Single Cause, Dual Presentation: Inferior Pancreatico-Duodenal Artery Pseudoaneurysm as a Cause of Acute Gastrointestinal Bleeding and Obstructive Jaundice

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Pseudoaneurysms of the inferior pancreaticoduodenal artery are rare. We report a case of chronic pancreatitis-related inferior pancreaticoduodenal artery pseudoaneurysm that resulted in obstructive jaundice and life-threatening bleeding. This case highlights both of these complications, and it also reflects on the importance of a multidisciplinary and multimodal approach to diagnosis and management. Anticipating potential complications and intervening at the right time can prevent fatal consequences in such patients.

INTRODUCTION

Inferior pancreaticoduodenal artery pseudoaneurysms are rare. The most common causes include abdominal trauma, acute or chronic pancreatitis, septic emboli and laparoscopic cholecystectomy. This is in contrast to true aneurysms which are caused by arteriosclerosis, congenital disease or stenosis of celiac trunk. Pseudoaneurysm rupture is more likely to cause gastrointestinal (GI) bleeding whereas true aneurysm rupture mostly causes a retroperitoneal bleed. We present a case of a life-threatening GI bleed from a pseudoaneurysm of the inferior pancreaticoduodenal artery, also causing obstructive jaundice by virtue of its size and location.

Case

A 45-year-old male with past medical history of chronic pancreatitis from alcohol use presented with severe right upper quadrant abdominal pain. On exam, he had exquisite right upper quadrant abdominal tenderness and scleral icterus. Vitals signs were stable on initial presentation (Blood pressure: 144/68mmHg, Pulse: 74/min, Resp: 18/min, O2 sat: 100% on room air). Labs revealed microcytic hypochromic anemia (Hb: 6.1, Hct: 20.3, RDW: 25.2), and abnormal liver enzymes with a cholestatic pattern (alkaline phosphatase 416 [reference range {RR} 45-115 U/L], gamma glutamyl transferase (GGT) 230 (RR 10-66)U/L, aspartate aminotransferase (AST) 76 (RR 8-40)U/L, alanine aminotransferase (ALT) 132 (RR 7-60) U/L, total serum bilirubin 4.4 (RR 0.2-1.2)mg/dL, direct bilirubin 3.4 (RR 0-0.3) mg/dL.

Computed tomography (CT) scan of the abdomen with intravenous contrast (Image 1a and 1b) showed a pseudoaneurysm measuring 65 x 41 mm arising from the inferior pancreaticoduodenal artery. In addition to evidence of acute on chronic pancreatitis, there was obstruction of the biliary tree due to mass effect from pseudoaneurysm, new marked intra and extrahepatic biliary dilation (common bile duct measuring up to 17 mm) and gallbladder distension. Mesenteric angiography (Image 2) also revealed the aneurysm but was felt...

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not to be amenable to embolization. Overnight, the patient became hypotensive and his abdominal pain worsened. Stat CT angiography of the abdomen showed an increase in size of the pseudoaneurysm to approximately 67 x 43 mm. Hyperdense material was noted within a moderately distended stomach and dilated small bowel loops, new from the most recent previous CT, concerning for GI hemorrhage. After initial stabilization, the patient underwent exploratory laparotomy with distal gastrectomy along with duodenotomy with suturing of the pseudoaneurysm with anterior abdominal closure. Following the procedure, his liver enzymes trended to normal. The course was complicated by delirium, multi-organ failure, pneumonia, prolonged ventilator dependent respiratory failure, severe protein-calorie malnutrition requiring total parenteral nutrition and tube feedings via jejunostomy tube. The patient was eventually discharged to a long-term acute care facility.

DISCUSSION

A bleeding pseudoaneurysm is a rare and potentially life threatening complication of chronic pancreatitis. As a complication of chronic pancreatitis, pseudoaneurysms most commonly occur in the splenic artery, followed by the gastroduodenal, pancreaticoduodenal and hepatic arteries. Given the history of chronic pancreatitis with multiple severe acute exacerbations, it is the most likely cause of the pseudoaneurysm (of inferior pancreaticoduodenal artery) in our patient. Once formed, they can cause direct pressure over the pancreaticobiliary ducts, leading to recurrent bouts of acute pancreatitis and jaundice.

Some proposed mechanisms for pseudoaneurysm formation due to pancreatitis include: severe inflammation contributing to local spread of proteolytic enzymes causing auto digestion of pancreatic or peripancreatic arterial tissue, weakening of the vessel wall,
producing arterial disruption and erosion of a long standing pseudocyst directly into a visceral artery potentiated by virtue of the enzymatic content of fluid especially if there is communication with the pancreatic ductal system.\textsuperscript{2,3,4} Risk factors include necrotizing pancreatitis, sepsis, multiorgan failure, previous history of procedures such as necrosectomy, Whipple procedure or underlying vasculitis.\textsuperscript{8} Pseudoaneurysm formation after a surgical procedure is a late complication, mostly occurring days to weeks after the procedure.\textsuperscript{8}

Abdominal computed tomography (CT) is the most commonly used noninvasive test for diagnosing pseudoaneurysms with a sensitivity of 80-100%. It can detect partial thrombosis or the effect on adjacent viscera, however, carries risks of exposure to ionizing radiation and intravenous iodinated contrast. Abdominal ultrasound (US) has limited ability to detect aneurysms.\textsuperscript{10} Mesenteric angiography is the gold standard diagnostic test that precisely identifies the feeding artery.\textsuperscript{1,5,8} It has a sensitivity of 100% in detecting arterial bleeding due to pseudoaneurysms.\textsuperscript{8,6} Smaller lesions which could be missed on other imaging modalities can also be identified.\textsuperscript{8}

A fatal complication of pseudoaneurysms is acute hemorrhage. The mortality is 90-100% in untreated patients and remains 12-50% even with aggressive treatment.\textsuperscript{5} Pseudoaneurysms may bleed into the gastrointestinal tract, retroperitoneum, biliary tree (hemobilia), pancreatic ducts (hemosuccus pancreaticus), peritoneal cavity and pseudocysts, resulting in massive hemorrhage.\textsuperscript{8} Clinically, ruptured pseudoaneurysms present as abdominal pain, anemia or gastrointestinal (GI) bleeding. Bleeding can be chronic or acute leading to hemorrhagic shock.\textsuperscript{5,6,7} Local inflammation or mechanical compression by virtue of the size of the aneurysm may lead to biliary and/or pancreatic duct compression resulting in obstructive jaundice and/or acute pancreatitis. Similarly, compression of the adjacent portal system may lead to variceal formation and eventual hemorrhage.\textsuperscript{8} Our patient had developed common bile duct obstruction and features of obstructive jaundice from the recent increase in the size of the aneurysm.

Two major treatment modalities (radiologic and surgical) are available, based on the location of pseudoaneurysm and hemodynamic stability. These include angiographic embolization and surgical treatment. Angiographic therapy has been reported to have a high success rate, ranging from 79-100% and has been associated with shorter lengths of stay as compared to surgery.\textsuperscript{8} Real time ultrasound guided thrombin injections have been reported to be of value, however, the efficacy is not well established. Surgical ligation of the feeding vessel can be attempted, however, if this fails, pancreatectomy may be required. A Whipple procedure may be needed for pseudoaneurysms near the pancreatic head.\textsuperscript{8} In general, this potentially lethal complication of chronic pancreatitis should be treated as an urgent situation, and a multidisciplinary approach covering diagnostic and therapeutic interventions including angiography, surgery and endoscopy may be needed to manage it optimally.

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