

Fig. 2 A CT scan at the time of initial injection with Beriplast shows complete occlusion of the lumen. Patchy low attenuation of the spleen is attributable to distal embolisation into the splenic artery

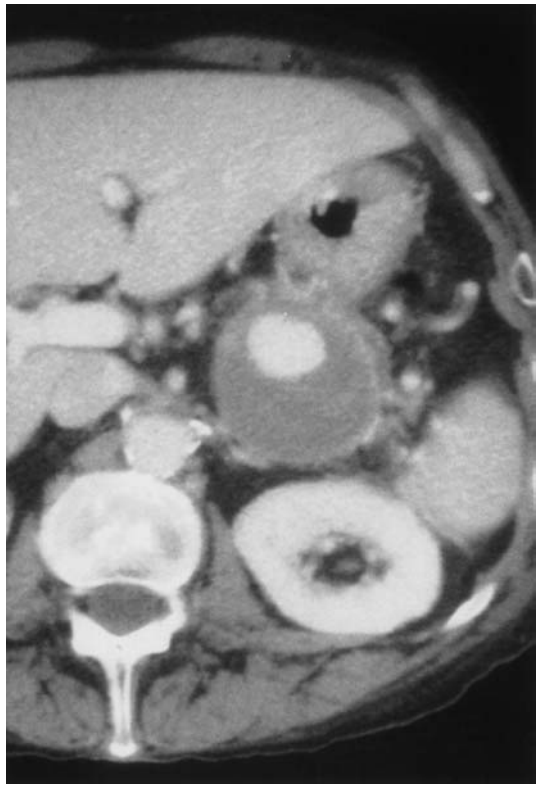

Fig. 3 Recanalisation of the pseudoaneurysm at the follow-up scan 4 weeks after the first injection. There is no change in the size of the pseudoaneurysmal sac

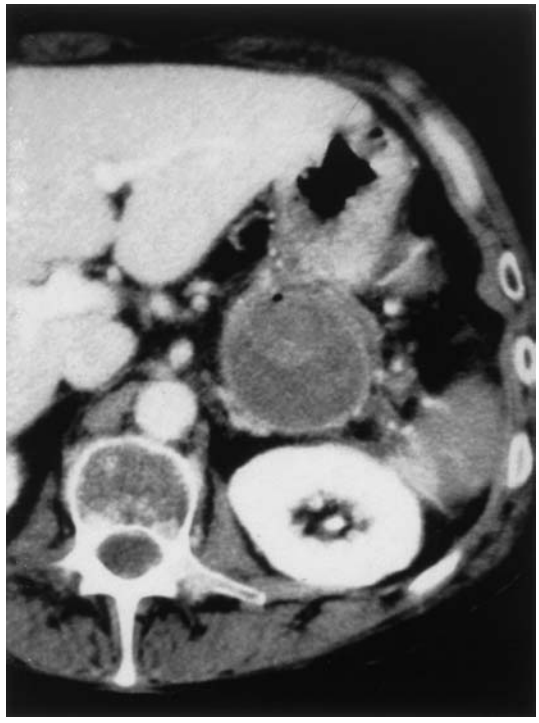

Fig. 4 Complete thrombosis of the lumen is achieved immediately after the second injection of Beriplast

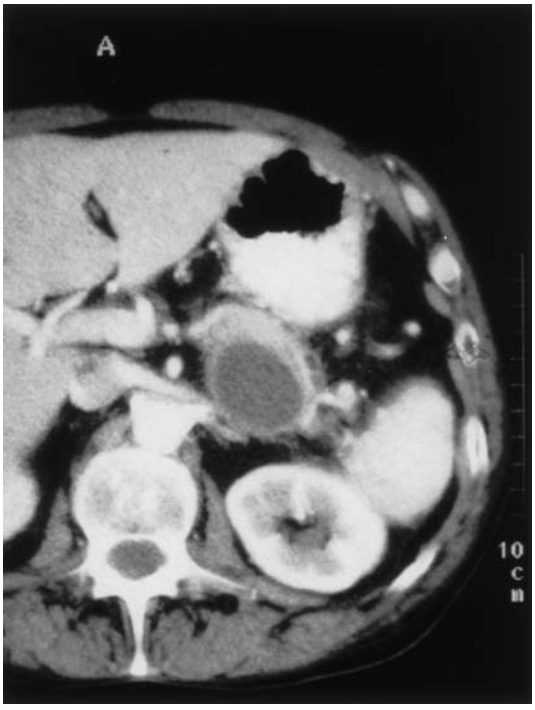

Fig. 5 Follow-up CT scan at 8 weeks shows no evidence of recanalisation. The lumen remains occluded. Note the reduction in the size of the pseudoaneurysmal sac from 5.0 to 3.8 cm

lumen (Fig. 3). The patient was then recalled for a repeat injection of Beriplast when 1000 IU of human thrombin was reinjected (Fig. 4). Both procedures were uneventful. The patient did not have any adverse effects from the treatment. The CT scan performed 8 weeks following the second injection confirmed complete occlusion of the lumen with a decrease in the size of the sac from 5.0 to 3.6 cm (Fig. 5). To date, the patient remains well after 6 months of follow-up with no evidence of recanalisation.

Discussion

Percutaneous injection of thrombin, a potent thrombosis-inducing agent, has been widely used as a simple and effective solution for the treatment of femoral artery pseudoaneurysms [2, 3], most of which are iatrogenic. Its use has also been reported in the treatment of axillary artery [5], subclavian artery [6], splanchnic artery [7] and pancreatic head pseudoaneurysm [4]. We used it successfully in the management of a splenic artery pseudoaneurysm in a patient with chronic pancreatitis. There was partial recanalisation after the initial injection and complete thrombosis was achieved after the second injection. Both the procedures were uneventful and achieved in 10–15 min under CT guidance. No sedation or anaesthesia was required for the procedure, which was performed under local anaesthesia. No other local or systemic side effects were noted.

The inflammation and enzymatic auto digestion associated with pancreatitis and coexisting pancreatic pseudocyst can disrupt pancreatic and peripancreatic vascular structures. Release of pancreatic enzymes results in necrotising arteritis with destruction of vessel architecture and fragmentation of its elastic tissue leading to aneurysm or pseudoaneurysm formation and gastrointestinal bleeding [8]. The splenic artery is the most commonly affected vessel followed by gastroduodenal, pancreaticoduodenal, pancreatic, gastric, and hepatic arteries. Aneurysms and pseudoaneurysms are reported in 10–21% of patients with chronic pancreatitis [8]. The treatment until recently has been by surgical ligation or transcatheter embolisation.

Several forms of thrombin are commercially available. Bovine thrombin has been used for many years but carries a risk of anaphylaxis [9]. The use of human thrombin obviates the immunological risks associated with the bovine form [10]. Autologous thrombin is a cheaper alternative than commercial bovine or human thrombin and obviates the risk of anaphylaxis and contamination with prions [11]. Although most of the reports using thrombin for the treatment of pseudoaneurysms have emphasized the high success rate and safety of this technique, the potential complication of downstream embolisation into the arterial system, although rare, is well recognized [12, 13].

In our case, patchy low attenuation was noted in the spleen after the first injection (Fig. 2). We attribute this to minor embolisation distally into the splenic vasculature. This was, however, not associated with any significant clinical sequelae as has been reported previously [12, 13].

The amount of thrombin used to inject the pseudoaneurysm therefore requires careful consideration and needs to be titrated according to the volume of the flowing component of the pseudoaneurysm to minimize the risk of distal embolisation.

In conclusion, percutaneous thrombin injection appears to be a safe, minimally invasive and effective alternative to surgery for treating visceral artery pseudoaneurysms.

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