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Case Report

Salmonella typhi infection in walled-off pancreatic necrosis following recurrent acute pancreatitis: a rare case report and review of pathogenesis

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ABSTRACT

Infected pancreatic necrosis is a serious complication of acute pancreatitis, typically caused by enteric Gram-negative organisms. The isolation of atypical pathogens, particularly *Salmonella enterica* serovar *Typhi*, from pancreatic collections is exceedingly rare and poses diagnostic and therapeutic challenges. A 28-year-old male with alcohol-related recurrent acute pancreatitis presented with abdominal pain, vomiting, and high-grade fever. He had been initially managed at an outside facility and was referred approximately four weeks after symptom onset with clinical deterioration. Imaging revealed a large necrotic pancreatic collection involving the body and tail, with internal debris and features suggestive of infection. The computed tomography severity index (CTSI) was 8/10, and the collection was classified as infected walled-off necrosis. Given persistent sepsis and unfavorable anatomy for endoscopic drainage, a minimally invasive step-up approach was adopted, and CT-guided percutaneous catheter drainage (PCD) was performed. Microbiological analysis of the drained fluid revealed growth of *Salmonella enterica* serovar *Typhi*, sensitive to third-generation cephalosporins and azithromycin but resistant to fluoroquinolones. Blood cultures were not obtained at initial presentation. Targeted intravenous antibiotic therapy was initiated based on culture sensitivity, resulting in progressive clinical improvement. The patient stabilized with resolution of fever and reduction in drain output and was discharged with the catheter in situ for follow-up. The presence of *Salmonella typhi* in pancreatic necrosis is rare, with only a limited number of cases reported in the literature. Possible mechanisms include hematogenous dissemination during transient bacteremia and bacterial translocation in the setting of necrotic pancreatic tissue. This case highlights the importance of differentiating true infection from contamination and underscores the role of culture-directed therapy. It also reinforces the effectiveness of a tailored, minimally invasive step-up approach in managing infected walled-off necrosis. Atypical pathogens such as *Salmonella typhi* may rarely complicate pancreatic necrosis and should be considered in patients with persistent sepsis. Integration of microbiological data with clinical and radiological findings is essential for accurate diagnosis and targeted management. Early recognition and individualized intervention strategies can significantly improve patient outcomes.

Keywords: Acute pancreatitis, Walled-off necrosis, Infected pancreatic necrosis, *Salmonella typhi*, Percutaneous catheter drainage, Necrotizing pancreatitis

INTRODUCTION

Acute pancreatitis is a heterogeneous inflammatory condition with outcomes largely dictated by the development of local complications, particularly necrotizing pancreatitis and its sequelae.[1] Among these, acute necrotic collections and walled-off necrosis represent critical stages in disease evolution, often necessitating intervention when infection supervenes. Infected pancreatic necrosis remains a major contributor to morbidity and mortality, with bacterial contamination typically arising from enteric translocation and dominated by Gram-negative organisms such as *Escherichia coli* and *Klebsiella* species.[2]

The isolation of atypical organisms from pancreatic collections is distinctly uncommon and poses both diagnostic and therapeutic challenges. *Salmonella enterica* serovar *Typhi*, a pathogen classically associated with enteric fever and systemic bacteremia, rarely manifests as a focal pancreatic infection.[3] Its presence within a pancreatic collection raises important questions regarding pathogenesis, including hematogenous dissemination during transient bacteremia and enhanced susceptibility of necrotic pancreatic tissue to uncommon pathogens in the setting of recurrent inflammatory injury.

Beyond its rarity, the identification of such an organism has significant clinical implications. It necessitates careful differentiation from contamination, demands correlation with clinical and radiological evidence of infection, and directly influences antimicrobial strategy. For the surgeon, this underscores the importance of culture-directed therapy in addition to timely source control in managing infected necrotic collections.

We report a case of recurrent acute pancreatitis complicated by an infected necrotic pancreatic collection, in which culture from image-guided drainage yielded *Salmonella typhi*. The case highlights an unusual microbiological etiology in a well-defined setting of pancreatic necrosis with associated regional complications, and emphasizes the need for heightened clinical vigilance when encountering atypical organisms in pancreatic infections

CASE REPORT

A 28-year-old male presented with a 15 day history of progressively worsening upper abdominal pain associated with intermittent vomiting and high-grade fever (103-104°F) with chills. He had a prior history of recurrent acute pancreatitis, with documented episodes in August 2025 and January 2026, both managed conservatively. The etiology of pancreatitis was alcohol-related.

During the current illness, the patient was initially managed at an outside facility, where he remained admitted for approximately 10 days. In view of persistent symptoms and clinical deterioration, he was referred to our centre approximately four weeks after the onset of pain. At presentation, he was hemodynamically unstable, necessitating intensive care admission and resuscitative measures.

Laboratory investigations revealed anemia (hemoglobin 8.7 g/dL) and neutrophilic leukocytosis (TLC 16.8, N: 92%), with preserved renal function. Given the persistence of fever and systemic inflammatory response, an infected pancreatic collection was suspected.

Ultrasonography demonstrated a contracted pancreas with irregular margins and heterogeneous echotexture, along with moderate fluid accumulation in the pancreatic bed and pelvis. A well-defined hypoechoic collection with internal echoes suggested the presence of necrotic debris.

Contrast-enhanced computed tomography (CECT) revealed features of necrotizing pancreatitis with a large heterogeneous collection measuring approximately 11.8×6.9 cm replacing the neck, body, and tail of the pancreas (Figure 1). The presence of dependent debris confirmed necrosis. Additional findings included peripancreatic inflammatory changes, a smaller air-containing collection in the right lumbar region, and splenic vein narrowing with perigastric collaterals, consistent with evolving left-sided portal hypertension. The CTSI was calculated at 8/10.

Based on the duration of illness exceeding four weeks and characteristic imaging findings, the collection was classified as walled-off necrosis (WON) with superimposed infection. In view of persistent sepsis and radiological evidence of infected necrosis, intervention was deemed necessary and a minimally invasive step-up approach was adopted. Endoscopic drainage with lumen-apposing metal stent (LAMS) placement was considered; however, the collection was deemed not amenable to transluminal drainage due to unfavourable anatomical location and lack of a safe window (Figure 2).

Therefore, CT-guided PCD was performed. Approximately 250 mL of necrotic fluid was aspirated initially, followed by gradual reduction in drain output over subsequent days. The procedure was uneventful and resulted in early clinical stabilization.

Microbiological analysis of the drained fluid demonstrated numerous pus cells and Gram-negative bacilli on Gram staining. Culture yielded growth of *Salmonella enterica* serovar Typhi, sensitive to cefixime, ampicillin, azithromycin, ceftriaxone and resistant to ciprofloxacin. Blood cultures were not obtained at initial presentation, as enteric fever was not clinically suspected at that stage.

Targeted intravenous antibiotic therapy was instituted based on culture sensitivity. Following drainage and antimicrobial therapy, the patient showed progressive

clinical improvement, with resolution of fever and stabilization of hemodynamic parameters. Drain output decreased steadily, and no additional interventions were required. The patient was discharged in stable condition with the pigtail catheter in situ and advised regular follow-up for drain management and interval imaging.

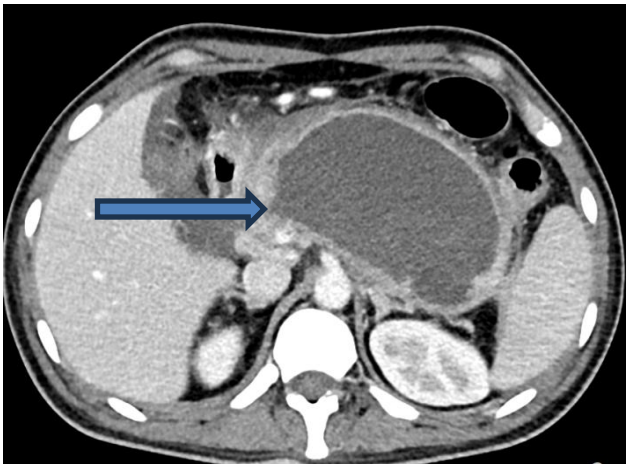

Figure 1: CECT of the abdomen demonstrating walled-off pancreatic necrosis involving the neck, body, and tail of the pancreas, characterized by a large heterogeneous collection with internal dependent debris.

*Associated findings include peripancreatic inflammatory changes, focal air pockets suggestive of infection, and splenic vein narrowing with perigastric collateral formation, consistent with evolving left-sided portal hypertension.

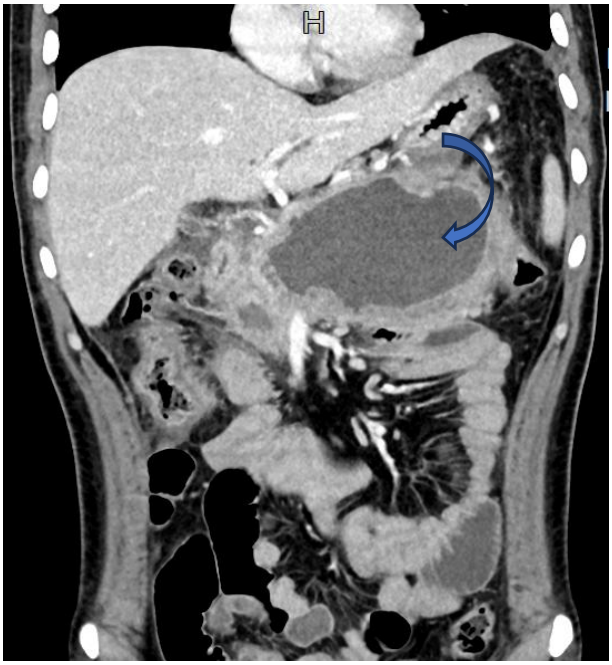

Figure 2: CECT image demonstrating anatomical inaccessibility for endoscopic transmural drainage, with lack of a safe window between the collection and the gastric or duodenal lumen, thereby necessitating image-guided PCD as part of a step-up approach.

DISCUSSION

Infected pancreatic necrosis represents a critical inflection point in the natural history of acute pancreatitis and is associated with a substantial increase in morbidity and mortality, often necessitating timely intervention.[5] The microbiological spectrum of infected necrosis is well characterized, with a predominance of enteric Gram-negative organisms such as *Escherichia coli*, *Klebsiella* species, and *Enterococcus*, reflecting translocation of gut flora into necrotic pancreatic tissue.[6] Within this established framework, the isolation of *Salmonella enterica* serovar *Typhi* from a pancreatic collection is distinctly uncommon and merits careful scrutiny.

The foremost challenge in such cases is to differentiate true infection from contamination or secondary bacteremic seeding. In the present case, several lines of evidence strongly support a pathogenic role for *Salmonella typhi*. The organism was isolated from fluid obtained via image-guided percutaneous drainage performed under sterile conditions, minimizing the likelihood of contamination. Furthermore, the microbiological findings were concordant with clinical sepsis, characterized by persistent high-grade fever and hemodynamic instability. Radiological features of walled-off necrosis with internal debris and air foci further corroborated the presence of infection. Collectively, these factors substantiate the interpretation of *Salmonella typhi* as a true pathogen in this clinical setting.

The pathogenesis of *Salmonella typhi* infection in pancreatic necrosis is not clearly established but can be rationalized through multiple mechanisms. Hematogenous dissemination during transient or subclinical bacteremia is a plausible pathway, particularly in regions where enteric fever is endemic.[7] Alternatively, bacterial translocation from the gastrointestinal tract into necrotic pancreatic tissue may occur due to impaired mucosal barrier function and immune dysregulation associated with severe pancreatitis.[5] Recurrent episodes of pancreatitis, as observed in this patient, may further predispose to colonization by atypical organisms by disrupting local tissue integrity and microcirculation. It is likely that a confluence of these mechanisms underlies such rare presentations.

The available literature on *Salmonella*-associated pancreatic infections remains limited, with fewer than 15 cases reported globally in contemporary literature, most of which describe pancreatic abscesses or infected collections in the setting of systemic infection or immunocompromised states.[8,9] The present case is notable for the isolation of *Salmonella typhi* from a well-characterized walled-off necrosis in a patient with recurrent alcohol-related pancreatitis, without documented systemic enteric fever at presentation. This distinction adds a unique dimension to the existing body of evidence and expands the recognized microbiological spectrum of infected pancreatic necrosis.

From a therapeutic standpoint, the management of infected necrotizing pancreatitis has evolved toward a minimally invasive, step-up approach, with percutaneous or endoscopic drainage serving as the initial modality of intervention.[10] In this case, PCD was selected over endoscopic transmural drainage due to unfavorable anatomical considerations precluding safe placement of a LAMS. This decision underscores the importance of individualized intervention planning based on anatomical feasibility and patient condition, rather than a one-size-fits-all approach.

Equally critical is the role of targeted antimicrobial therapy. The identification of *Salmonella typhi* with a defined susceptibility profile enabled rational antibiotic selection, likely contributing to the favourable clinical outcome. This reinforces the principle that microbiological confirmation should guide therapy, particularly in cases involving atypical pathogens where empirical regimens may be inadequate or inappropriate.

The absence of blood culture data represents a limitation of this report, as it precludes definitive differentiation between primary pancreatic infection and secondary hematogenous seeding. However, the strong concordance between clinical, radiological, and microbiological findings supports the interpretation of a localized infected pancreatic process.

CONCLUSION

This case highlights a rare instance of *Salmonella enterica* serovar *Typhi* infection in walled-off pancreatic necrosis following recurrent alcohol-related pancreatitis. It underscores that atypical pathogen, although uncommon, can play a clinically significant role in infected pancreatic collections and should be considered when patients fail to respond to standard empirical therapy. The case reinforces the importance of integrating clinical, radiological, and microbiological data to establish the diagnosis and guide management.

A tailored, minimally invasive step-up approach, combined with culture-directed antimicrobial therapy, remains the cornerstone of effective treatment. Recognition of such unusual microbiological profiles not only broadens the spectrum of organisms implicated in pancreatic infections but also has direct implications for therapeutic decision-making, particularly in endemic settings. Vigilance in identifying atypical pathogens can ultimately improve outcomes by enabling timely and targeted intervention.

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