

# Primary Gall Bladder Tuberculosis Comprehensive Review

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**Abstract:** Tuberculosis (TB) is an infectious disease that can affect various organ systems, including the abdomen. Abdominal TB may involve the gastrointestinal tract, lymph nodes, visceral organs, or the peritoneum, but primary involvement of the gallbladder (GB) is exceptionally rare. A review of the literature indicates that documented cases of gallbladder TB are mostly limited to case reports, with no comprehensive analysis available on this uncommon condition. Preoperative diagnosis is challenging, as it often mimics more prevalent gallbladder diseases like gallstones or malignancy. Histopathological examination of a surgically removed specimen remains the key to confirming this diagnosis. Conducting routine histopathological analysis on all resected specimens and initiating appropriate medical treatment can lead to successful management. This review aims to highlight the significance of this rare pathology.

**Keywords:** Gall bladder, Tuberculosis, Anti tubercular drugs

## 1. Introduction

Tuberculosis remains a leading cause of death among infectious diseases, alongside Human Immunodeficiency Virus (HIV). In developed countries, the incidence of tuberculosis has risen due to coexisting HIV infections. [1, 2]. Pulmonary tuberculosis is the most prevalent form of the disease. Abdominal tuberculosis can manifest as peritoneal, gastrointestinal, lymphatic, or visceral involvement [3]. Cases of concurrent abdominal and pulmonary tuberculosis are observed in 15–25% of patients [4, 5]. Among abdominal TB cases, hepatobiliary tuberculosis accounts for only 1% [6, 7]. While liver involvement in visceral TB has been documented, primary biliary tuberculosis is exceptionally rare. Reports on gallbladder tuberculosis are scarce [8], with the condition first described by Gaucher in 1870 [9]. Since then, various case reports have detailed different presentations. By 2011, fewer than 120 cases had been documented in medical literature [10 - 12]

This manuscript aims to provide an overview of the epidemiology, pathophysiology, diagnosis, and treatment of this rare condition based on the available literature.

### Epidemiology and Pathophysiology

Primary gallbladder tuberculosis is a rare manifestation of abdominal TB [67]. It is more frequently observed in males, with a male - to - female ratio of 2: 1. The condition has been reported in patients ranging from 11 to 50 years of age [13]. The gallbladder can become infected through hematogenous or lymphatic spread, as well as by direct extension from adjacent organs [14]. The low incidence of gallbladder tuberculosis is largely attributed to the alkaline nature of bile. However, prolonged irritation from gallstones in the cystic duct can lead to the absorption of bile salts, making the gallbladder mucosa more susceptible to infection. Chronic mucosal injury, often due to coexisting cholelithiasis, appears to be a key factor in the development of tuberculous cholecystitis [15].

Four distinct types of gallbladder tuberculosis have been described in medical literature:

- 1) As part of miliary tuberculosis in both children and adults.
- 2) As a component of widespread abdominal tuberculosis.
- 3) Isolated gallbladder tuberculosis without evidence of infection elsewhere in the body.
- 4) Gallbladder involvement in individuals with immunodeficiency [12].

## 2. Clinical Features

The presentation of gallbladder (GB) tuberculosis is highly variable. Most patients experience abdominal pain, but the disease can manifest in different ways. General symptoms such as malaise, unintended weight loss, and low - grade fever are common. Some cases have been reported with peritoneal seeding leading to discharge from the umbilicus [18], gallbladder perforation with bilioma formation [19], and 16. Arlandis F. F., Villalobos T. J., Mazure L. R. et al.: Tuberculosis of the biliary system: presentation of a case and review of the literature. Revista española de Enfermedades digestivas: organo oficial de la Sociedad Española de Patología Digestiva. 1990; 78 (1): 43. jaundice. Kumar P. et al. [20] have documented cases where gallbladder perforation resulted in abscess formation and sinus development in the anterior abdominal wall. Gulati et al. [21] described a patient with a cystic mass in the gallbladder along with bilateral adrenal gland enlargement.

In most cases of tubercular cholecystitis, gallstones or cystic duct stones (seen in approximately 70% of cases) are present [22]. However, only three cases of acalculous tubercular cholecystitis have been reported in the literature [16]. Additionally, tuberculosis of the gallbladder can sometimes mimic gallbladder cancer, making preoperative diagnosis challenging. Due to similarities in clinical presentation, gallbladder TB is often misdiagnosed as cholelithiasis, gallbladder cancer, or xanthogranulomatous cholecystitis, conditions that are significantly more common.

## 3. Investigations

In most cases, hematological investigations in patients with gallbladder tuberculosis appear normal. However, a

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preoperative increase in erythrocyte sedimentation rate (ESR) and a positive tuberculin skin test may be helpful in cases with a high clinical suspicion. Some patients with hepatobiliary tuberculosis may also show elevated liver enzyme levels [23]. Serological tests for detecting antibodies such as IgG, IgA, and IgM have been studied, with reported sensitivities of 62%, 52%, and 11%, respectively, and specificities of 100%, 97%, and 95%, as noted by Raja and Kaustova et al. [24, 25]. Detection of Acid - Fast Bacilli (AFB) in bile aspirated via endoscopic retrograde cholangiopancreatography (ERCP) is rare [12]. However, elevated Adenosine Deaminase (ADA) levels have been linked to improved diagnostic sensitivity [26]. The first description of gallbladder tuberculosis findings on ultrasonography (USG) was provided by Jain et al. in 1995 [27]. Ultrasound imaging typically shows a mass replacing the gallbladder, with stones embedded within it. Differentiating gallbladder TB from gallbladder cancer using ultrasonography alone is challenging. The authors suggested that mesenteric lymphadenopathy and omental thickening are more indicative of TB, whereas liver infiltration and metastases are more suggestive of malignancy. However, the presence of ascites and lymphadenopathy does not contribute significantly to differentiation, as these features can be found in both conditions. Contrast - enhanced computed tomography (CECT) findings described by Xiu - Fang Xu et al. [8] identified three patterns in gallbladder TB cases: micronodular lesions in the gallbladder wall, gallbladder wall thickening, and the presence of a mass. Micronodular lesions can resemble polyps or papillary tumors, but while gallbladder polyps and cancerous growths are usually larger than 1 cm, TB - related thickening tends to be more subtle. The other two patterns are difficult to distinguish from malignancy. Additional markers, such as lymphadenopathy, omental thickening, and chest infiltrates, may indicate tuberculosis. Among these, the thick - wall type is the most frequently observed form of gallbladder TB on CECT, making it difficult to differentiate from acute cholecystitis or cancer. Ramia et al. [15] reported a case where gallbladder tuberculosis resulted in a false - positive PET scan, initially suggesting gallbladder cancer. However, histopathological analysis confirmed tuberculosis. This was the first documented case of a false - positive PET scan in gallbladder TB. The use of an 11C - choline tracer has been found to be more reliable than 18Ffluorodeoxyglucose in distinguishing tuberculosis from malignancy [28].

### Histopathology

The presence of caseating granulomas along with Langhans giant cells is a key histopathological feature that aids in diagnosing tuberculosis. Performing a histopathological examination on all postoperative specimens is essential for distinguishing this condition from other similar diseases. Granulomas associated with tuberculosis can be challenging to differentiate from those seen in other granulomatous diseases of the gallbladder. For example, xanthogranulomatous cholecystitis also exhibits granulomas, but these are non - caseating and typically contain foam cells as a distinguishing feature [29]. Similarly, Crohn's disease can affect the gallbladder and present with non - caseating granulomas, as noted by Andoh A. et al. [30]. Additionally, Sharara et al. [31] documented a case of schistosomal granulomatous infection in the gallbladder. To date, approximately ten cases of gallbladder schistosomiasis have

been reported in English literature [31]. Although uncommon, tuberculosis must be excluded to confirm the diagnosis. The identification of parasites within the gallbladder wall can help differentiate schistosomiasis from tuberculosis. Despite the diagnostic challenges, histopathological examination remains the definitive method for confirming gallbladder tuberculosis.

### Treatment

The primary approach to managing gallbladder tuberculosis is antitubercular chemotherapy. The standard drug regimen consists of rifampicin (10 mg/kg), isoniazid (5 mg/kg), and pyrazinamide (25–30 mg/kg) for an initial two - month intensive phase, followed by a four - month continuation phase using rifampicin and isoniazid alone [32].

Unfortunately, due to the absence of specific preoperative markers, surgery often plays a crucial role in diagnosing this condition. However, surgical intervention may be unnecessary and potentially harmful for a disease that can be managed with medication. In fact, the risk of bile duct injury associated with surgical procedures is estimated to be around 0.2% [33], posing a significant threat to patient safety. A study by Jain et al. demonstrated that antitubercular therapy led to the regression of gallbladder masses and abdominal lymphadenopathy when monitored through ultrasound, highlighting the effectiveness of a non - surgical treatment approach.

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## 4. Conclusion

Gallbladder tuberculosis is an uncommon condition that can only be definitively diagnosed through histopathological examination. It presents a significant challenge for clinicians during the preoperative assessment. Despite advancements in diagnostic techniques, surgery remains necessary for confirmation. Gallbladder TB should always be considered as a potential diagnosis in cases of gallbladder masses, particularly in patients from endemic regions or those with compromised immune systems. This article highlights the crucial role of histopathological analysis of resected specimens, which remains underutilized in many developing nations.

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