CASE REPORT

Transarterial catheter embolisation for an unusual cause of upper gastrointestinal haemorrhage

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Accepted 10 May 2015

SUMMARY

A 72-year-old man with a history of gallstones, and complex cardiac and endocrinological comorbidities, presented with severe abdominal pain and melaena. CT mesenteric angiogram showed a cystic artery pseudoaneurysm and gallbladder distended by haematoma. Subsequent mesenteric angiography confirmed a cystic artery pseudoaneurysm, which was successfully embolised with microcoils. The patient made a rapid recovery and was discharged after 3 days.

BACKGROUND

Gallstones are a common finding in the general population; cystic artery pseudoaneurysms are very rare. Rupture of a pseudoaneurysm with associated haemobilia and upper gastrointestinal haemorrhage is a potentially life-threatening condition.

This case demonstrates how rapid diagnosis and prompt embolisation can quickly achieve haemostasis and obviate the need for emergency surgery, and improve patient outcomes. Interval cholecystectomy should be considered to prevent further pseudoaneurysm formation and recurrent haemobilia, however, only a few publications have reported excellent long-term outcomes for treatment with embolisation alone. This case demonstrates how the sole use of this technique may be a viable life-saving option in a truly complex surgical candidate.

CASE PRESENTATION

A 72-year-old man attended his local district general hospital with right upper quadrant pain, deranged liver function tests and mildly raised lipase. Gallstones had been diagnosed on ultrasound examination of the abdomen 2 weeks previously when he had presented with abdominal pain to his GP (figure 1). The patient was therefore initially treated for a presumed diagnosis of gallstone pancreatitis.

The patient had a complex medical history that included hypertension, implantable cardiac defibrillator for ventricular tachycardia and Conn's syndrome. The patient was warfarinised with an international normalised ratio of 1.8 on admission.

Within 24 h of admission, the patient developed two episodes of melaena and one episode of haematemesis. On clinical review, he was tachycardic (heart rate 112) but hypertensive (blood pressure 188/110). He was clammy and sweaty, and a PR examination revealed altered blood in the rectum. Full blood count showed low haemoglobin of 8.4 g/dL (normal = 13–18 g/dL).

Figure 1 Ultrasound image demonstrating a 2 cm gallstone (white arrow) lying at the neck of a distended, mildly thick-walled gallbladder filled with a layering of sludge.

INVESTIGATIONS

An upper gastrointestinal endoscopy demonstrated a submucosal ulcer in the inferior bulb of the proximal duodenum, but no evidence of active bleeding. Haemorrhage from the ampulla was not present at the time of investigation.

A triple phase (unenhanced, arterial and portal venous) mesenteric CT angiogram was performed to identify the source of haemorrhage. Unenhanced images demonstrated a distended gallbladder containing mixed density material consistent with

Figure 2 Unenhanced axial CT image demonstrating the gallbladder distended by haematoma (white arrow).

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To cite: Shelmerdine SC, Ameli-Renani S, Lynch JO, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-206837

Figure 3 (A) Arterial phase axial CT image demonstrating a cystic artery pseudoaneurysm (white arrow). (B) Coronal maximum intensity projection image demonstrating the cystic artery pseudoaneurysm clearly (white arrow). Note the artefact within the left ventricle from the patient's implantable cardioverter.

haematoma (figure 2). Following administration of intravenous iodinated contrast media, arterial phase images revealed a cystic artery pseudoaneurysm (figure 3A, B).

TREATMENT

The patient was fluid resuscitated and transfused with 3 units of packed red cells. Prothrombin complex concentrate, vitamin K and tranexamic acid were prescribed to reverse the effects of warfarin, and treat any evolving coagulopathy. The patient was urgently transferred to our institution for percutaneous transarterial embolisation.

Following common femoral artery puncture, the common hepatic artery was selectively catheterised. Diagnostic angiography confirmed a 6 mm pseudoaneurysm arising from the cystic artery (figure 4A). No active extravasation was demonstrated during the procedure itself. The cystic artery in this patient arose from the right hepatic artery, the most common anatomical arrangement (figure 4B). A microcatheter was introduced into the cystic artery, which was subsequently embolised with fibred platinum microcoils. Postembolisation angiograms revealed no residual filling of the pseudoaneurysm (figures 5 and 6).

OUTCOME AND FOLLOW-UP

The patient made an uncomplicated recovery and was discharged home 3 days postembolisation. An outpatient appointment was made with the local general surgical team for ongoing follow-up.

DISCUSSION

Cystic artery pseudoaneurysm formation is rare.^{1–3} The majority (85% cases⁴) of reported cystic artery pseudoaneurysms have been attributed to traumatic or postsurgical causes.^{5–6} Only 21 cases of cystic artery pseudoaneurysm formation relating to calculous cholecystitis have been reported in the medical literature before 2013,⁷ with a further four cases published within the last year.^{8–11}

It has been proposed that repeated mechanical trauma to the gallbladder wall from gallstones may cause a local inflammatory reaction^{12–13} with involvement of the adjacent cystic artery wall.^{1–14–16} Persistent inflammation will lead to weakening of the arterial wall and pseudoaneurysm formation.

The classical signs and symptoms of haemobilia consist of biliary colic, obstructive liver function tests and upper gastrointestinal bleeding—the so-called 'Quinke's Triad'.⁷ Nevertheless, the

Figure 4 (A) Selective catheter angiogram via the common hepatic artery demonstrating the cystic artery and cystic artery pseudoaneurysm (white arrow). (B) Right anterior oblique angiogram performed with catheter in same position as in A better demonstrates the origin of the cystic artery (arrow) arising from the right main hepatic artery.

Figure 5 Superselective catheter angiogram via microcatheter sited within the cystic artery pseudoaneurysm.

Figure 6 Postembolisation angiograms show exclusion of the pseudoaneurysm.

diagnosis is rarely clear-cut as these three modes of presentation occur in only 32–40% of cases and rarely all at the same time.^{17–21}

Increased availability of interventional radiological procedures has facilitated a beneficial change in the treatment of cystic artery pseudoaneurysms. Traditionally, surgical ligation of the haemorrhaging vessel with cholecystectomy had been considered the only method of achieving satisfactory outcomes.^{4, 22} This was later followed by successful reports detailing the advantages of a ‘two-staged approach’ with radiologically-guided embolisation to achieve haemodynamic stabilisation and patient optimisation prior to subsequent cholecystectomy.^{17, 19, 23–26}

In this case, the patient’s multiple medical comorbidities placed him at high risk of surgical as well as anaesthetic complications. Emergency cholecystectomy was not considered a safe option.

It is possible to embolise the cystic artery because the gallbladder receives collateral blood supply from multiple perforating arteries arising from the gallbladder bed (the same vessels that can bleed during dissection of the gallbladder during cholecystectomy). There has been a concern that sudden interruption to the major arterial supply might cause ischaemia and inflammation. In an experimental porcine model, this was found not to be the case and no adverse outcomes were observed.²⁷

Three published cases described the management of cystic artery pseudoaneurysm solely by percutaneous embolisation, with complication-free survival ranging from 12 to 24 months.^{9, 15, 28} In these cases, surgical intervention was avoided either due to a presumed high risk of mortality or patient refusal.

Complication rates from percutaneous embolisation of cystic artery pseudoaneurysms are around 2% and considered to be

lower than with emergency cholecystectomy.^{29–31} Complications include gallbladder ischaemia²¹ and perforation, coil migration into bile ducts and recurrent haemorrhage.^{29, 32} In a case report by Priya *et al*,⁷ migration of a microcoil resulted in recurrent haemorrhage and emergency surgery was necessary to control the bleeding.

Following discharge, patients who have undergone embolisation should have out-patient follow-up and be informed of

Learning points

- ▶ Presenting symptoms of haemobilia may include upper or lower gastrointestinal bleeding, right upper quadrant pain and jaundice (Quinke’s triad), although not necessarily at the same time.
- ▶ CT mesenteric angiography is essential in the initial assessment of gastrointestinal haemorrhage for identifying the source of haemorrhage and facilitating procedure planning.
- ▶ Embolisation is a safe and effective treatment of haemobilia and gastrointestinal haemorrhage secondary to cystic artery pseudoaneurysm.
- ▶ If interventional radiology facilities are not available locally, prompt transfer to a tertiary referral centre for percutaneous embolisation should be considered.
- ▶ Following successful embolisation, interval cholecystectomy should be considered.

symptoms indicating cholecystitis, gallbladder ischaemia and haemorrhage.^{15–19} Careful informed patient consent prior to embolisation should bear in mind the potential risks and include discussion regarding patient choice surrounding subsequent surgical intervention.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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