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Surgical Resection of a Ruptured Pancreaticoduodenal Artery Aneurysm

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Conflict of interest: None declared

Patient: Female, 71
Final Diagnosis: Rupture of a pancreaticoduodenal artery aneurysm
Symptoms: —
Medication: —
Clinical Procedure: Surgical operation
Specialty: Surgery

Objective: Rare disease

Background: Ruptured aneurysms of the pancreaticoduodenal artery result in fatal hemorrhage and high mortality. Therefore, prompt diagnosis and treatment are required, but there are sometimes problems differentiating this specific diagnosis from other abdominal pathologies.

Case Report: We encountered a rare case of a ruptured pancreaticoduodenal artery aneurysm with an atypical clinical presentation that simulated acute pancreatitis. A 71-year-old woman was admitted to the emergency department with abdominal pain in the left upper quadrant, a slightly elevated level of pancreatic amylase, and cholelithiasis on ultrasonography. With persistent pain and progressively decreasing hemoglobin level, computed tomography with contrast showed fluid collection in the subphrenic space, a retroperitoneal hematoma, and a pancreaticoduodenal artery aneurysm that appeared to originate from a branch of the SMA. Urgent angiography indicated spontaneous rupture of a pancreaticoduodenal artery aneurysm. Emergent surgery was undertaken, and a simple aneurysmectomy was successfully performed. The patient's recovery was unremarkable. The prompt diagnosis of a pancreaticoduodenal artery aneurysm was difficult because the initial symptoms were vague and misleading in our case.

Conclusions: A high level of suspicion, rapid diagnostic capability, and prompt surgical or endovascular intervention, as well as effective teamwork in the emergency department, are critical to avoid the devastating consequences of a ruptured visceral artery aneurysm.

MeSH Keywords: Abdominal Pain • Ambulatory Surgical Procedures • Aneurysm, Ruptured • Emergency Service, Hospital

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/895782

Background

Visceral artery aneurysms are rare [1], and only 2% involve the pancreaticoduodenal artery (PDA) [2]. Although extremely rare, PDA aneurysms are clinically important because most are found after they have ruptured, leading to fatal hemorrhage and high mortality rates [3]. In spite of the importance of accurate diagnosis, ruptured PDA aneurysms are difficult to differentiate from other abdominal pathologies. Here, we report a rare case of a ruptured PDA aneurysm that needed immediate surgical treatment.

Case Report

A 71-year-old woman was admitted to the emergency department with acute abdominal pain. She presented walking without limitations, and she was conscious and alert.

Her body temperature was 35.5°C, blood pressure 100/60 mmHg, and heart rate 65 bpm. On abdominal examination, bowel sounds were normal, and she had left upper quadrant spontaneous pain and moderate tenderness but neither guarding nor rebound. She had no history of pancreatitis, abdominal trauma, or alcohol abuse, and she had undergone subtotal gastrectomy for gastric cancer about 10 years earlier.

The admission laboratory data included the following: white blood cell count, 9.4×10^3/μL; hemoglobin, 10.4 g/dL; hematocrit, 33%; platelets, 16.9×10^4/μL; total bilirubin, 0.2 mg/dL; aspartate aminotransferase, 28 U/L; alanine aminotransferase, 21 U/L; lactic dehydrogenase, 214 U/L; serum amylase, 213 U/L; blood urea, 17 mg/dL; serum creatinine, 0.79 mg/dL; creatinine phosphokinase, 165 U/L; and C-reactive protein, 0.04 mg/dL. An ultrasound revealed many tiny stones in the gallbladder.

The laboratory examinations were repeated 7 hours after admission and revealed a significant drop in hemoglobin level (7.8 g/dL). The contrast-enhanced computed tomography (CT) revealed a large retroperitoneal hematoma and ascites with Hounsfield units consistent with blood. In addition, the CT suggested an aneurysm arising from a branch of the superior mesenteric artery (SMA) (Figure 1A–1C).

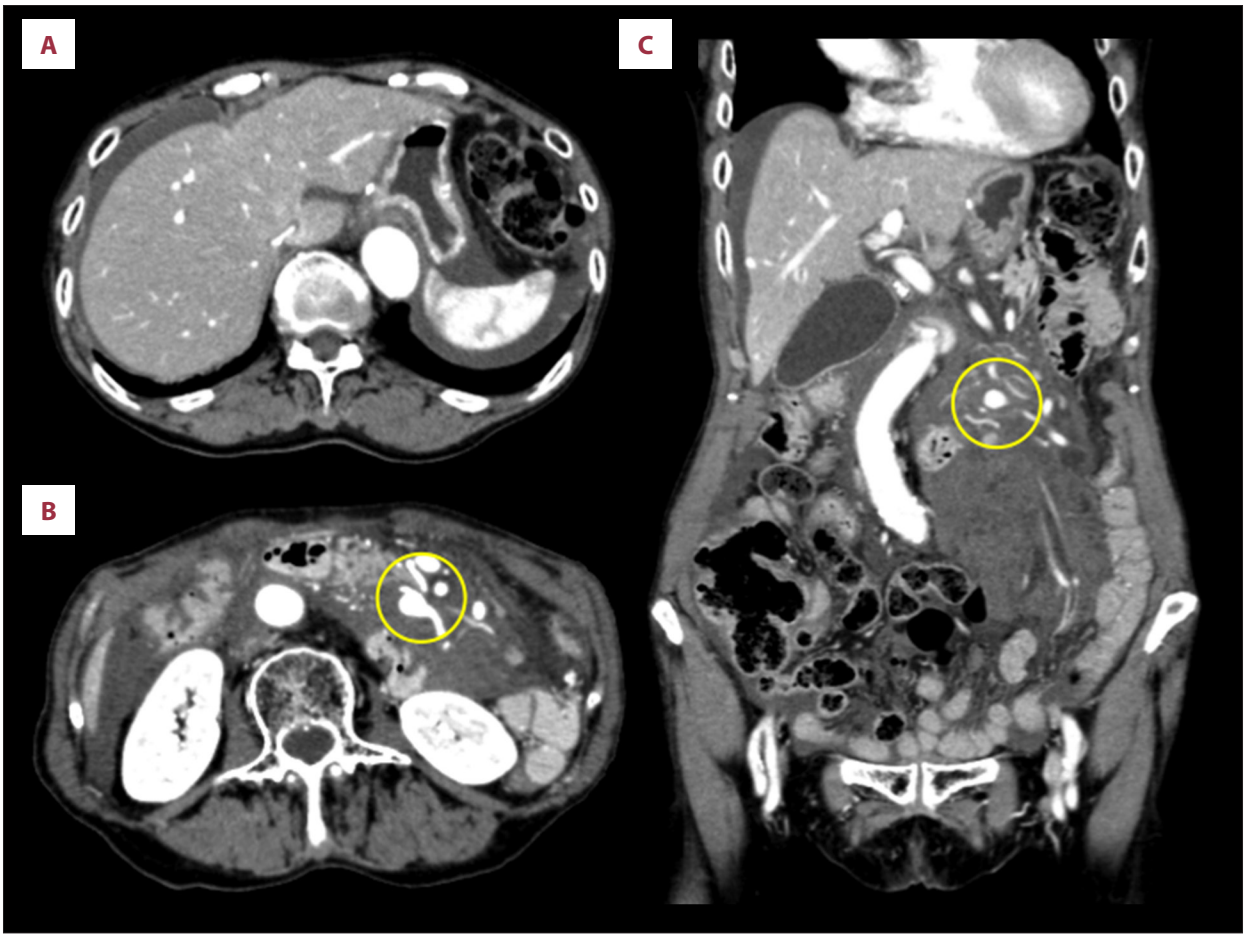

Figure 1. CT scan showing (**A**) fluid collection in the both the subphrenic and retroperitoneal spaces and (**B, C**) a pancreaticoduodenal artery aneurysm (yellow circle).

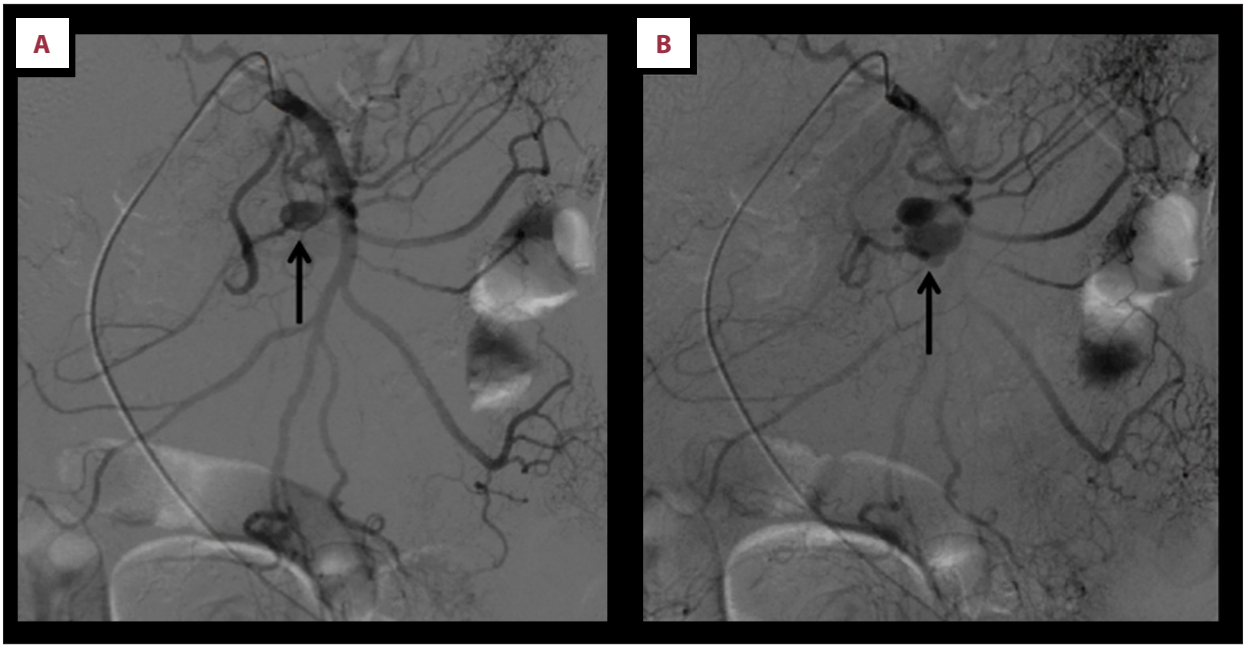

Figure 2. Superior mesenteric arteriography showing (**A**) a pancreaticoduodenal artery aneurysm (arrow) and (**B**) bleeding from the aneurysm (arrow).

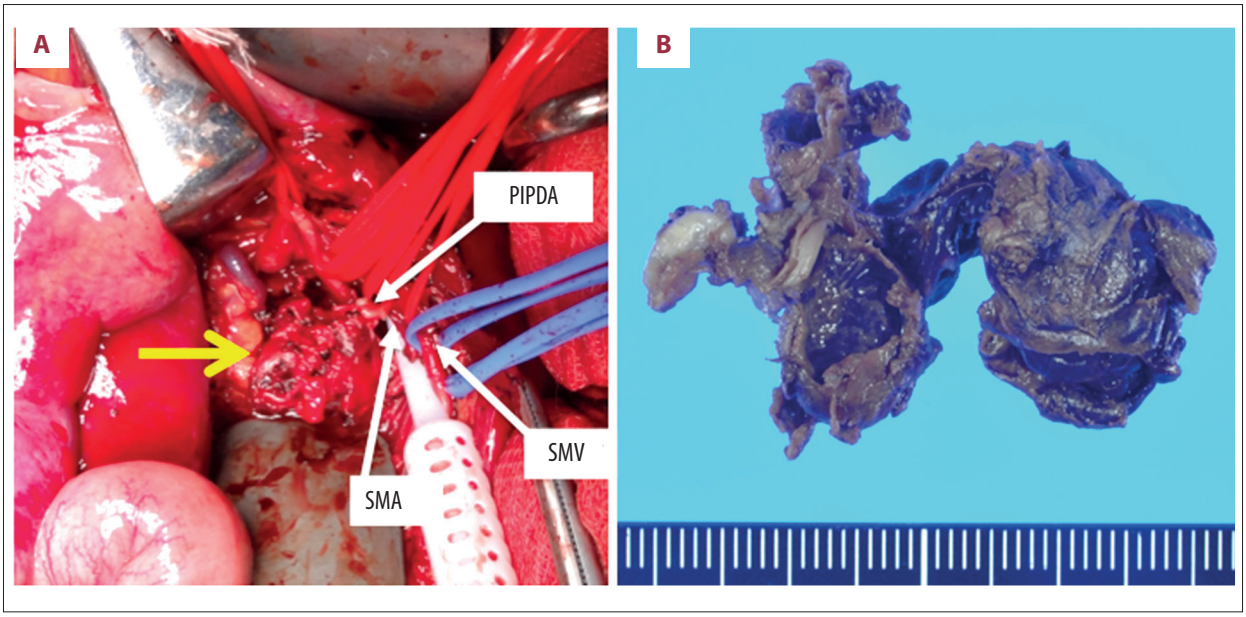

Figure 3. (**A**) Intraoperative photography of the aneurysm (yellow arrow). PIPDA; posterior inferior pancreaticoduodenal artery. SMA – superior mesenteric artery. SMV – superior mesenteric vein. (**B**) A photograph of the resected aneurysm.

Urgent selective SMA angiography demonstrated an aneurysm on the arch comprising the superior and inferior PDA (pancreatic arch) with signs of hemorrhage (Figure 2A, 2B). Angiography also demonstrated stenosis at the origin of the celiac artery. Because of the anatomic conformation of the celiac artery and the arterial arch, superselective transcatheter arterial embolization (TAE) was not possible. For this reason the patient underwent immediate surgical treatment.

During laparotomy, massive blood and coagula weighing 1250 g were noted in the peritoneal cavity. A dense adhesion due to a previous operation was observed around the head of the pancreas, which made it difficult to identify the aneurysm. Intraoperative color Doppler ultrasonography (CDUS) was performed to establish the precise orientation. The feeding arteries were easily exposed under CDUS guidance and were ligated with minimum operative blood loss (Figure 3A), and then the

aneurysm was resected (Figure 3B). The patient's postoperative course was uneventful, and on the 11th day after the operation, she was discharged from the hospital with complete recovery.

Discussion

PDA aneurysms may be congenital or caused by atherosclerosis, celiac axis stenosis, pancreatitis, mycotic, trauma, or fibromuscular hyperplasia [2,4–6]. In particular, true PDA aneurysms are frequently associated with atherosclerosis and celiac axis stenosis. With stenosis of the celiac artery, blood flows into its branches via the superior mesenteric and inferior PDAs. The increased blood flow in the collateral channels may be related to the development of an aneurysm at an area of congenital weakness in the arterial wall [6,7]. In our case, angiography demonstrated findings of celiac axis stenosis.

Our patient presented with acute abdominal pain and slightly elevated pancreatic amylase levels as a symptom of rupture, but did not show signs of either shock or extreme anemia. This, together with the ultrasound finding of cholelithiasis, led us to misdiagnose her with slight pancreatitis, thereby delaying the diagnosis of a ruptured PDA aneurysm.

PDA aneurysms usually rupture into the retroperitoneal space. In some cases, symptoms mimic gastroduodenal, biliary, or pancreatic disease [3,8,9], which make prompt diagnosis and treatment difficult. In our case, the elevation of pancreatic amylase level could have been caused by transient pancreatic ischemia due to reactive vasoconstriction or by compression of the main pancreatic duct from the retroperitoneal hematoma.

Although abdominal CT is a valuable examination, selective angiography of the celiac or SMA is the criterion standard to diagnosis PDA aneurysms in case of rupture, as it can be followed by endovascular treatment, which includes different techniques, such as coil embolization, placement of covered stents, plug deployment, gluing, and injection of endoluminal thrombin, polyvinyl alcohol, particles, or Gelfoam [10]. In our case, the anatomic conformation of the celiac artery and the arterial arch made superselective endovascular treatment difficult.

Operative treatment can be invasive for patients with ruptured PDA aneurysms, because pancreaticoduodenectomy or partial enterectomy are occasionally required instead of simple ligation of the bleeding vessel or aneurysmectomy [6]. In addition, it is sometimes difficult to detect a bleeding point and an aneurysm during operation [11,12]. Intraoperative ultrasonography provides useful information for guidance during the hepatobiliary-pancreatic surgery [13,14]. Intraoperative color Doppler flow imaging helps to delineate the anatomy and to identify the vascular structures for pancreatic surgery [15]. In our case, the color Doppler-assisted procedure clearly contributed to the simple aneurysmectomy performed by ligating the anastomosing vessels as close to the aneurysm as possible, avoiding any enterectomy.

Conclusions

Rupture of visceral artery aneurysms, although rare, may be a relevant differential diagnosis of an acute abdomen. When the patient comes to the emergency department with abdominal pain, a diagnosis of visceral artery aneurysm rupture should be considered.

Competing interests

None.

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