A Rare Case of Emphysematous Pancreatitis: Confronting a Fatal Scourge Without the Scalpel's Touch

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Case Report

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ABSTRACT:

The term "Emphysematous pancreatitis" indicates presence of infected pancreatic necrosis with production of gas bubbles within the damaged pancreatic tissue. It is a rare and very severe complication of acute pancreatitis often associated with high mortality. Treatment for emphysematous pancreatitis primarily involves surgical debridement, with only a limited number of cases managed conservatively using antibiotics.

Key words: Emphysematous pancreatitis, Necrosis, *Escherichia coli*, Needle aspiration.

INTRODUCTION:

Emphysematous or gangrenous pancreatitis is a rare and often life-threatening complication of acute necrotizing pancreatitis. It is characterized by pancreatic necrosis combined with the presence of air within or around the pancreas, occurring alongside epigastric pain and a threefold increase in pancreatic enzyme levels, especially lipase.[1] Unlike typical acute pancreatitis, which primarily results from gallstones or chronic alcohol use, emphysematous pancreatitis is often linked to gas forming bacterial infections or immune suppressed conditions such as diabetes mellitus or chronic renal failure.[2]

Gram-negative bacteria are mostly responsible for infective pancreatic necrosis with Escherichia coli being the most frequently identified pathogen. Other bacteria that may be found include *Klebsiella, Pseudomonas, Enterobacter, Clostridium perfringens* and on rare occasions, *Mycobacterium*.[3]

Abdominal CT scan is the preferred imaging technique for evaluating the pancreas, offering high sensitivity and specificity for detecting gas, fluid collections, and vascular abnormalities. Typically, the CT scan reveals gas bubbles within the parenchyma of the pancreas.[4]

In current practice, there are two main approaches for managing emphysematous pancreatitis: conservative treatment with antibiotics and surgical debridement.[4] This report describes a 39-year-old male with acute emphysematous pancreatitis successfully managed with conservative care.

CASE REPORT:

A 39-year-old obese male with chronic gastritis and a history of duodenal ulcers presented to the emergency department of Square Hospital with sudden-onset epigastric pain radiating to the back for 1 day, associated with nausea and vomiting. On examination his temperature was 36.5°C, blood pressure was 110/80 mm of Hg and heart rate was 100 beats per minute. On examination of his abdomen the patient had epigastric and right hypochondrium tenderness.

Blood tests demonstrated hyperleukocytosis (16200 cells/µl) with significantly elevated lipase (18504 IU/L) and amylase (2790 IU/L). Mildly deranged liver function was observed with raised Bilirubin: 2.5 mg/dl (0.2-1.2), ALT: 245 U/L (<50), AST: 517 U/L (17-59), Alkaline phosphatase: 188 U/L (38-126) and Gamma-GT: 319 U/L (15-73). An abdominal ultrasound revealed hepatomegaly with mild fatty infiltration, gallbladder sludge and swollen pancreas,

suggestive of pancreatitis. So, the patient was admitted in the high dependency unit (HDU) with a working diagnosis of acute pancreatitis. On admission the patient was put on conservative management with intravenous fluids, injectable antibiotics and other standard cares.

Blood culture of the patient revealed a growth of ***Escherichia coli***. His treatment was escalated with injection meropenem with on-going other routine conservative management for pancreatitis with intravenous fluid, parenteral nutrition and nasogastric tube decompression of stomach.

Five days into hospitalization, the patient developed high grade fever. His clinical condition deteriorated with increased abdominal distension and persistent vomiting. There was a significant rise in the inflammatory markers: C-reactive protein 245 mg/dl (previous was 10mg/dl); Procalcitonin (18 ng/ml); WBC (18700 cells/ul).

A non-contrast CT-Scan of abdomen demonstrated a diffusely swollen pancreas with heterogenous density, air densities within the pancreas. Peri-pancreatic fat stranding and collection was seen as well (Fig-1). A diagnosis of acute severe emphysematous pancreatitis was made.

A follow-up CT-Scan of Abdomen was done 7 days later and there was increased swelling of the pancreas with increased collection and air densities in the lesser sac. Stomach was displaced anteriorly by the swollen pancreas (Fig-2). A percutaneous puncture of the peripancreatic collection was performed for bacteriological analysis, which identified Escherichia coli as the pathogenic agent.

A third CT-Scan of abdomen was done after 2 weeks of the initial scan which showed mild reduction in swelling of pancreas with fewer air densities within the pancreas. (Fig-3)

Over time, the inflammatory markers showed improvement, with a gradual decline in both leukocyte count and C-reactive protein levels. Following the resolution of the septic condition, the patient improved clinically and was finally discharged from the hospital after 28 days.

DISCUSSION:

The most common etiologies of acute pancreatitis are alcohol consumption and gallstone migrating to the level of the lower bile duct. Other possible conditions include smoking, drug, metabolic and infectious diseases.[5]

Clinical scenarios involving gas in the pancreatic bed typically result from infections caused by gas-forming organisms, such as Enterobacteriaceae or anaerobes. Gas formation is a consequence of mixed acid fermentation by these species, which may colonize the inflamed pancreatic tissue.

Emphysematous pancreatitis (EP) most commonly results from bacterial superinfection of pancreatic tissue with Gram-negative bacteria such as *Escherichia coli.* Other organisms such as Klebsiella, Pseudomonas, Enterobacter and Clostridium perfringens are occasionally seen. This mainly occurs in immunocompromised individuals especially in patients with diabetes or chronic renal failure.[6]

Bacterial superinfection can develop through spread via the bloodstream or lymphatic system. It may also arise from infection spreading through the ampulla of Vater or by direct extension from the adjacent colonic wall. In rare cases, perforation of a gastroduodenal ulcer can lead to pancreatic infection.[7]

The abdominal CT scan is the preferred method for detecting intra- and/or peripancreatic gas, which helps in suspecting emphysematous pancreatitis when supported by a clinical and biological context. A detailed CT scan report should include descriptions of the pancreatic parenchyma, any collections present, the severity of acute pancreatitis, and the presence of ascites, gallstones, bile duct dilation, and vascular anomalies.[3]

Differential diagnosis includes other causes of air in the pancreas such as entero-pancreatic fistula, a recent history of endoscopic instrumentation, duodenal diverticulum, penetrating duodenal ulcer and patulous ampulla of Vater, but these conditions lack features of predominant pancreatic inflammation.[1]

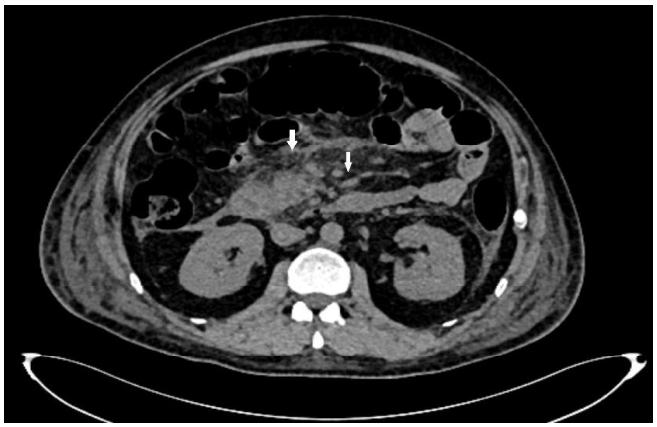

Fig-1: Non-contrast CT-Scan of abdomen demonstrated a diffusely swollen pancreas with heterogenous density, air densities within the pancreas.

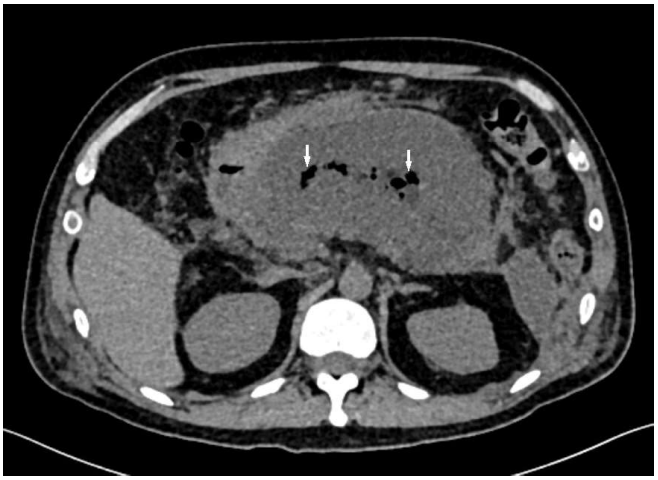

Fig-2: Follow up study of emphysematous pancreatitis, compared with previous CT scan dated 11.03.2024 showing further increased swelling of pancreas and increased size of the collection in lesser sac. Stomach is displaced anteriorly by the swollen pancreas

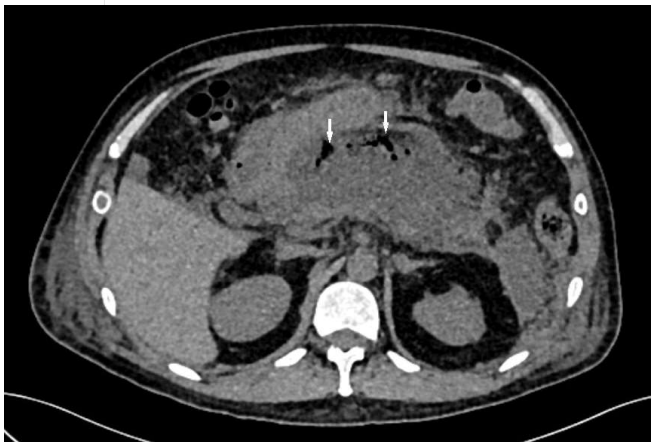

Fig-3: Findings suggest emphysematous pancreatitis. Compared to previous CT scan showing reduced swelling of pancreas, fewer collection with air densities in lesser sac.

Diagnosis is confirmed by identifying the organism in peripancreatic needle aspiration fluid and correlating it with positive blood culture results; however, not all cases will show positive blood cultures. In the above-described case Escherichia coli was isolated in the blood as well as the pancreatic fluid and was found to be sensitive to multiple antibiotics.

The standardized management of infected pancreatic necrosis is pancreatic necrosectomy, which involves removing the necrotic pancreatic tissue. However, some patients be managed conservatively. Conservative management involves organ support, pancreatic rest, and the use of empirical broad-spectrum injectable antibiotics to target common pathogens or antibiotics tailored to specific positive cultures. Although only a limited number of cases has been reported to have been successfully managed conservatively with percutaneous drainage and appropriate antibiotic, it can be a treatment option for patients who are at high risk of surgical intervention.[8]

Patients failing to respond to conservative management, showing worsening organ dysfunction and clinical deterioration despite maximum medical measures, should be considered for escalation of therapy with more advanced interventions, such as percutaneous drainage or surgical debridement.[2]

Despite adequate management, fatality rate in emphysematous pancreatitis remains very high at 50% cases. Mortality occurs mostly due to sepsis with multiorgan failure.[9]

CONCLUSION:

Emphysematous pancreatitis results from acute necrotizing pancreatitis complicated by superinfection of pancreatic tissue with gas-forming organisms such as Escherichia coli and Klebsiella pneumoniae. CT-Scan of abdomen is the investigation of choice for suspicion of emphysematous pancreatitis, which is indicated by the presence of intra- or peripancreatic gas in an evocative clinical and biological context. Confirmation of diagnosis can be achieved by isolation of pathogen in peripancreatic aspiration fluid and blood.

Mortality remains at a high level despite adequate treatment. Early detection and prompt management can help avoid surgical intervention especially in fragile patients and save valuable lives.

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