

Inferior pancreaticoduodenal artery false aneurysm: a rare cause of gastrointestinal bleeding diagnosed by three-dimensional computed tomography

Colak M C, Kocaturk H, Bayram E, Karaca L

ABSTRACT

We report a 57-year-old man who presented with a two-month history of persistent epigastric pain associated with indigestion, weight loss and jaundice. Contrast-enhanced computed tomography revealed a large pseudoaneurysm 87 mm × 68 mm in diameter, with its origin from the inferior pancreaticoduodenal artery of the superior mesenteric artery and in continuity with an ectatic gastroduodenal artery. The aneurysmal mass exerted direct pressure over the head of the pancreas, common bile duct and duodenum, causing obstruction. Non-selective abdominal angiography confirmed the aneurysm stemming from the inferior pancreaticoduodenal artery. Because of the obstructive symptoms and the size of the aneurysm, surgery was planned, but the patient refused and died from massive gastrointestinal bleeding one month later.

Keywords: computed tomography, gastrointestinal haemorrhage, inferior pancreaticoduodenal artery, pancreaticoduodenal artery rupture, pseudoaneurysm

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INTRODUCTION

Pancreaticoduodenal artery aneurysms are rare, accounting for only 2% of all splanchnic artery aneurysms, but they are important vascular diseases because of their potential for fatal rupture.^(1,2) False pancreaticoduodenal artery aneurysms can occur after pancreatitis, abdominal trauma, septic emboli or laparoscopic cholecystectomy, and they often rupture into the gastrointestinal tract, whereas true aneurysms are usually associated with coeliac axis stenosis, and rupture into the retroperitoneal space.⁽¹⁻³⁾ A review of the literature indicates that the most common complication

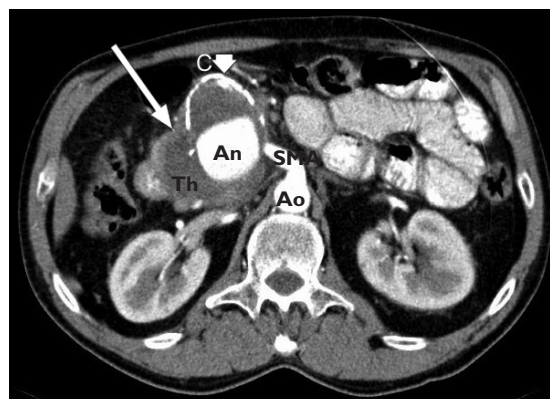


Fig. 1 Contrast-enhanced axial CT image shows a pseudoaneurysm (long arrow) surrounded by thrombus with extensive calcification (short arrow).

An: aneurysm; C: calcification; Th: thrombus; Ao: aorta; SMA: superior mesenteric artery

of such aneurysms is rupture, usually causing massive haemorrhage with an associated high mortality rate.^(2,4) We present a large inferior pancreaticoduodenal artery pseudoaneurysm that ruptured into the gastrointestinal tract, leading to the patient's death.

CASE REPORT

A 57-year-old Caucasian man presented to our hospital with a two-month history of persistent epigastric pain associated with indigestion, weight loss and jaundice. His past medical history included recurring attacks of epigastric discomfort and chronic alcohol abuse. The physical examination revealed a palpable beating mass in the epigastrium. The biochemical investigation showed obstructive jaundice: gamma-glutamyl transferase 368 (reference range [RR] 8–61) U/L; alkaline phosphatase 352 (RR 40–129) U/L; total serum bilirubin 8.5 (RR < 1.0) mg/dL; direct bilirubin 7.17 (RR < 0.2) mg/dL; alanine aminotransferase 123 (RR < 41) U/L; aspartate aminotransferase 41 (RR < 38) U/L. Ultrasonography (US) and Doppler US showed a widening of the biliary tree (common bile duct diameter of 17 mm) and a cystic

Department of
Cardiovascular
Surgery,
Firat University
School of Medicine,
Elazig 23119,
Turkey

Colak MC, MD
Assistant Professor

Department of
Cardiology,
Sifa Hospital,
Erzurum 25100,
Turkey

Kocaturk H, MD
Cardiologist

Department of
Radiology

Karaca L, MD
Radiologist

Department of
Cardiology,
State Hospital,
Erzurum 25070,
Turkey

Bayram E, MD
Cardiologist

Correspondence to:
Dr Hasan Kocaturk
Tel: (90) 442 329 0000
Fax: (90) 442 329 0420
Email: haskaturk@
hotmail.com

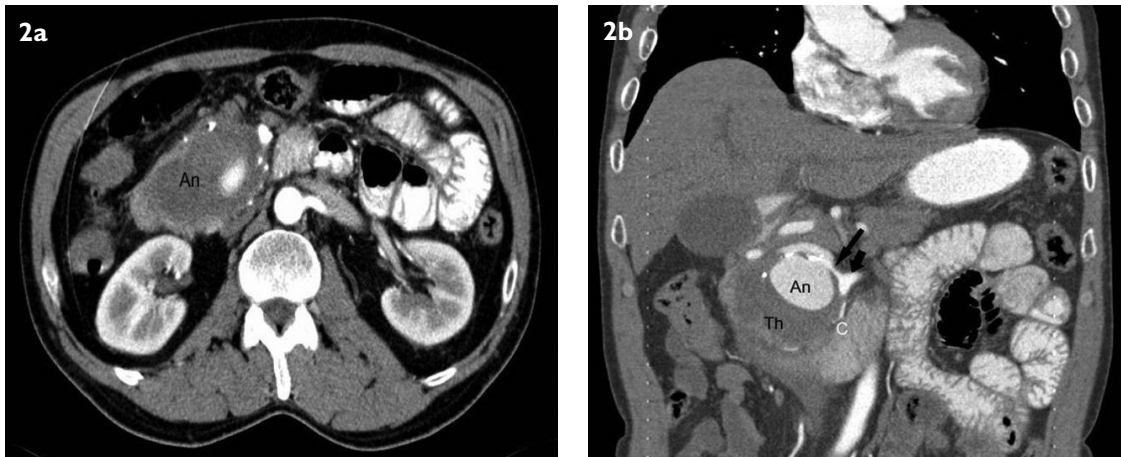


Fig. 2 (a) Axial CT image shows the pseudoaneurysm with contrast medium centrally surrounded by a massive thrombus with external calcification. (b) Coronal CT image clearly shows a pseudoaneurysm arising from the inferior pancreaticoduodenal artery (long arrow) branch of the superior mesenteric artery (short arrow), and causing compression to the duodenum. An: aneurysm; Th: thrombus; C: calcification

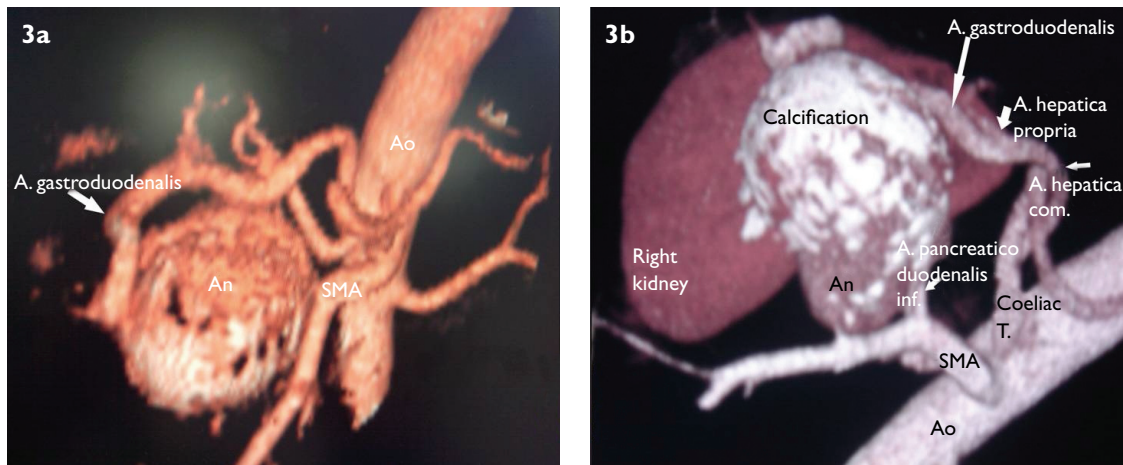


Fig. 3 (a, b) 3D CT images clearly show the false aneurysm stemming from the inferior pancreaticoduodenal artery with external calcification and associated vessels; and in continuity with an ectatic gastroduodenal artery. A: artery; An: aneurysm; Ao: aorta; SMA: superior mesenteric artery

mass in the pancreatic head with turbulent flow, suggesting a pseudoaneurysm supplied by the superior mesenteric artery. Dynamic axial and coronal computed tomography (CT) of the abdomen performed with intravenous contrast material showed an enhancing aneurysmal mass with well-demarcated borders surrounded by low-density areas, which was in accordance with a thrombus with extensive calcification on the outer surface of the aneurysm (Figs. 1 & 2). The 87 mm × 68 mm aneurysmal mass produced direct pressure over the common bile duct and the head of the pancreas and duodenum, resulting in an obstruction of the pancreatic ducts, common bile duct and duodenum (Fig. 2). Three-dimensional CT revealed a pseudoaneurysm originating from the inferior pancreaticoduodenal artery branch of the superior mesenteric artery, and in continuity with an ectatic gastroduodenal artery (Fig. 3). The coeliac

axis was normal. Abdominal aortography confirmed the diagnosis and showed that this mass had recovered blood circulation (Fig. 4). An operation was scheduled, but the patient refused surgery and remained jaundiced. One month later, his previous symptoms were aggravated, and he was readmitted to the hospital. Within two hours of admission, he experienced abundant haematemesis and hypotension, which did not respond to fluid resuscitation, and died from massive gastrointestinal haemorrhage.

DISCUSSION

Aneurysm originating from the inferior pancreaticoduodenal artery is a rare diagnosis among the group of the aneurysms of the visceral arteries.⁽⁵⁾ Our patient developed a large pseudoaneurysm 87 mm × 68 mm in diameter, originating from the inferior pancreaticoduodenal artery. To the best of our

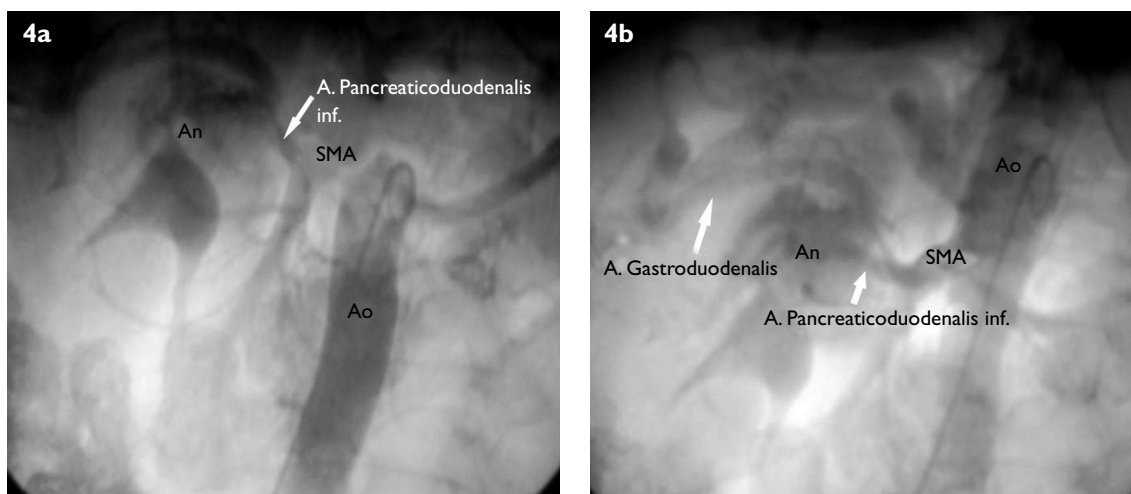


Fig. 4 (a, b) Anteroposterior views from aortography after injection through a 6F pigtail catheter show the blood circulation of the aneurysm to be in continuity with the enlarged gastroduodenal artery.
An: aneurysm; Ao: aorta; SMA: superior mesenteric artery

knowledge, it is the first time that this has been reported in the literature. Pseudoaneurysms occur as a result of damage to the wall of an artery.^(2,6) In our case, recurring attacks of abdominal discomfort and longstanding alcohol abuse made chronic pancreatitis the most possible aetiology, because the patient had no medical history of abdominal trauma, septic emboli, carcinoma or cholecystectomy. Although pseudoaneurysms in chronic pancreatitis develop more often in the splenic and gastroduodenal arteries because of their proximity to the pancreas,^(2,4) it arose in our patient from the inferior pancreaticoduodenal artery, and the aneurysm led to sufficient pressure over the pancreas to obstruct the flow of pancreatic secretions, which may have resulted in the recurring attacks of pancreatitis.

CT is an excellent modality and demonstrates the features of pseudoaneurysm in the majority of cases in the initial differential diagnosis. Angiography also plays a critical role and is considered the gold standard for diagnosis of aneurysms in the peripancreatic vessels.^(4,6) Furthermore, associated vascular anomalies can also be revealed, which may be of primary significance for the operating surgeon, and provides a potential means for treatment via transcatheter embolisation.^(4,6) Acute haemorrhage is a life-threatening complication of pseudoaneurysm, with a high mortality rate of up to 37%.⁽⁶⁾ The high morbidity and mortality associated with a false aneurysm emphasises the importance of early diagnosis and treatment, as in our case.^(6,7) The risk of rupture is not dependent on the size of the aneurysm. Hence, it is advocated that all pancreaticoduodenal artery aneurysms, regardless of size, be treated actively at the time of the diagnosis. The two possible treatments for pseudoaneurysm are surgery or angiographic embolisation.^(1,7,9)

The accepted gold standard for treatment of visceral artery aneurysm is surgery.^(1,4,6,8,9) Endoluminal techniques have now become the first line of therapy instead of surgery in most instances, especially in an emergency setting, but they have also been used successfully in elective patients. The most widely-used materials to embolise or exclude the aneurysm from visceral circulation are coils, gelfoam, polyvinyl alcohol and flow directed detachable balloons.^(2,7-9) A review of the literature indicates that true aneurysms and pseudoaneurysms of the pancreaticoduodenal artery are treated via endoluminal techniques, which have a lower procedure mortality and a high success rate.^(2,8-10) Due to the large size of the pseudoaneurysm of our patient, resulting in direct pressure over the common bile duct and the head of the pancreas and duodenum, surgery was considered to be the treatment of choice. Endoluminal techniques might have been effective in our patient, but it could not be easily used as an alternative to surgery in such a huge aneurysm, where the mass effect is the underlying cause of the symptoms.⁽⁴⁾ Our review of the literature did not reveal any reported cases of aneurysms with a diameter above 87 mm in an emergency setting, and the treatment of such a huge aneurysm in the inferior pancreaticoduodenal artery by endoluminal techniques has also not been reported.

Surgical treatment was recommended while our patient was in a relatively stable clinical condition during his hospitalisation. However, after his clinical status deteriorated, endoluminal embolisation was recommended, but unfortunately, this was not possible because of the rapid degradation of the patient's status and haemorrhagic shock. A review of the literature shows that more deaths occurred in an emergency setting than

in elective patients treated by endovascular techniques for vascular aneurysms.^(1,9) Endovascular intervention complicated by reperfusion, recurrent bleeding and failure of intervention may also necessitate surgery and/or reintervention.^(1,11) To the best of our knowledge, this is the first case report of a 87 mm × 68 mm pseudoaneurysm originating from an inferior pancreaticoduodenal artery. Visceral aneurysms, though rare, should be borne in mind in cases of unexplained haemorrhagic shock.^(5,6,12) The treatment of the aneurysm should not be delayed because of catastrophic consequences. A suitable approach to such aneurysms must be selected in each case.⁽¹³⁾

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