A Case of Spontaneous Intraperitoneal Rupture of an Acute Necrotic Fluid Collection Associated with Necrotizing Pancreatitis

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Conflict of interest: None declared

Patient: Male, 61
Final Diagnosis: Intraperitoneal rupture of acute necrotic peri-pancreatic fluid collection
Symptoms: Abdominal and/or epigastric pain • abdominal distension • hypotension • shock
Medication: —
Clinical Procedure: Exploratory laparotomy with external pancreatic drainage • exploratory laparotomy, cholecystectomy, cystgastrostomy
Specialty: Surgery

Objective: Rare co-existence of disease or pathology

Background: An acute necrotic fluid collection is a rare condition that occurs within four weeks of the onset of necrotizing pancreatitis. This report is of a case of spontaneous intraperitoneal rupture of an acute necrotic fluid collection that required emergency laparotomy.

Case Report: A 61-year-old man presented with worsening symptoms following hospital discharge for necrotizing pancreatitis. On hospital admission, a computed tomography (CT) scan showed changes of pancreatic necrosis and inflammation with a peripancreatic fluid collection. On the sixth day following admission, he developed hemodynamic instability and peritonitis. Repeat CT scan showed a reduction in the size of the peripancreatic collection but free intraperitoneal fluid, consistent with intraperitoneal rupture. At exploratory laparotomy, several liters of necrotic pancreatic fluid were drained from the abdomen, followed by admission to the intensive care unit (ICU) for continued resuscitation. On postoperative day 3, he underwent open cystgastrostomy, cholecystectomy, placement of a jejunostomy tube (J-tube), and abdominal closure. He remained in the ICU for several weeks until ventilatory support could be reduced, and was transferred to the hospital ward when he was able to tolerate J-tube and oral feeding. On postoperative day 35, he was transferred to a long-term care facility.

Conclusions: Acute pancreatitis is usually managed conservatively, and surgical management has become less common. A case of acute necrotic fluid collection arising within the first four weeks of onset of acute necrotizing pancreatitis is presented that underwent spontaneous intraperitoneal rupture leading to ascites, peritonitis, and hemodynamic instability, requiring emergency surgical management.

MeSH Keywords: Pancreatic Fistula • Pancreatic Juice • Pancreatic Pseudocyst

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Background

Acute pancreatitis can be due to gallstones, alcohol, trauma, and can occur following some medications [1–3]. According to the 2012 revised Atlanta classification, acute pancreatitis has two main presentations that include acute interstitial edematous pancreatitis and necrotizing pancreatitis. Interstitial edematous pancreatitis presents more commonly, with only 5–10% of acute cases presenting as necrotizing pancreatitis [1,4,5]. Peripancreatic fluid collections are a frequent complication of both types of pancreatitis, occurring in between 30–50% of cases [6].

The recently revised Atlanta classification subdivides acute fluid collections, which occur within four weeks of the onset of acute pancreatitis, into acute peripancreatic fluid collection (APFC), which can lead to pancreatic pseudocyst, and acute necrotic fluid collection (ANC), which contains necrotic debris [5]. Acute pancreatitis is usually managed conservatively, and the management of acute peripancreatic fluid collection is usually with supportive measures because the immature fibrous tissue of the wall of the collection is prone to rupture during surgical intervention [3]. Surgical management of the complications of acute pancreatitis, including infected pancreatic necrosis or pseudocyst, is becoming less common due to the increasing use of endoscopic or percutaneous drainage and debridement [4].

In most cases, the acute peripancreatic fluid collection and the acute necrotic fluid collection will resolve with time and supportive care, and surgical intervention is reserved for symptoms that include increasing size, or complication such as infection, hemorrhage, rupture, fistula formation, or obstruction [7,8]. Occasionally, fluid collections or pseudocysts can erode into adjacent hollow viscera of the gastrointestinal tract causing a fistulous connection and spontaneous internal drainage. The transverse colon and splenic flexure are the most common sites for fistula formation, followed by the duodenum, small intestine, and stomach. Fistula formation may be associated with symptoms that include diarrhea, hematochezia, or hematemesis depending on the fistula location and whether there is erosion into adjacent blood vessels [7]. The mechanisms associated with rupture and hemorrhage include the activation of lytic pancreatic enzymes that digest and disrupt the adjacent wall of a hollow viscus and blood vessels, compression of adjacent organs that results in local ischemia, and localized compression of the portal or splenic vein resulting in portal hypertension with hemorrhage [7,9]. The symptoms and location of the fistula determine surgical management, as gastric and enteric fistulas have a high rate of spontaneous closure, while duodenal and colonic fistulas are more likely to require surgical intervention for definitive management [10].

Case Report

A 61-year-old man was admitted to the emergency department with abdominal pain, nausea, and vomiting. Five days previously, he had been discharged from hospital following recent hospital admission for necrotizing pancreatitis due to gallstones. He had been managed conservatively and follow-up had been planned for the evaluation of elective cholecystectomy.
Imaging of the abdomen was performed using magnetic resonance cholangiopancreatography (MRCP) with intravenous contrast, which cholelithiasis without choledocholithiasis or cholecystitis, necrotizing pancreatitis, the development of a loculated peripancreatic fluid collection centered around the pancreatic head and body (Figure 1). The patient was admitted to hospital and remained nil by mouth and was given intravenous (IV) fluids and pain medication. During the next five days, his symptoms improved on conservative management and he began to tolerate food. However, on the sixth day following hospital admission, the patient developed fever and leukocytosis, although his vital signs remained stable. He was treated empirically with IV antibiotics due to concern for possible infected pancreatic necrosis. An abdominal computed tomography (CT) scan (Figure 2) showed that the peripancreatic fluid collection was stable in size, although there was compression of the distal duodenum associated with dilation of the stomach and esophagus.

On the seventh day following hospital admission, the patient woke with severe abdominal pain, abdominal distension, nausea, and vomiting. He became hemodynamically unstable and developed respiratory distress, which was initially attributed to aspiration pneumonitis. He was intubated, a nasogastric tube was placed, and he was transferred to the intensive care unit (ICU). He had an initial aggressive volume resuscitation but ultimately required multiple vaspressors for hemodynamic support. Physical examination showed abdominal tenderness in keeping with peritonitis. A repeat CT scan (Figure 3) showed that the peripancreatic fluid collection had decreased in size but there was intraperitoneal free fluid consistent with rupture of an acute necrotic fluid collection associated with necrotizing pancreatitis.

The patient was transferred as an emergency to the operating room for exploratory laparotomy. More than two liters of ascites was evacuated from the abdominal cavity. There was...
saponification throughout the mesentery of the transverse colon, and one of the larger areas of saponification was actively draining cloudy pancreatic fluid, consistent with the site of intraperitoneal rupture (Figure 4). In the operating room, radiopaque silicone Blake drains were placed in the lesser sac and at the base of the mesentery of the transverse colon at the site of the intraperitoneal rupture. The abdomen was left open and an ABThera™ open abdomen negative pressure therapy (NPT) system (KCI USA Inc., San Antonio, TX, USA) was used. The patient underwent postoperative resuscitation in the intensive care unit (ICU) and his condition improved with antibiologic treatment and external drainage. Intra-operative fluid cultures grew Gram-positive Micrococcus and he was treated with IV meropenem.

On postoperative day 2, abdominal imaging showed a persistent peripancreatic fluid collection near the posterior stomach. The patient was taken back to the operating room on postoperative day 3 and underwent open cystgastrostomy, cholecystectomy, jejunostomy tube (J-tube) placement, and abdominal closure. He had a prolonged stay in ICU due to delay in discontinuing ventilatory support but was eventually extubated and tolerated enteral nutrition. He was transferred to the surgical ward where he continued his recovery, and oral feeding recommenced. The surgical drains were removed when the intraperitoneal rupture (Figure 4).
fluid drainage became minimal. His postoperative course was complicated by the development of an intra-abdominal abscess that required percutaneous drainage. Contrast-enhanced imaging showed no evidence of a leak at the cystgastrostomy site. The patient was discharged from hospital on postoperative day 35, and continued his recovery and rehabilitation in a long-term care facility with ongoing IV antibiotic therapy.

Discussion

This report is of a case of spontaneous intraperitoneal rupture of an acute necrotic fluid collection due to acute necrotizing pancreatitis, associated with ascites, peritonitis, and hemodynamic instability, which required emergency surgery. The revised Atlanta classification of acute fluid collections associated with acute pancreatitis includes acute peripancreatic fluid collection (APFC), which can lead to pancreatic pseudocyst, and acute necrotic fluid collection (ANC) containing necrotic debris [5].

Intraperitoneal rupture of acute peripancreatic fluid collection or pseudocyst is rare, but there have been several previously published cases that have reported intraperitoneal rupture after blunt abdominal trauma in patients with known pancreatic pseudocysts [11–13]. In these cases, clinical management approaches have depended on the hemodynamic status of the patient and abdominal examination and imaging. Most patients with pancreatic pseudocyst have been reported to undergo exploratory laparotomy with either internal or external drainage of the ruptured pseudocyst, although percutaneous drainage with peritoneal lavage has been described as a possible alternative treatment [14].

Spontaneous intraperitoneal rupture of pancreatic pseudocyst or cysts containing necrotic fluid has been less commonly reported, with only a few case reports in the published literature [6,15,16]. Two of the previously reported cases were associated with intracystic hemorrhage [6,15]. In 2016, Rocha et al. described two patients with spontaneous intraperitoneal rupture of pancreatic pseudocyst complicated by ascites [16]. One of the two patients underwent exploratory laparotomy with cystojejunostomy, as the draining site of the pancreatic cyst was clearly identified [16]. The second patient underwent exploratory laparotomy, but as the walls of the pseudocyst were not easily identified, the patient underwent external drainage and lavage [16]. In the case of the second patient, a pancreatic fistula was successfully managed with total parenteral nutrition and treatment with octreotide for two weeks followed by removal of the drains and discharge from hospital [16].

In the present case, the management of the patient was driven by his rapid development of peritonitis and hemodynamic instability despite resuscitation, and he underwent exploratory laparotomy with drainage of a large volume of ascites. This patient had a significant degree of inflammation and saponification of the small bowel and although the site of intraperitoneal rupture was identified, and active drainage commenced, the patient was not stable enough to undergo a definitive internal drainage procedure at the time of initial operation. Therefore, multiple drains were sited and his abdomen was left open. He was resuscitated in the intensive care unit (ICU), and after clinical improvement, he returned to the operating room for internal drainage with cystgastrostomy with external drains left in place at the site of the intraperitoneal rupture. Also, in this case, given his history of gallstones, the patient underwent cholecystectomy, and a jejunostomy tube (J-tube) was sited to facilitate enteral feeding. Although this patient had an extended hospital course, he was discharged to a long-term care facility on postoperative day 35.

Conclusions

Spontaneous intraperitoneal rupture of an acute necrotic fluid collection due to acute necrotizing pancreatitis is rare. As this case report has shown, the decision to perform surgical management depends on the type and severity of clinical complications. In patients who are hemodynamically unstable with signs of peritonitis, open surgical intervention is required for drainage of the necrotic fluid, control of bleeding, and repair of damaged tissue, with continued patient resuscitation until final abdominal closure is performed. For patients without peritonitis who are clinically more stable, it may be possible to attempt percutaneous drainage of intraperitoneal fluid, with or without ongoing peritoneal lavage, or to use external drains and conservative management. As this case has shown, imaging of the abdomen should be performed as soon as possible to provide a clear diagnosis and to allow individualized treatment planning, including optimal surgical management.

Conflict of interest

None.
References:

1. Banks PA, Bollen TL, Dervenis C et al: Classification of acute pancreatitis – 2012: Revision of the Atlanta classification and definitions by international consensus. Gut, 2013; 62: 102–11

2. Afghani E, Pandol SJ, Shimosegawa T et al: Acute pancreatitis – progress and challenges: A report on an International Symposium. Pancreas, 2015; 44: 1195–210

3. Stamatakos M, Stefanaki C, Kontzoglou K et al: Walled-off pancreatic necrosis. World J Gastroenterol, 2010; 16(14): 1707–12

4. van Santvoort HC, Besselink MG, Bakker OJ et al: A step-up approach or open necrosectomy for necrotizing pancreatitis. N Engl J Med, 2010; 362: 1491–502

5. Sarr MG, Banks PA, Bollen TL et al: Revision of the Atlanta classification of acute pancreatitis. Acute Pancreatitis Classification Workgroup, April 2008. Available from: http://pancreasclub.com/atlanta-classification

6. Papadimitriou N, Robotis J, Rokkas T: Spontaneous intra-gastric walled-off pancreatic necrosis rupture. JOP, 2014; 15(6): 628–29

7. Somani PO, Jain SS, Shah DK et al: Uncomplicated spontaneous rupture of pancreatic pseudocyst into stomach: A case report. World J Gastrointest Endosc, 2013; 5(9): 461–64

8. Rana SS, Sharma V, Prasad KR et al: Spontaneous intra-gastric rupture of walled-off pancreatic necrosis: Endoscopic ultrasound features. J Dig Endosc, 2016; 7(4): 160–62

9. Okamura K, Ohara M, Kaneko T et al: Pancreatic pseudocyst ruptured due to acute intracystic hemorrhage. Case Rep Gastroenterol, 2017; 11: 755–62

10. Tsilotos GG, Smith CD, Sarr MG: Incidence and management of pancreatic and enteric fistulas after surgical management of severe necrotizing pancreatitis. Arch Surg, 1995; 130(1): 48–52

11. Baker R: Pseudocyst of the pancreas due to trauma: Spontaneous intraperitoneal rupture. Proc R Soc Med, 1974; 67(2): 115–16

12. Somsen SM, Marx IJ: Rupture of a pancreatic pseudocyst following blunt abdominal trauma. J Emerg Med, 1988; 6(1): 29–32

13. Whitman GJ, Pearce WH, Moore EE, Barton B: Free intraperitoneal rupture of a pancreatic pseudocyst: A presentation of acute abdominal trauma. J Trauma, 1988; 28(4): 555–56

14. Moore WR, Canton HH, Raines DR: Peritoneal lavage in the treatment of acute pancreatic ascites. Am J Gastroenterol, 1978; 69(1): 88–91

15. Soumian S, Manimaran N, Jones B: Ruptured pseudocyst of pancreas presenting with paraplegia: A case report. Cases J, 2009; 2: 9336

16. Rocha R, Marino R, Gomes A et al: Spontaneous rupture of pancreatic pseudocyst: Report of two cases. Case Rep Surg, 2016; 2016: 7056567

17. Boumitri C, Brown E, Kahaleh M: Necrotizing pancreatitis: Current management and therapies. Clin Endosc, 2017; 50(4): 357–65

18. Sheu Y, Furlan A, Almusa O et al: The revised Atlanta classification for acute pancreatitis: A CT imaging guide for radiologists. Emerg Radiol, 2012; 19: 37–43

19. Uhl W, Warshaw A, Imrie C et al: IAP Guidelines for the surgical management of acute pancreatitis. Pancreatology, 2002; 2: 565–73

20. Working Group IAP/APA Acute Pancreatitis Guidelines: IAP/APA evidence-based guidelines for the management of acute pancreatitis. Pancreatology, 2013; 13(4 Suppl. 2): e1–e15

21. Pitchumoni CS, Agarwal N: Pancreatic pseudocysts: When and how should drainage be performed? Gastroenterol Clin North Am, 1999; 28(3): 615–39