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Imaging of Emphysematous Pancreatitis: A Case Series

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Abstract | **Case Report**

Emphysematous pancreatitis (EP) is a rare and potentially fatal complication of acute pancreatitis, characterized by the presence of gas within the pancreatic parenchyma or surrounding tissues [1]. This condition typically arises in immunocompromised or diabetic patients due to infection with gas-forming organisms [1]. Diagnosis is primarily radiologic, with contrast-enhanced computed tomography (CT) being the gold standard for detecting intrapancreatic or peripancreatic gas [1]. We present three cases of EP diagnosed through abdominal CT scans in diabetic patients, all of whom were managed conservatively with favorable clinical outcomes.

Keywords: Emphysematous pancreatitis (EP), Acute pancreatitis, Gas-forming organisms, Computed tomography (CT), Diabetic patients.

INTRODUCTION

Emphysematous pancreatitis is a severe and uncommon subtype of necrotizing pancreatitis, associated with high morbidity and mortality rates that may exceed 50% [1]. It results from infection of necrotic pancreatic tissue by gas-producing bacteria such as Escherichia coli, Klebsiella, Pseudomonas, and Clostridium perfringens [1]. This condition is most commonly seen in individuals with poorly controlled diabetes or compromised immunity [2]. Contrast-enhanced CT imaging is crucial for diagnosis, revealing characteristic gas locules within or around the pancreas, often accompanied by necrosis and fluid collections [12]. This report discusses three confirmed cases of EP, highlighting key radiological features and management strategies.

CASE PRESENTATION

Case 1:

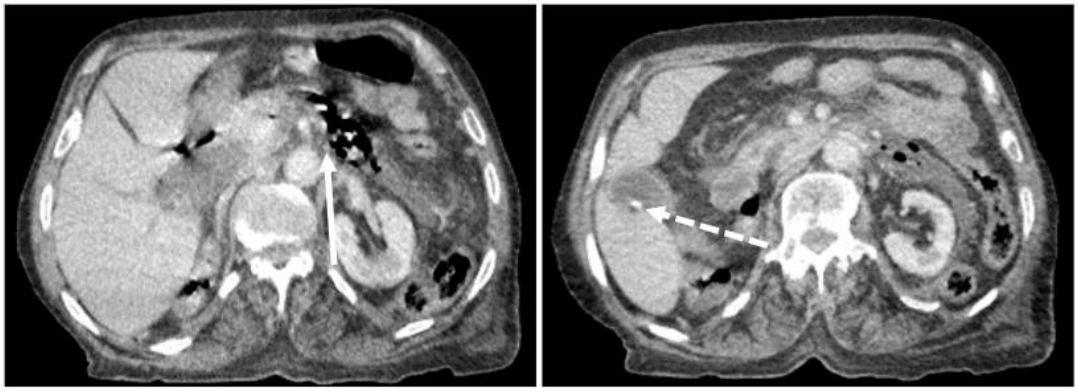

Figure 1: An 87-year-old male with type 2 diabetes presented with a 5-day history of epigastric pain and vomiting. Physical examination revealed epigastric tenderness and fever (39°C). Laboratory results showed CRP at 193 mg/L and elevated lipase at 1,997 U/L. A contrast-enhanced CT revealed gas in the peripancreatic region and omental sac (solid arrow), consistent with EP (Balthazar stage E, CTSI score 4) with gallbladder calculi (dotted arrow). Conservative management led to clinical improvement

Case 2:

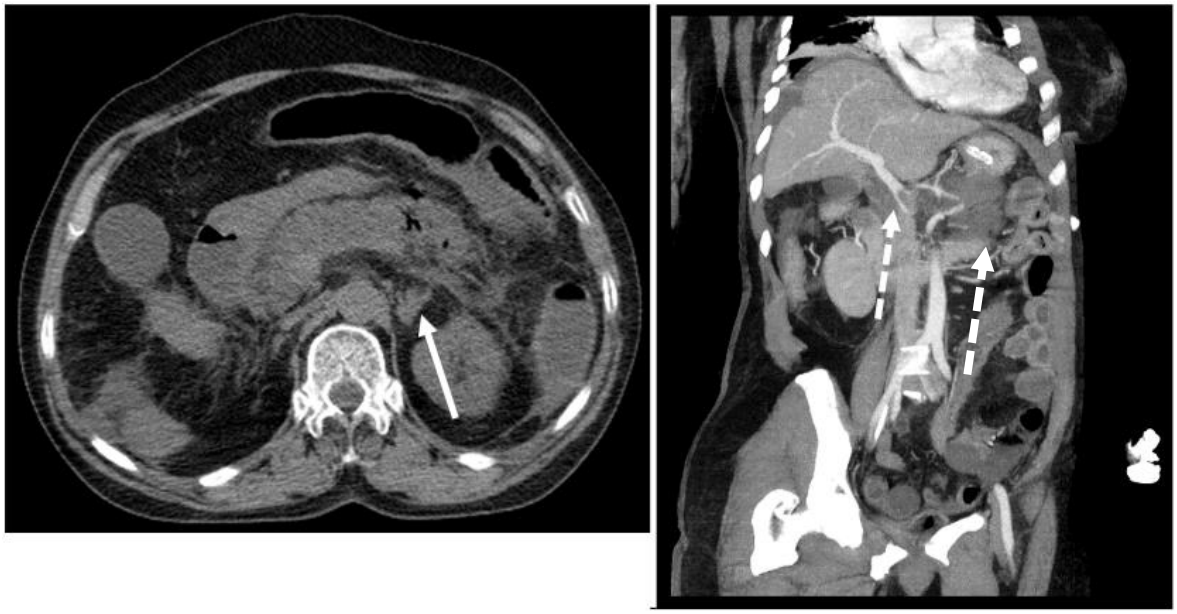

Figure 2: An 85-year-old diabetic male was admitted for septic shock with concurrent symptoms of epigastric pain and vomiting. Labs showed CRP at 299 mg/L and lipase at 1,100 U/L. CT imaging demonstrated intrapancreatic air (solid arrow), extensive fat stranding, and a thrombus in the proximal portal vein (dotted arrow), suggesting severe EP (Balthazar stage E, CTSI score 10). The patient improved with conservative management

Case 3:

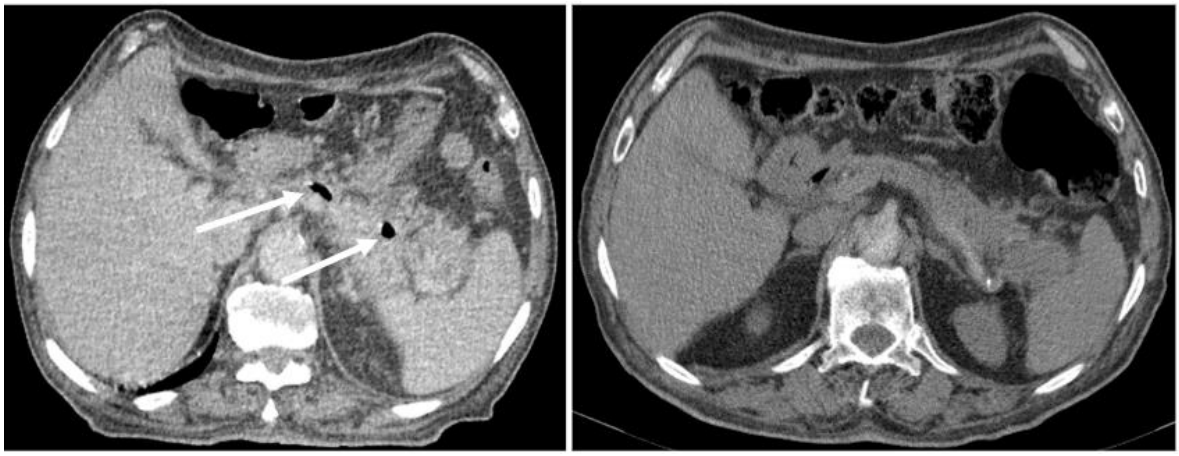

Figure 3: A 79-year-old diabetic male reported a 3-day history of abdominal pain and vomiting, with fever at 39°C. Lab findings included CRP at 278 mg/L and lipase at 1,203 U/L. CT scan revealed heterogeneous pancreatic enhancement (A), air pockets (solid arrows), and necrotic collections in the omental cavity. Follow-up CT after 3 weeks (B) showed resolution of gas but persistence of exudative changes. Conservative treatment yielded a favorable outcome

DISCUSSION

Emphysematous pancreatitis (EP) is a critical complication of acute pancreatitis, frequently occurring in diabetic or immunocompromised patients due to bacterial infection of necrotic pancreatic tissue [1,2]. Gram-negative rods are the most common causative agents, with potential polymicrobial involvement. The presence of gas typically indicates infected pancreatic necrosis [1,2].

Diagnosis is suspected clinically and biologically, but CT imaging confirms EP by detecting gas within necrotic pancreatic or peripancreatic tissue. Findings typically include non-enhancing pancreatic areas, gas bubbles, peripancreatic inflammation, and fluid collections. Ultrasound may aid in identifying biliary etiology by revealing gallstones.

CT remains the most sensitive modality for identifying intrapancreatic or peripancreatic gas, and plays a critical role in both diagnosis and monitoring response to treatment. Next-generation sequencing (NGS) has emerged as a useful tool for pathogen identification in cases where conventional cultures may

be negative, enhancing diagnostic precision and guiding targeted antimicrobial therapy.

The STEP-UP approach is now widely endorsed, favoring initial conservative measures, followed by percutaneous or endoscopic drainage, and reserving surgical necrosectomy for refractory cases [3]. Several studies, including those by Cao et al. and Filipović et al., emphasize that early intervention with broad-spectrum antibiotics, nutritional support, and ICU monitoring can result in improved survival, particularly when surgical intervention is delayed and individualized [3].

Management of EP typically involves conservative measures, including advanced supportive care, percutaneous drainage, and endoscopic therapy [4,5]. The step-up approach, as outlined in guidelines and literature, includes options ranging from conservative management to percutaneous or endoscopic drainage, and surgical necrosectomy [1]. Conservative treatment includes the use of antibiotics, intravenous fluids, pain management, and nutritional support. In our cases, all patients received conservative treatment exclusively with favorable outcomes in all cases.

Recent literature underscores the importance of multidisciplinary care and individualized treatment strategies [4]. While some EP patients require surgical intervention due to rapid clinical deterioration or failure of conservative measures, a growing body of evidence supports non-operative management in stable cases, even when gas is present within the pancreas [4,6].

CONCLUSION

Emphysematous pancreatitis is a rare but life-threatening form of acute pancreatitis. Early diagnosis via CT and prompt, conservative management can lead to favorable outcomes, especially in patients with diabetes. Radiologic imaging remains central to diagnosis and follow-up, underscoring the pivotal role of CT in the management of this condition. Emerging diagnostic tools like NGS and tailored step-up management strategies are reshaping the prognosis for selected patients with EP.

Conflict of interest: The authors declare no conflicts of interest.

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