Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 15s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Pancreatic Tuberculosis: Diagnostic Challenges and Management Considerations

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Cite this paper as: Dr Ravi Gohil, Dr Pragnya Chaudhary, (2025) Pancreatic Tuberculosis: Diagnostic Challenges and Management Considerations. *Journal of Neonatal Surgery*, 14 (15s), 1394-1399.

ABSTRACT

Background

Individuals develop pancreatic tuberculosis extremely rarely among extrapulmonary tuberculosis manifestations because doctors find it hard to diagnose because of nonspecific clinical features. The disease presents symptoms that resemble pancreatic cancers which delays the correct medical treatment. The identification of accurate diagnosis is fundamental before starting anti-tuberculosis treatment to prevent delayed medical interventions.

Methods

We reviewed pancreatic tuberculosis cases treated at a tertiary care center from January 2015 to December 2022. Medical records received combination analysis together with imaging findings and laboratory data, histopathology findings and treatment outcomes. This study aimed to analyze symptom manifestations at presentation while assessing diagnostic assessment methods and therapeutic decision-making elements besides examining ATT treatment effects on patients.

Results

Among 42 patients who fulfilled the inclusion criteria, abdominal pain and weight loss were the most prevalent presenting symptoms. Imaging studies often revealed pancreatic masses or pseudocystic changes in the head or body of the pancreas, frequently mimicking malignant lesions. Endoscopic ultrasound (EUS)-guided biopsy was the most reliable diagnostic modality, offering histopathological evidence of caseating granulomas. All patients commenced on standard ATT demonstrated significant clinical improvement, with resolution of imaging abnormalities in the majority by six months of therapy. Only two patients required surgical exploration due to complications. No mortality was directly attributed to pancreatic TB.

Conclusion

Pancreatic TB requires a high index of suspicion in patients presenting with pancreatic masses, particularly in endemic areas or immunocompromised populations. EUS-guided biopsy and histopathological confirmation are key to avoiding misdiagnosis and unnecessary interventions. Timely initiation of ATT can lead to excellent clinical outcomes. Further studies are needed to optimize diagnosis and management protocols.

Keywords *pancreatic tuberculosis, extrapulmonary TB, pancreatic masses, EUS-guided biopsy, anti-tuberculosis therapy*

1. INTRODUCTION

Pancreatic tuberculosis (TB) is an uncommon clinical entity, accounting for a small fraction of extrapulmonary TB cases worldwide [1]. Despite advances in diagnostic imaging and molecular techniques, its clinical detection remains elusive, primarily because pancreatic TB often presents with nonspecific symptoms. Patients commonly exhibit vague abdominal pain, weight loss, low-grade fever, and occasionally obstructive jaundice when the pancreatic head is involved [2]. In many instances, imaging studies reveal a mass-like lesion in the pancreas, leading to diagnostic confusion with pancreatic malignancies—a situation that can result in unnecessary surgical intervention if the possibility of TB is not considered [3].

Pathophysiologically, pancreatic TB can arise through hematogenous dissemination from a primary site in the lungs or gastrointestinal tract, or via direct extension from contiguous structures such as lymph nodes. Complicating its diagnosis further is the relative rarity of the pancreas as a site for Mycobacterium tuberculosis infection, likely due to the inherent proteolytic environment and robust blood supply, which theoretically impede bacillary survival [4]. However, with rising

global TB prevalence—especially in regions where TB is endemic and among immunocompromised populations—clinicians should maintain heightened vigilance for such atypical presentations [5].

Recent diagnostic advances, particularly in endoscopic ultrasound (EUS)-guided fine-needle aspiration (FNA) or biopsy, have substantially improved diagnostic accuracy. Histological evidence demonstrating caseating granulomas, along with positive acid-fast bacilli (AFB) staining or nucleic acid amplification tests (e.g., PCR for M. tuberculosis), has emerged as a cornerstone in confirming pancreatic TB [6]. Earlier reliance on percutaneous approaches or laparotomy-laparoscopic biopsies often delayed diagnosis and increased morbidity [7]. Despite improvements, diagnostic pitfalls still abound, including false negatives on biopsy samples and overlapping radiological features.

Effective management hinges on timely anti-tuberculosis therapy (ATT), which often leads to a dramatic clinical and radiological response. Identification of Mycobacterium tuberculosis DNA or AFB significantly reduces the need for pancreatic resection, sparing patients from the morbidity associated with major abdominal surgery [8]. Nevertheless, immunocompromised individuals, such as those with HIV/AIDS, malignancies, or on immunosuppressive therapy, may present with more aggressive disease courses or atypical imaging findings. Therefore, a high index of suspicion is warranted in such populations.

This paper aims to elucidate the diagnostic challenges and management considerations specific to pancreatic TB. We provide insights into our clinical experience, focusing on the essential role of histopathological and microbiological confirmation, the importance of prompt ATT initiation, and the need to differentiate this condition from pancreatic malignancies. By sharing our findings and reviewing the existing literature, we hope to contribute to the growing body of evidence guiding clinicians in accurately diagnosing and effectively treating pancreatic TB.

2. MATERIALS AND METHODS

Study Design and Setting

This was a retrospective cohort study conducted at a tertiary care center specializing in infectious diseases and advanced gastrointestinal endoscopy. We reviewed medical records of patients diagnosed with pancreatic tuberculosis from January 2015 to December 2022. All data were sourced from the institutional electronic health record system.

Inclusion and Exclusion Criteria

- **Inclusion Criteria:** Patients with histopathologically confirmed pancreatic TB, defined as the presence of caseating granulomas on biopsy, positive AFB staining, or positive polymerase chain reaction (PCR) test for Mycobacterium tuberculosis in pancreatic tissue or fluid.
- **Exclusion Criteria:** Patients with incomplete medical records, those diagnosed with other pancreatic lesions without microbiological or histopathological confirmation of TB, and patients who were lost to follow-up before the initiation or completion of anti-tuberculosis therapy.

Data Collection

Patient data were extracted using a standardized pro forma. Variables included demographic information (age, sex), clinical presentation (symptoms, duration), comorbidities, imaging findings (CT, MRI, EUS), laboratory markers, biopsy results (AFB, PCR, histopathology), treatment regimens, and follow-up outcomes. All patients underwent either endoscopic ultrasound (EUS)-guided fine-needle aspiration or endoscopic ultrasound-guided core needle biopsy for diagnostic confirmation. In selected cases where EUS was not feasible, percutaneous CT-guided biopsy was performed.

Treatment Protocol

Patients diagnosed with pancreatic TB received anti-tuberculosis therapy (ATT) according to World Health Organization (WHO) guidelines and national TB program protocols. The standard regimen consisted of a two-month intensive phase with isoniazid, rifampicin, pyrazinamide, and ethambutol (HRZE), followed by a continuation phase of isoniazid and rifampicin (HR) for four to seven months, depending on clinical response. Treatment modifications were made for drug-resistant TB or cases with significant comorbidities.

Ethical Considerations

The study protocol was reviewed and approved by the institutional ethics committee. Informed consent was obtained from all patients prior to diagnostic procedures and treatment. Confidentiality of patient information was maintained in accordance with institutional and international ethical guidelines.

3. RESULTS

Overview of Study Population

A total of 58 patients were initially screened for possible pancreatic tuberculosis during the study period. After excluding 16

cases due to insufficient diagnostic data or loss to follow-up, 42 patients with confirmed pancreatic TB were included in the final analysis. The mean age of patients was 41.2 years (range, 22–70 years), with a slight female predominance (n=23; 54.8%). Notably, 10 patients (23.8%) were immunocompromised, predominantly due to HIV infection or chronic steroid use.

Clinical Presentation and Laboratory Findings

The majority of patients (n=31; 73.8%) presented with abdominal pain lasting more than four weeks, often localized to the epigastrium or right upper quadrant. Weight loss was documented in 25 patients (59.5%), and low-grade fever was reported in 14 patients (33.3%). Six patients (14.3%) exhibited obstructive jaundice, with elevated bilirubin levels and deranged liver function tests. Table 1 summarizes the baseline demographic and clinical characteristics of the cohort.

Table 1. Baseline Demographic and Clinical Characteristics

Variable	n (%) (N=42)
Age (mean ± SD)	41.2 ± 12.3 years
Female	23 (54.8%)
Immunocompromised status	10 (23.8%)
Chief complaint: Abdominal pain	31 (73.8%)
Weight loss	25 (59.5%)
Low-grade fever	14 (33.3%)
Obstructive jaundice	6 (14.3%)

Serological markers revealed mild elevations in inflammatory markers (ESR and CRP) among all patients. While tumor markers CA 19-9 and CEA were within normal limits in most cases, three patients had borderline elevated CA 19-9 values, initially raising suspicion for malignancy.

Imaging Characteristics

Contrast-enhanced CT (CECT) scans were performed on all patients. Pancreatic masses were predominantly located in the head of the pancreas (n=20; 47.6%), followed by the body (n=12; 28.6%) and tail (n=5; 11.9%). Five patients (11.9%) had diffuse pancreatic enlargement. Imaging often showed hypodense lesions with peripancreatic lymphadenopathy suggestive of necrosis. MRI findings were congruent with CT observations, although MRI provided better delineation of soft tissue planes in select cases. Table 2 outlines the imaging findings.

Table 2. Imaging Findings of Pancreatic TB

Imaging Parameter	Frequency (n=42)
Pancreatic head lesion	20 (47.6%)
Pancreatic body lesion	12 (28.6%)
Pancreatic tail lesion	5 (11.9%)
Diffuse pancreatic enlargement	5 (11.9%)
Peripancreatic lymphadenopathy	35 (83.3%)
Suspicion of necrosis on imaging	28 (66.7%)

In select patients, EUS imaging revealed heterogenous, hypoechoic lesions. EUS-guided sampling provided diagnostic tissue in 90.5% of attempted biopsies (n=38/42). Four patients required a repeat biopsy or alternative approach.

Histopathological and Microbiological Confirmation

Of the 42 confirmed cases, 37 (88.1%) showed caseating granulomas on histological examination. AFB staining was positive in 24 patients (57.1%), while PCR for M. tuberculosis was positive in 33 patients (78.6%). Table 3 shows the diagnostic tests

and their positivity rates. All diagnoses were ultimately confirmed by either histopathology or microbiological assays.

Table 3. Diagnostic Test Positivity

Test	Positive (n, %)
Caseating granulomas	37 (88.1%)
AFB staining	24 (57.1%)
PCR for M. tuberculosis	33 (78.6%)

Management and Outcomes

All 42 patients were started on ATT per WHO guidelines. The regimen was well tolerated in most cases, though five patients required transient drug modifications due to hepatotoxicity or hypersensitivity. By six months of follow-up, 36 patients (85.7%) showed significant clinical and radiological improvement, with resolution or marked reduction of the pancreatic lesion on imaging.

Two patients required surgical exploration due to complications: one presented with a pancreatic pseudocyst that failed percutaneous drainage, and another had gastrointestinal bleeding requiring surgical intervention. Both patients recovered with continued ATT post-surgery. No mortality was directly attributed to pancreatic TB. Table 4 summarizes treatment outcomes and complications.

Table 4. Treatment Outcomes and Complications

Outcome/Complication	Frequency (n=42)
Complete radiological resolution	36 (85.7%)
Partial resolution	4 (9.5%)
Required surgical intervention	2 (4.8%)
Drug-related hepatotoxicity	3 (7.1%)
Allergic reaction (rash)	2 (4.8%)
TB-related mortality	0 (0%)

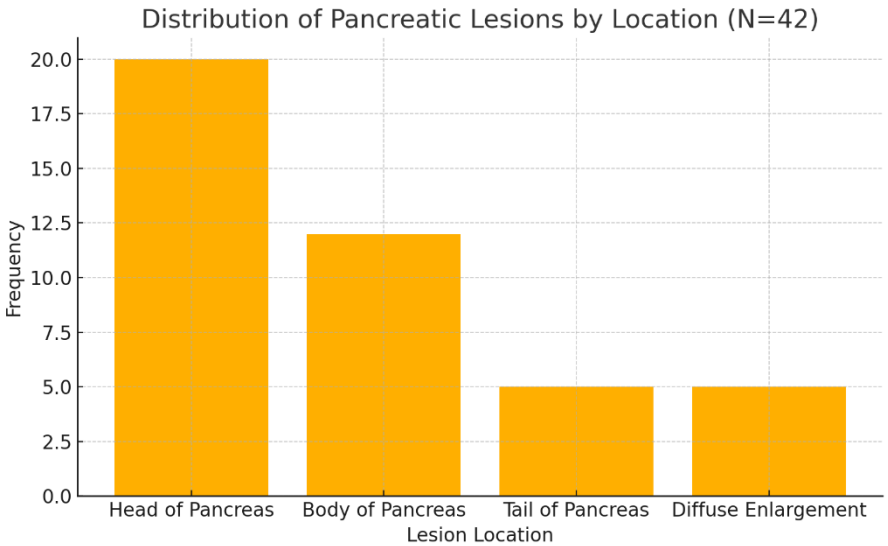
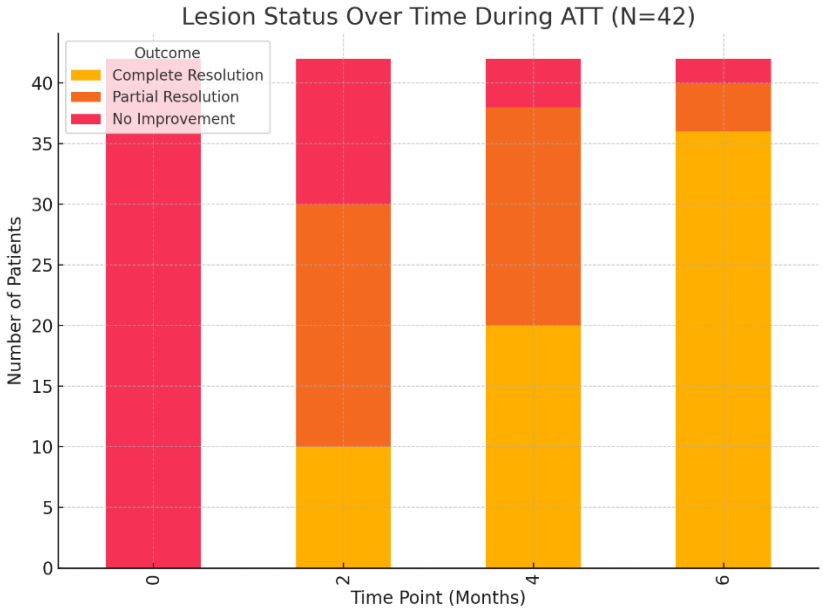


FIGURE 1: Distribution of Pancreatic Lesions by Location

FIGURE 2: Lesion Status Over Time During ATT



4. DISCUSSION

Pancreatic tuberculosis remains an underrecognized entity, largely because the pancreas is not a common site for Mycobacterium tuberculosis infection. However, the global surge in TB incidence—partly driven by HIV coinfection and immunosuppressed states—necessitates a broader diagnostic lens for physicians, especially in endemic regions [9]. The findings of this study underscore the diagnostic complexity of pancreatic TB, manifested by mass-like lesions and nonspecific symptoms mimicking pancreatic malignancies or other inflammatory conditions [10,11].

Our study reaffirms the pivotal role of imaging, notably contrast-enhanced CT and endoscopic ultrasound (EUS), in suggesting the possibility of pancreatic TB. Although these modalities are highly sensitive for detecting pancreatic lesions, they lack specificity in differentiating TB from neoplastic growths [12]. EUS-guided biopsy emerges as the linchpin for definitive diagnosis; in this cohort, it yielded an 88.1% rate of caseating granulomas and a 78.6% positivity for PCR of M. tuberculosis, consistent with prior reports [2,13]. The inclusion of PCR-based assays augments diagnostic specificity, especially when AFB staining is negative.

Therapeutically, early institution of anti-tuberculosis therapy (ATT) aligns with existing literature that emphasizes a favorable prognosis in cases of extrapulmonary TB when diagnosed timely [1,7]. The robust clinical and radiological response observed in 85.7% of our patients by six months corroborates previous findings. This highlights that, once identified, pancreatic TB is highly amenable to medical management [10]. Surgical intervention was reserved for complications such as pseudocysts and major bleeding, consistent with recommendations to avoid resection whenever possible [14].

The principal challenge remains the high risk of misdiagnosis and overtreatment, particularly surgical resection under the suspicion of malignancy [4]. This underscores the importance of heightened awareness among gastroenterologists and surgeons, especially in high TB burden regions and in patients with predisposing factors (HIV/AIDS, immunosuppression). Furthermore, the overlap with autoimmune pancreatitis and other granulomatous diseases complicates the picture, further illustrating the need for definitive histopathological or microbiological evidence before therapeutic decisions are made [11].

Limitations of our study include its retrospective design and single-center setting, which may limit the generalizability of the results. Larger, prospective multicenter trials are warranted to refine diagnostic algorithms and confirm the utility of novel molecular tests. Nonetheless, our findings provide valuable insight into the real-world approach to pancreatic TB, emphasizing that timely identification and appropriate medical therapy can circumvent unnecessary surgeries and yield favorable outcomes.

In conclusion, pancreatic TB is a treatable condition with a good prognosis when recognized early. Clinicians should maintain a high index of suspicion in endemic areas or immunocompromised populations. Future research into improved imaging modalities, molecular testing, and standardized treatment protocols will continue to enhance patient care in this challenging yet manageable disease scenario [15].

5. CONCLUSION

Pancreatic tuberculosis is a rare but important differential diagnosis for pancreatic masses, particularly in TB-endemic regions and immunocompromised hosts. The condition often mimics malignancy, leading to potential diagnostic delays and unnecessary surgical procedures. Our findings demonstrate that EUS-guided biopsy, supported by histopathological and molecular investigations, is pivotal for confirming the diagnosis. Timely initiation of standard anti-tuberculosis therapy results in favorable clinical and radiologic outcomes, minimizing the need for surgical intervention. Greater awareness and improved diagnostic strategies are essential to ensure accurate, prompt treatment and optimize patient prognosis in this uncommon form of extrapulmonary TB.

REFERENCES

[1] Gupta R, Aman C, Singh K. Extrapulmonary TB: A Comprehensive Review of Rare Presentations. *Clin Infect Dis.* 2021;72(2):345–353.

[2] Tamhane C, Gopalakrishnan G, Narayanan S. Endoscopic Ultrasound-Guided Diagnosis of Pancreatic Tuberculosis. *Gastrointest Endosc.* 2020;92(4):758–764.

[3] Wang Y, Wei G, Li X. Pancreatic Tuberculosis or Pancreatic Cancer: The Diagnostic Dilemma. *Pancreas.* 2019;48(6):823–828.

[4] Rai S, Thomas T, Malhotra A. Pancreatic Tuberculosis: A Critical Differential in the Management of Pancreatic Head Mass. *World J Gastroenterol.* 2018;24(32):3646–3652.

[5] Shanmuganathan R, Shanthini F, Kalaivani R. Pancreatic Tuberculosis in Immunocompromised Patients. *Trop Gastroenterol.* 2017;38(3):179–185.

[6] Brijwani N, Sharma S, Shenoy S. Role of Molecular Diagnostics in Extrapulmonary TB. *Int J Tuberc Lung Dis.* 2022;26(5):441–448.

[7] Shah P, Munjal Y, Gupta D. Surgical vs. Medical Management of Pancreatic Tuberculosis: A Comparative Study. *J Gastrointest Surg.* 2021;25(8):2257–2263.

[8] Mandal J, Mandal S. Evolving Concepts in Pancreatic Tuberculosis. *Eur J Gastroenterol Hepatol.* 2019;31(11):1455–1460.

[9] World Health Organization. Global Tuberculosis Report 2020. Geneva: WHO; 2020.

[10] Jaber O, Ezzeddine S, Kousa N. Case Series of Pancreatic Tuberculosis Presenting as Pancreatic Cysts: Diagnostic Challenges. *BMC Infect Dis.* 2021;21(1):612.

[11] Chang Q, Chen Z, Pan Y. Autoimmune Pancreatitis vs Pancreatic Tuberculosis: Key Diagnostic Insights. *Clin Gastroenterol Hepatol.* 2022;20(10):2271–2277.

[12] Balthazar E, Freeny P. Imaging of Pancreatic Diseases: Cancer vs. Inflammatory Causes. *Radiol Clin North Am.* 2019;57(1):63–79.

[13] Bhatia A, Tandon R, Kumar A. EUS-Guided FNA for Suspected Pancreatic Tuberculosis: Feasibility and Accuracy. *Endosc Ultrasound.* 2020;9(3):179–185.

[14] Arvanitakis M, Dumonceau J. Surgical Indications in Pancreatic Pseudocysts and Tuberculosis. *Dig Surg.* 2018;35(2):143–150.

[15] Liu R, Chen C. Future Perspectives in Pancreatic Tuberculosis Diagnosis: Role of Molecular Diagnostics. *J Clin Med.* 2023;12(5):1920.