
CLINICAL CASE OF THE MONTH

Expanding Abdominal Mass in a 41-Year-Old Patient with a History of Alcohol Abuse

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A 41-year-old man with a history of significant alcohol use presented to an outside hospital with complaints of nausea, vomiting, epigastric pain, and subjective fever for 4 days. He also complained of dizziness and weakness that began 1 day prior to presentation. The patient stated that he drank in excess of one case of beer the night prior to presentation. There was no history of recent trauma. In the past, he experienced sporadic episodes of abdominal pain which lasted for up to 2 days. The episodes were typically preceded by excessive drinking of alcohol. The patient did report a 20-pound weight loss that occurred over the prior 2 years, but denied chest pain, shortness of breath, post-prandial abdominal pain, change in bowel habits, change in stool color, urinary symptoms, or skin abnormalities.

The patient has no significant medical history and was not on any prescribed medications. A construction worker, he smoked one-half pack of cigarettes per day for 24 years. He drank beer regularly, sometimes drinking up to one and one-half cases daily. The patient denied intravenous drug use but did admit to smoking cocaine.

On presentation, the patient's vital signs were: temperature of 97° Fahrenheit, pulse rate of 129 beats per

minute, respiratory rate of 24 breaths per minute, and blood pressure of 118/56 mmHg. The patient appeared acutely ill and lethargic. Though his speech was slurred, he was oriented in all spheres. Physical exam further revealed temporal wasting, anicteric sclera, and dry mucous membranes. The abdomen was not distended but decreased bowel sounds were appreciated. No tenderness of the abdomen was elicited with palpation, and there was no evidence of a palpable mass or hepatosplenomegaly.

Laboratory values on admission were a white count of 14,000/ μ L (normal range, 4,500-11,000/ μ L), hematocrit of 47.7% (normal range, 40-51%), platelets of 392,000/ μ L (normal range, 130,000-400,000/ μ L), amylase of 349 U/L (normal range, 25-115 U/L), sodium of 149 mmol/L (normal range, 135-146 mmol/L), potassium of 3.5 mmol/L (normal range, 3.6-5.2 mmol/L), chloride of 83 mmol/L (normal range, 96-107 mmol/L), bicarbonate of 36 mmol/L (normal range, 24-32 mmol/L), blood urea nitrogen of 86 mg/dL (normal range, 7-25 mg/dL), creatinine of 6.9 mg/dL (normal range, 0.6-1.2 mg/dL), glucose of 163 mg/dL (normal range, 70-115 mg/dL), calcium of 10.0 mg/dL (normal range 8.4-10.3 mg/

CME INFORMATION

TARGET AUDIENCE

The July/August Clinical Case of the Month is intended for family physicians, general internists, medicine subspecialists, general practitioners, critical care specialists, obstetricians-gynecologists, emergency medicine physicians, pediatricians, dermatologists, pathologists, radiologists, general surgeons, and psychiatrists.

EDUCATIONAL OBJECTIVES

The Clinical Case of the Month is a regular educational feature presented by the Louisiana State University Department of Medicine in New Orleans. Medical students, residents, postdoctoral fellows, and faculty collaborate in the preparation of these discussions. After reading this article, physicians should be able to identify and to understand better the etiology, clinical presentation, complications, diagnosis, and treatment of pancreatitis.

CREDIT

The LSMS Educational and Research Foundation designates this educational activity for a maximum of one (1) category 1 credit toward the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

DISCLOSURE

Mr. Ghanami has nothing to disclose.
Dr. Obeid has nothing to disclose.
Ms. Buchert has nothing to disclose.
Dr. Beech has nothing to disclose.
Dr. Wang has nothing to disclose.
Dr. Lopez discloses that he is a member of the LSMS *Journal* Board and the LSMS *Journal* Editorial Board.

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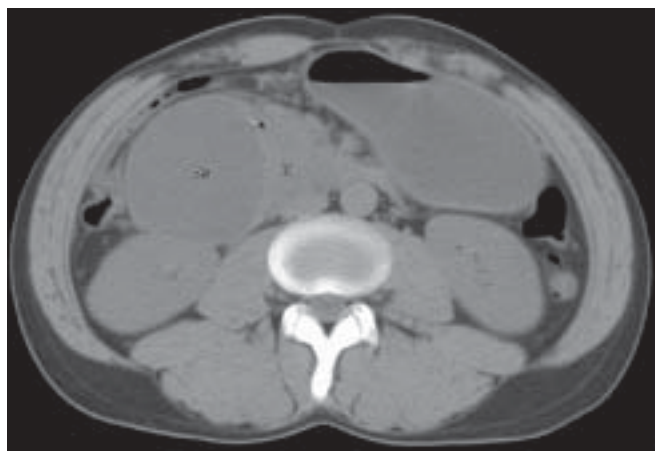


Figure 1. Noncontrast enhanced CT demonstrates pancreatic pseudocyst (PS). The duodenum (arrow) is compressed between the pseudocyst and the head of the pancreas (H) resulting in proximal bowel obstruction.

dL), total protein of 10.7 g/dL (normal range, 6-8 g/dL), albumin of 5.6 g/dL (normal range 3.4-5.0 g/dL), and normal liver transaminase values.

A chest x-ray revealed no abnormalities. A computed tomogram (CT) of the abdomen showed a 9.1 cm x 6.0 cm x 5.8 cm cystic mass involving the head of the pancreas. It was felt that this finding could represent a pancreatic neoplasm, a pseudocyst with hemorrhagic components, or an infectious process. Obstructive changes involving the duodenal folds were also noted. The abdominal ultrasound supported the initial CT results. The patient was transferred to our institution for endoscopic retrograde cholangiopancreatography (ERCP).

Upon arrival to our hospital, a second abdominal CT was performed (Figure 1). This study demonstrated a 14 cm x 11.3 cm x 6.7 cm cystic structure involving the lateral wall of the 2nd and 3rd portions of the duodenum, which was felt to be a pseudocyst or a duodenal hematoma. A magnetic resonance cholangiopancreatography (Figure 2) supported the diagnosis of pancreatic pseudocyst. The patient was taken to the operating room where drainage of the cyst with a Roux-en-Y cystojejunostomy was performed. Specifically, a bilateral subcostal incision was made to enter the peritoneum. The cystic mass was identified and the lesser sac was then entered in order to inspect the pancreas and reveal the anatomic relationship between the mass and the pancreas. Dark red fluid consistent with old blood was next aspirated from the cyst and sent to the lab to confirm the pre-operative radiographic diagnosis. An elevated fluid amylase level further supported the diagnosis of a communicating pancreatic pseudocyst. Furthermore, a presumed cyst-content-induced arterial erosion event in the immediate preoperative period was supported by the history of a rapid preoperative expansion of the mass resulting in gastric outlet obstruction. A portion of the cyst wall was sent for frozen section to rule out cystic neoplasm of the pancreas. The histopathologic finding

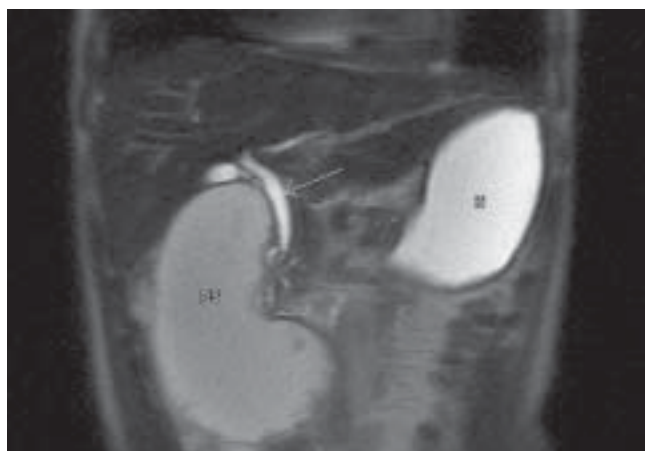


Figure 2. Coronal magnetic resonance cholangiopancreatography demonstrates high signal fluid within the Pseudocyst (PS) and obstructed stomach (G). The common bile duct is also dilated (arrow).

of "fibrous tissue without epithelial lining" was consistent with the diagnosis of pancreatic pseudocyst. An area of the jejunum was then selected and transected. The distal portion was anastomosed to the pseudocyst in a side-to-side fashion over the most dependent portion of the cyst, and the proximal portion of the small bowel was reanastomosed to the jejunum approximately 40 cm distal to the cystojejunostomy site to reestablish the continuity of the GI tract. The patient tolerated the procedure with no complications. He recovered uneventfully and was discharged to home on postoperative day 6.

DISCUSSION

Acute pancreatitis is a common medical condition that is often initially evaluated by the primary care physician and usually responds to supportive care including intravenous fluids, bowel rest, and pain control. However, one must not underestimate the potential life-threatening complications of acute pancreatitis.

Clinical Presentation

Typically, acute pancreatitis presents as constant epigastric and periumbilical pain, usually radiating to the back but sometimes to the chest, lower abdomen, and flank.¹ It is often associated with nausea and vomiting. The pain is worse in the recumbent position and is relieved by sitting up. Low grade fever, tachycardia, and hypotension are not uncommon. On physical exam, decreased bowel sounds and abdominal distention due to intestinal hypomotility are common findings. Epigastric pain is usually elicited with palpation and it is important to look for signs of severe necrotizing pancreatitis such as Cullen's sign (i.e., periumbilical discoloration indicating hemoperitoneum) and Grey-Turner sign (i.e., green-brown or red-purple flank discoloration representing tissue breakdown of hemoglobin).¹ Laboratory data typically reveals an elevated serum amylase and lipase,

increased or normal white blood cell count, and a serum calcium level that can be elevated, decreased, or normal. Hypertriglyceridemia and hyperglycemia may also be present, and transient elevation(s) of serum bilirubin, alkaline phosphatase, and aspartate aminotransferase are often reported. Plain abdominal x-rays are usually non-specific, though they may reveal an ileus pattern, i.e., the sentinel loop.

Causes

The two most common causes of acute pancreatitis are gallstones and alcohol abuse,¹ together accounting for about 75% of pancreatitis cases in the United States. Gallstones can be diagnosed with a right upper quadrant ultrasound in the setting of biliary colic. A history of excessive alcohol use suggests that as the etiology. A lipid panel and a serum calcium level are obtained to rule out hypertriglyceridemia and hypercalcemia, respectively, as causes of pancreatitis. A thorough drug history for agents such as thiazide and loop diuretics, metronidazole, tetracycline, pentamidine, didanosine, valproic acid, and sulfonamides, as well as a history of any trauma, should be elicited. Other causes of pancreatitis include microlithiasis, sphincter of Oddi dysfunction, cystic fibrosis, pancreatic divisum, pancreatic duct tumor, stricture, or stones, as well as ampullary tumors and choledochocoele.¹

Determining the Severity of Pancreatitis

The severity of pancreatitis should be assessed on admission. Due to the ease of their application, Ranson's criteria² have historically been used to assess severity. Ranson's criteria are usually calculated not only on admission but also at 48 hours. At admission, evaluation factors include a white blood cell count greater than 16,000/uL, age greater than 55 years, serum lactate dehydrogenase level greater than 350 IU/L, serum aspartate aminotransferase level greater than 250 IU/L, and serum glucose level greater than 200mg/dL. At 48 hours, evaluation includes fall in hematocrit by greater than ten percent, fluid deficit greater than 6 L, serum calcium level less than 8 mg/dL, arterial oxygen partial pressure less than 60mmHg, increase in blood urea nitrogen greater than 5 mg/dL, and a base deficit greater than 4 meq/L. If patients exhibit three to four out of the eleven criteria, a mortality of 16% is expected; five or six risk factors, a mortality of 40%; and seven or eight risk factors, a mortality of 100%.² The acute physiology and chronic health evaluation scoring system (APACHE II) can also be used for prognosis.³ It uses the worst values of 12 physiologic measurements and takes into account previous health status. These indicators include tachycardia, hypotension, hypoxemia, hypocalcemia, hypoalbuminemia, elevated blood urea nitrogen, elevated serum creatinine, and oliguria.

Radiographic imaging can also be helpful to evaluate acute pancreatitis. A CT scan with contrast should be

obtained in suspected severe pancreatitis or when pancreatitis-associated signs or symptoms that fail to resolve. A commonly utilized CT grading system is Balthazar's acute pancreatitis CT Severity Index (CTSI).⁴ Grade A is given for a normal pancreas, Grade B for pancreatic enlargement, Grade C for peripancreatic inflammation, Grade D for a single ill-defined peripancreatic fluid collection, and Grade E for more than two peripancreatic collections, including gas in and around the pancreas. Grades D and E are associated with greater risks for infection and mortality. CTSI takes into account the grade and the degree of necrosis noted on CT scan. The higher the CTSI score, the poorer the prognosis.⁴

Complications

Systemic complications of pancreatitis include adult respiratory distress syndrome, renal failure, ascites, disseminated intravascular coagulation, and shock. Local complications include inflammatory lesions such as phlegmon, necrosis, pseudocyst, abscess and hemorrhagic pancreatitis. A pancreatic phlegmon results from acute intrapancreatic inflammation. Pancreatic necrosis manifests as areas of pancreatic tissue that fail to enhance on contrast-enhanced CT. A pseudocyst is a collection of blood and debris surrounded by a fibrotic rim. A phlegmon can become infected and become an abscess. Pseudocysts and the necrotic pancreatic and peripancreatic tissue can also become secondarily infected. A time-lag can be associated with these complications. Necrosis can develop within 1-2 weeks of the development of pancreatitis, a pseudocyst between 2 and 4 weeks, and an abscess will typically develop in 4-6 weeks.¹ When pancreatic necrosis involves greater than 30% of the pancreas, the risk of infection increases significantly and the initiation of broad-spectrum antibiotics is recommended.⁵ Patients with both infected and sterile necrosis of the pancreas present with pain, leukocytosis, and fever. A CT-guided needle aspiration with gram stain, cell count and differential, and culture of necrotic tissue can be helpful to differentiate between the two, particularly when a presumed sterile necrotizing pancreatitis fails to improve with conservative management or progressively worsens. If no infection is identified, the conservative measure can be continued. On the other hand, if infection is confirmed, surgical debridement must be pursued immediately. A pancreatic abscess can be treated with either percutaneous or open surgical drainage in conjunction with pathogen-directed antibiotic therapy.

PSEUDOCYST

Diagnosis

In our case, the patient appeared to have had previous episodes of acute pancreatitis and subsequently developed a pancreatic pseudocyst with obstructive symp-

toms. A pseudocyst is a collection of enzymatic fluid and debris surrounded by non-epithelial granulation and a fibrous rim.⁶ A pseudocyst is clinically suspected when: 1) serum amylase remains persistently elevated, 2) pancreatitis initially resolves but then worsens, and 3) a mass is felt in the epigastrium. Plain x-ray films may reveal displacement of the gastrointestinal tract or calcium deposits in the cyst wall. CT scan and ultrasound can be used for clearly demonstrating the presence of a pseudocyst. A CT scan is more advantageous in obese individuals, and it better delineates and localizes the pseudocyst when compared to an ultrasound. Ultrasound evaluation is ideal for monitoring size over time because it is convenient and less costly.

Therapeutic Approaches

The therapeutic approach to the patient with a pseudocyst includes expectant waiting, non-surgical drainage, or surgical drainage. Some studies suggest that the pseudocyst's attaining a size of 6 cm or persisting for 6 weeks is a relative rather than an absolute indication for intervention.^{8,9} O'Malley and colleagues noted that pseudocysts smaller than 4 cm resolve on their own.⁷ In a retrospective study reported by Yeo et al,⁸ pseudocyst size correlated with the necessity for surgical intervention. Sixty-seven percent of pseudocysts equal to or greater than 6 cm required surgical intervention compared to 40% of pseudocysts less than 6 cm. However, a study by Nguyen et al noted no differences between pseudocysts smaller or larger than 6 cm with respect to complication rates, spontaneous resolution, need for operative management, or mortality.⁹ These studies suggest that there is no strict absolute size at which intervention is required.^{6,10} Bradley and colleagues¹¹ reported a reduction in resolution rates and an increase in complication rates if a pseudocyst persisted for more than 6 weeks. In contrast, in the study by Yeo et al, in which patients were followed for 1 year with serial CT scans, complete resolution occurred in 60% of patients who were managed conservatively; in the remaining 40%, the cyst remained stable or decreased in size.⁸ Only one non-fatal complication was reported, i.e., a self-limited hemorrhage into the cyst. In another study by Vitas et al, which followed 68 patients with pseudocysts over a 51-month period, serious complications such as cyst infection, perforation, and intracystic hemorrhage were noted in only 9% of patients.¹² In the studies by Yeo et al, and Vitas et al, the average size of the pseudocysts was less than 6 cm. In summary, asymptomatic pseudocysts, regardless of size and duration, can be safely observed provided that they are serially monitored and not increasing in size. Intervention becomes mandatory in the presence of obstruction, pain, rupture, intracystic hemorrhage, or infection. Other indications for intervention include increasing cyst size, persistent symptoms despite conservative therapy, or inability to exclude a cystic neoplasm of the pancreas.

Specific Treatment Methods

The major methods for drainage of pseudocysts include the following: 1) percutaneous drainage, 2) endoscopic drainage, 3) surgical drainage, or 4) any combination of the above. The choice depends on the physician's expertise, certain patient criteria, and factors related to the cyst itself, i.e., the maturity of the cyst, communicating versus non-communicating characteristics, or the presence or absence of infection.

If 6 weeks have elapsed after the diagnosis of a pseudocyst has been established and the patient becomes symptomatic, complications occur, or the pseudocyst persists or enlarges, surgical drainage is a reasonable choice for an uninfected cyst since the wall will be mature enough to hold suture lines.¹³ If the pseudocyst is enlarging, worsening symptoms occur before 6 weeks, or the cyst is infected, then external continuous catheter drainage can be attempted under ultrasound-, CT-, or fluoroscopic-guidance. Continuous percutaneous catheter drainage is an effective method for draining pseudocysts,¹⁴ particularly when managing immature cysts, infected cysts, and high surgical-risk patients.⁶ However, a single percutaneous aspiration of a recently developed pseudocyst is not recommended because it carries a high recurrence rate.^{6,13} Complications associated with percutaneous catheter drainage include occlusion or dislodgement of the catheter, cellulitis at the insertion site, splenic rupture, conversion of a sterile cyst to an infected one, and the possibility of creating an external pancreatic fistula. Typically, the catheter is kept in place until drainage diminishes to about 5-10 mL per day.¹⁵ Adjunctive ocreotide therapy appears to decrease the duration of catheter drainage and to hasten the closure of a pancreatic fistula.¹⁶

For mature cysts, endoscopic drainage is a reasonable alternative to surgical intervention in centers that have endoscopic expertise. Advantages include minimal invasiveness, shortened hospital stay, and associated cost reduction. For many, however, surgery has traditionally been the procedure of choice. Conditions best managed by surgery include multiple cysts, recurrent pseudocysts, giant pseudocysts, presence of complications related to chronic pancreatitis, and suspected malignancy. Combination therapy includes endoscopic stenting of the pancreatic duct combined with a percutaneous drainage procedure. However, more randomized prospective studies are needed to evaluate the outcomes for these procedures before a definitive therapeutic approach can be recommended.

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CME QUESTIONS

To earn CME credit, read the preceding CME article and complete the registration, evaluation, and answer form on page 219. Mail or fax the registration, evaluation, and answer form to the Educational and Research Foundation. Answers must be postmarked or faxed prior to August 31, 2005. Participants must attain a minimum score of 75% to receive credit.

For each question, choose the one answer that is most correct.

1. All of the following are true of acute pancreatitis *except*:
 - a) Pain typically radiates to the back.
 - b) Pain is typically relieved by lying in the recumbent position.
 - c) Cullen's sign is a periumbilical manifestation of hemoperitoneum and necrotizing pancreatitis.
 - d) Serum amylase and lipase levels are typically elevated.
2. True or False. Hypercalcemia and sphincter of Oddi dysfunction are the two most common causes of acute pancreatitis in the United States.
3. Ranson's criteria for prognostic evaluation of the severity of pancreatitis include all of the following *except*:
 - a) White blood cell count
 - b) Serum glucose level
 - c) Hematocrit
 - d) Serum amylase level
 - e) Serum calcium level
4. All of the following are true about pancreatic pseudocysts *except*:
 - a) Pseudocysts typically develop within 1 week of the development of acute pancreatitis.
 - b) Pseudocysts are collections of enzymatic fluid surrounded by non-epithelial granulation tissue.
 - c) Therapeutic approaches to a pseudocyst include observation or drainage.
 - d) Complications associated with percutaneous drainage of a pseudocyst include cellulitis at the insertion site, creation of an external pancreatic fistula, and seeding of infection in the cyst.