CASE REPORT

An insidious case of hepatic artery pseudoaneurysm secondary to acalculus cholecystitis

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SUMMARY

A 68-year-old man with expressive dysphasia presented with upper gastrointestinal haemorrhage, jaundice and abdominal pain. He was unable to tolerate ultrasound transducer pressure. His oesophagogastroduodenoscopy (OGD) showed large blood clots in the stomach with blood trickling from the ampulla. An urgent CT angiogram demonstrated a 32 mm pseudoaneurysm within the gallbladder fossa. The patient subsequently underwent an endovascular embolisation of the pseudoaneurysm performed by the interventional radiology team.

BACKGROUND

Visceral artery aneurysms (VAAs), including pseudoaneurysms, are rare but can be potentially lethal. They have a prevalence of 0.1–2%.¹ It is estimated that hepatic artery aneurysms account for 20% of all VAAs.²

Most patients with VAAs are asymptomatic and are diagnosed incidentally via abdominal ultrasound, CT imaging or angiography,^{1–3} whereas most patient with pseudoaneurysms are symptomatic.¹ However, patients can present with one or more of Quincke's triad (upper gastrointestinal haemorrhage, jaundice and colicky right upper quadrant abdominal pain), particularly if there is rupture into the biliary tree. Patients rarely present with aneurysmal rupture into the peritoneal cavity.² Common presentation includes rupture in 30–40% cases with an associated mortality of 25–70%.⁴

We present this case report to highlight the importance of considering the possibility of hepatic artery aneurysm in patients presenting with malaena and haematemesis, with otherwise normal endoscopic findings.

CASE PRESENTATION

A 68-year-old man presented to accident & emergency from his nursing home, with haematemesis, malaena and jaundice. His medical history included a previous stroke with residual expressive dysphasia (2008) and a left carotid endarterectomy that same year. There was no history of any recent surgery.

On examination, he was jaundiced with mild upper abdominal tenderness but no peritonism or organomegaly. His systolic blood pressure was 78 mm Hg and he had a heart rate of 101 bpm.

INVESTIGATIONS

On admission, the patients bloods showed a low hemoglobin (Hb) (90 g/L falling to 64 g/L the next day), raised urea (18.7 mmol/L) and creatinine (168 µmol/L), high C reactive protein (145 mg/L),

elevated bilirubin (145 µmol/L), alanine aminotransferase (135 IU/L) and alkaline phosphatase (715 IU/L). His amylase was normal.

He proceeded to have an ultrasound scan, which was suboptimal, as the patient was unable to tolerate the transducer pressure.

This was followed by an urgent OGD, which revealed large fresh clots in the stomach. There were no varices, stomach ulcers or duodenal ulcers. However, it was noticed that there was blood trickling out from the duodenal ampulla.

An urgent CT angiogram was arranged, which demonstrated a 32 mm pseudoaneurysm formation within the gallbladder fossa (figure 1) involving the right hepatic artery, secondary to cholecystitis (figure 2). No gallstones were seen on CT.

DIFFERENTIAL DIAGNOSIS

Hepatic artery pseudoaneurysm, secondary to undetected acalculus cholecystitis due to the patient's expressive dysphasia.

TREATMENT

The patient received several units of blood transfusion to correct his low Hb.

He was also reviewed by the surgical team, who felt that, due to his multiple comorbidities and poor functional status, there was a high mortality risk with any surgical intervention, including laparoscopic cholecystectomy.

It was decided that the best option would be for emergency endovascular embolisation of the pseudoaneurysm to stop the bleeding.

A subsequent angiogram showed a 3 cm pseudoaneurysm arising from one of the lower branches of the right hepatic artery (figure 3). This was followed by coil embolisation, via insertion of 3 mm

Figure 1 CT angiogram demonstrating a hyperdense area within the gallbladder fossa.

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Figure 2 CT demonstrating cholecystitis with pericholecystic fluid collection.

MREYE coils across the neck of the pseudoaneurysm ([figure 4](#)). Prior to the procedure, the patient was warned about the possible risk of liver damage postembolisation.

OUTCOME AND FOLLOW-UP

Postembolisation, the patient continued to have some malaena. A repeat CT angiogram was performed, which showed a small area of infarction in the right lobe of the liver (segment VI), but no active bleeding. The patient continued to have small amounts of malaena intermittently for 9 days postembolisation, which resolved without need for further intervention.

The patient's liver function tests and jaundice also improved and he was discharged from hospital.

The patient had a full liver and vasculitic screen, all of which were negative.

DISCUSSION

VAAs are rare. Hepatic artery aneurysms, which comprise 20% of VAAs, are even rarer. True aneurysms generally involve all

Figure 3 Angiography showing pseudoaneurysm arising from one of the lower right hepatic artery branch.

Figure 4 Angiography after coil embolisation.

three layers of the arterial vessel wall (intima, media and adventitia), whereas pseudoaneurysms are defined as pulsating, encapsulated haematomas, with a connection to the lumen of the ruptured vessel through a hole in the vessel's wall.⁵

This distinction can be made through imaging and clinically. Radiologically, for pseudoaneurysms, there is evidence of focal arterial disruption in an otherwise normal artery. Inflammation surrounding an irregular aneurysmal wall also suggests a pseudoaneurysm. Clinically, it is typically associated with a history of trauma, intra-abdominal or retroperitoneal inflammation (including cholecystitis), malignancy or biliary tract manipulation.^{1 4}

From the literature, only eight cases of hepatic artery pseudoaneurysms secondary to cholecystitis have ever been reported in English. They are listed in [table 1](#).

However, increasing numbers of percutaneous biliary interventions, liver transplants and non-operative management of abdominal trauma, have led to a rise in the incidence of hepatic artery pseudoaneurysms.³

The distinction between pseudoaneurysms and true aneurysms is a clinically important one.

A study by Tulsyan *et al*¹ estimated that 89% of visceral artery pseudoaneurysms were symptomatic at presentation, compared to VAAs, where only 30% presented symptomatically.

Conventionally, indications for treatment of VAAs (and pseudoaneurysms) are: aneurysms larger than 2 cm, rapidly enlarging aneurysms, symptomatic aneurysms, infected aneurysms and aneurysms in women of gestational age, as they carry a high risk of rupture.^{1 5} However, this has been based on studies looking at true aneurysms.

Owing to the rarity of visceral artery pseudoaneurysms, there are few studies comparing their natural history to true aneurysms. Moreover, most studies do not differentiate between true aneurysms and pseudoaneurysms.¹ However, a cumulative review of splenic artery pseudoaneurysms showed that size was not a reliable predictor of the risk of rupture and recommended repair regardless of symptoms or size.¹⁴

Currently, options include open surgical repair (ligation, excision, venous grafting, synthetic grafting and hepatic resection) or endovascular treatment (percutaneous embolisation or stent-grafting). The latter is now generally preferred as it is minimally invasive with a lower complication rate compared to open surgery.^{1 4 15} It is also considered first-line treatment for intra-hepatic aneurysms.³ Common complications reported include

Table 1 Hepatic artery pseudoaneurysms associated with cholecystitis, in the literature

Reference	Age	Gender	Presentation	Method of diagnosis	OGD	Management
Poon <i>et al</i> ⁶	78	M	Upper GI bleed, RUQ pain	Angiography	Duodenal fistula	Embolisation
Akatsu <i>et al</i> ⁷	64	F	Upper GI bleeding	US Doppler	Blood from ampulla	Embolisation
Lin <i>et al</i> ⁸	73	M	RUQ pain, Upper GI bleed	MRI	Blood from ampulla	Surgical ligation of RHA, cholecystectomy
Bennett <i>et al</i> ⁹	85	M	Abdominal pain, jaundice	CT	NA	Embolisation
Arroja <i>et al</i> ¹⁰	72	M	Upper GI bleed, RUQ abdominal pain	Angiography	Blood from ampulla	Embolisation
Ramirez-Maldonado <i>et al</i> ¹¹	70	F	Abdominal pain, epigastric mass	CT	n/a	Embolisation
Habib and Williams ¹²	52	F	Upper GI bleeding	CT	Normal	Embolisation
Hangai <i>et al</i> ¹³	50	M	Fever, RUQ pain	US Doppler	n/a	Embolisation

GI, gastrointestinal; NA, not available; RHA, right hepatic artery; RUQ, right upper quadrant; US, ultrasonography.

groin haematomas, pseudoaneurysms, arterial thrombosis, hepatic ischaemia, abscess and cholecystitis.^{3 16}

In this case, the patient had grossly raised liver function tests postembolisation, which normalised over the next few weeks.

Learning points

- ▶ Hepatic artery pseudoaneurysm is a rare but potentially life threatening condition.
- ▶ Patients may present acutely with upper gastrointestinal bleeding, jaundice and biliary colic.
- ▶ Pseudoaneurysms may be more prone to rupture than true aneurysms, and require urgent, aggressive treatment, regardless of size.
- ▶ Options include open surgical repair or endovascular treatment.
- ▶ The latter is preferred due to its minimal invasiveness and lower complication rate.

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