



PREVALENCE AND CLINICAL CORRELATION OF ABDOMINAL TUBERCULOSIS IN SUBACUTE INTESTINAL OBSTRUCTION: A COMPREHENSIVE ANALYSIS

General Surgery

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ABSTRACT

Background: In developing countries abdominal tuberculosis continuous to be an a major health concern like India, where it commonly presents as subacute intestinal obstruction (SAIO). The object of this study is to assess the prevalence of intestinal tuberculosis in subacute intestinal obstruction (SAIO) patients and evaluate clinical correlations for early diagnosis and improved outcomes. **Methods:** A forward looking observational study was performed on cohort patients presenting with SAIO. Detailed history, clinical examination, radiological investigations, operative findings, histopathological evaluation, and microbiological confirmation were used for diagnosis. Data were analyzed to assess prevalence and associations. **Results:** Among patients presenting with SAIO, 4.5% were diagnosed with intestinal TB and. Empirical Antitubercular Therapy was effective in 18.4%. involvement of ileocecal region found to be the most common (52%-85%). Clinical features included colicky abdominal pain, distension, vomiting, weight loss, and constitutional symptoms. Diagnosis was confirmed through histopathology and imaging studies. **Conclusion:** Intestinal TB remains a prevalent and often overlooked cause of SAIO. A elevated clinical awareness, early radiological, pathological workup, timely initiation of anti-tubercular therapy is essential for reducing both morbidity and surgical complications.

KEYWORDS

INTRODUCTION

Tuberculosis to rank among most enduring and challenging infectious disease worldwide. Although effective treatment options and national control strategies are in place, TB still poses a major public health challenge, particularly in developing nations such as India.^[1] Globally, Each year tuberculosis is responsible for around 7 million new infections and 2.5 million fatalities annually, placing among the top ten causes of mortality. When coexisting with HIV/AIDS, TB is often referred to as the “deadly duo” due to their synergistic impact on patient outcomes^[1].

The COVID-19 pandemic has further disrupted TB control efforts worldwide, emphasizing the urgent need to reinforce early diagnosis and treatment strategies. The prompt detection of tuberculosis and identification of drug related resistance mainly depend on microbiology laboratories. key components of effective public health intervention. As per the recent report published by the world health organization, pandemic led to a significant decline in TB diagnostic services, resulting in fewer individuals being diagnosed and treated^[1,2].

In 2020, there was an 18% global decrease in TB case detection compared to 2019, with countries like India, Indonesia, and the Philippines experiencing the most significant reductions. Although partial recovery was observed in 2021, the setback led to a rise in untreated cases, contributing to increased mortality and continued transmission. TB-related deaths increased between 2019 and 2021, reversing the progress previously made in reducing disease burden and highlighting the necessity of revitalizing TB control initiatives post-pandemic^[1,2].

While TB can affect any organ system, the abdomen is one of the most frequently involved extrapulmonary sites after the lungs. Abdominal tuberculosis ranked as sixth most common form of extrapulmonary TB, preceded by lymphatic, genitourinary, skeletal, miliary, and meningeal involvement. However, in contrast to pulmonary TB, extrapulmonary forms particularly gastrointestinal tuberculosis remain under recognized and underdiagnosed^[3].

The clinical manifestations of intestinal TB and its sequelae, such as post-TB intestinal obstruction, are often nonspecific. Presentations may be acute, chronic, or acute-on-chronic, ranging from vague

abdominal discomfort to overt peritonitis or bowel obstruction. This variability complicates clinical diagnosis, especially in resource-limited settings where preoperative confirmation is often difficult.

Gastrointestinal TB may result in serious complications, including strictures, obstruction, perforation, and hemorrhage. Among these, intestinal obstruction is the most common, typically arising from luminal narrowing due to multiple strictures or adhesions. Though rare, intestinal TB remains an important cause of mechanical bowel obstruction^[3].

Despite being a potentially curable condition, abdominal TB continues significantly increase the risk of patient complications and death among patients. The disease can include the gastrointestinal tract, peritoneum, lymph nodes, and solid abdominal organs. Intestinal tuberculosis morphology commonly manifests in one the following type: ulcerative, hypertrophic or mixed (ulcerohypertrophic), fibrous stricturing^[4].

Symptoms varies on the type and organ site involvement. The disease often follows an insidious course, with patients presenting late with diagnosis such as acute or subacute intestinal obstruction(SAIO), gastrointestinal perforation leading to peritonitis^[5].

The aim of this study to evaluate the prevalence of intestinal tuberculosis in patients presenting with subacute intestinal obstruction. Timely diagnosis and intervention are crucial to reduce the risk of severe complication and enhance patient prognosis.

MATERIALS AND METHODS

Study Location

This study conducted in general surgery unit at Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh.

Study Duration

This study spanned a period of 18 months, from July 2023 to January 2025.

Study Design

This study employed a hospital based, prospective design to observe a patient outcomes over the time.

Study Population

This study enrolled patients who are hospitalized on diagnosis of subacute intestinal obstruction

Sample Size

This study includes 87 patients and the sample size was established by standard statistical methods.

Data Collection And Analysis:

Information was gathered using a structured Performa and subsequently entered into **Microsoft Excel** for organization. **Descriptive statistics included frequencies and percentages for categorical variables, mean $\pm$ standard deviation (SD).** analysis was conducted using **Stata MP-17 software**, and a **statistical significance defined as p-value less than 0.05.**

Inclusion & Exclusion Criteria

Study participants aged 18–75 years of either sex, diagnosed with subacute intestinal obstruction, were included. Special consideration was given to individuals with confirmed intestinal tuberculosis, a history of TB contact, or past pulmonary/extrapulmonary TB. Patients below 18 or above 75 years, or those unwilling to participate, were excluded.

Methodology

All patients received a thorough medical evaluation. **Suspicion of tuberculosis (TB)** was raised based on specific clinical signs such as **unintentional weight loss, low-grade evening fever, persistent cough, and loss of appetite**, particularly in individuals with a documented known case of tuberculosis or **close exposure with active tuberculosis patient.**

Supportive investigations included ESR, Mantoux test, and specific tests like AFB smear, TB Gold assay, and CBNAAT on sputum samples. Chest X-rays assessed for pulmonary TB signs, while abdominal X-rays, ultrasonography, and CT scans evaluated for features suggestive of abdominal TB, such as lymphadenopathy, ascites, and ileocecal thickening.

Endoscopic findings (ulcers, strictures, granulomas) and barium studies further aided diagnosis. All patients received initial conservative management. Those suspected of TB were started on anti-tubercular therapy under the DOTS regimen and monitored for 2–6 months for clinical response and complications.

RESULTS

Age profile of the study population, highest proportion patients (25.3%) fell within the 21–30 age category, next most common was 19.5% in the 41–50 age category and 17.2% in the 31–40 age category. The mean age of this study was 41.75 years. Among the 87 cases of this study, 53% were male and 47% female, the two groups did not differ significantly in terms of age.

In this study, two patients had a history of pulmonary tuberculosis. One was on treatment at the time of presentation with abdominal TB, while the other had discontinued therapy prematurely and Thirteen patients (14.9%) had a known history of contact with tuberculosis.

Table 1. Clinical Spectrum Of Presenting Symptoms

Symptoms	Numbers	Percentage%
Abdominal pain	82	94
Nausea/Vomiting	73	73
Distension	72	82
Obstipation	59	68
Altered bowel habits	57	65
Anorexia	38	43
Fever	30	34
Weight loss	17	19
Cough	13	14

Table 1. suggestive of almost all patients the leading clinical manifestation was abdominal pain, reported by 94% of study participants, with nausea/vomiting (84%) are second most common, distension (82%), and obstipation (68%). Other frequently reported symptoms included altered bowel habits (65%), anorexia (43%), fever (34%), weight loss (19%), and cough (14%).

Table 2: Distribution of Physical Findings Among Patients

Signs	Numbers	Percentage%
Abdominal Tenderness	87	100
Distension	74	85
Raised Bowel sounds	43	49
Guarding	36	41
Reduced Bowel sounds	23	26
Rigidity	3	3
Mass	1	1

Table 2. suggestive of abdominal tenderness was present in all patients (100%), followed by distension (85%), raised bowel sounds (49%), and guarding (41%). Reduced bowel sounds were noted in 26%, while rigidity and palpable mass were less common, observed in 3% and 1% of patients, respectively.

Table 3. Distribution Of Thoracic Radiograph Findings In Study Participants

Chest X-Ray Findings	Present	Absent	Percentage%	Total
Baseline Findings	43	44	49.4	87
Prominent bronchovascular markings	46	41	52.9	87
Pleural effusion	10	77	11.49	87

Table 3. suggestive of The most frequently observed radiographic feature was prominent bronchovascular markings, present in 52.9% of patients. Normal chest X-rays were noted in 49.4% of cases. Pleural effusion was identified in 11.5% of patients. Notably, there were no instances of nodular opacities, miliary nodules, pleural thickening, or hilar lymphadenopathy observed in the study population. Distribution of X-Ray

Table 4. Abdomen (Erect) Findings Among Patients

Findings	Present	Absent	Percentage%	Total
Normal Findings	1	86	1.1	87
Multiple Air-Fluid Level	86	1	98.9	87
Calcified lymph nodes	2	85	2.3	87
Gas under diaphragm	1	86	1.1	87

Table 4. suggestive of Abdominal X-ray (erect) findings suggestive of Multiple air-fluid levels were the most frequent feature, observed in 98.9% of patients which were suggestive of intestinal obstruction. Calcified lymph nodes were seen in 2.3%, while gas under the diaphragm and normal findings were each noted in 1.1% of cases.

Table 5. Distribution Of Ultrasound Findings Among Patients

Findings	Present	Absent	Percentage%	Total
Normal Findings	2	85	2.3	87
Distention	79	8	91.9	87
Calcified lymph nodes	22	65	25.6	87
Thumbprinting sign	1	86	1.2	87
Stricture	1	87	1.1	87

Table 5. suggestive of On whole abdomen ultrasound, abdominal distention most frequent finding in 91.9% of study participants. Calcified lymph nodes in 25.6%, and gas under the diaphragm in 20.9%. Less frequent findings included the thumbprinting sign (1.2%), strictures (1.1%), and normal sonographic appearance (2.3%).

Table 6. Distribution Of CT Scan Findings Among Patients

Findings	Number of Patients	Percentage
Normal Findings	9	10.5
Ascites	33	38.4
Other Bowel wall thickening	21	24.4
Enlarged Mesenteric Lymphnode	20	23.3
Ileocecal thickening	8	9.3
Calcified lymph nodes	3	3.5
Peritoneal thickening	2	2.3
Omental thickening	1	1.2

Table 6. suggestive of CT scan findings suggestive of Ascites most frequent finding abnormality in 38.4% of study participants. Other findings included increased mural thickness (24.4%), enlargement of lymph nodes in mesentery (23.3%), ileocecal thickening (9.3%). Less frequent findings were calcified lymph nodes (3.5%), peritoneal thickening (2.3%), and omental thickening (1.2%). Normal scans were observed in 10.5% of cases.

Cross-sectional imaging via contrast enhanced computer tomography of abdomen revealed features indicative of **abdominal tuberculosis**, including **mesenteric lymphadenopathy, ascites, thickening of the bowel wall, and peritoneal and omental thickening**. Additional findings included **loculated intra-abdominal collections, inter-bowel adhesions, strictures, fibrous bands, and mesenteric fat stranding**.

ESR distribution shows, Most patients (39.1%) had ESR values between 0–15 mm/hr, followed by 28.7% with values between 16–20 mm/hr. Elevated ESR levels above 20 mm/hr were seen in 32.1% of patients, with 21.8% showing values >30 mm/hr, suggesting possible inflammatory or infectious etiology.

Mantoux test results shows the test was negative in 63.2% of patients and positive in 27.6%, while results were unavailable for 9.2% of the cases.

Table 7. Distribution Of Management Among Patients

Management	Number of Patients	Percentage %
Conservative management (Without ATT)	69	79.3
Empirical Antitubercular Therapy	16	18.4
Antitubercular Therapy (For Confirmed case)	2	2.3

Table 7. shows the management approach. The majority of patients (79.3%) were managed conservatively without antitubercular therapy (ATT). Empirical ATT was initiated in 18.4% of suspected cases, while 2.3% received ATT based on confirmed diagnosis.

Out of 87 patients, only 2 (2.3%) required surgical intervention. Intraoperative findings included adhesions in both cases (2.3%), along with omental thickening (1.1%), enlarged mesenteric lymph nodes (1.1%), ileocecal involvement (1.1%), strictures, and a small bowel perforation (1.1%). No cases of a pulled-up cecum were observed.

DISCUSSION

This study is a hospital based, prospective design to observe a patient outcomes over the time, **conducted** This study conducted in general surgery unit at Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh, over a duration of **18 months (from July 2023 to January 2025)**. The primary objective aimed to evaluate prevalence and clinical presentation of **abdominal tuberculosis (ATB)** in individuals presenting with **subacute intestinal obstruction (SAIO)**. The findings were analyzed and compared with existing literature to identify trends and variations.

Age Distribution

The study participants ranged in age from 18 to 75 years with an average age of 41.75. A significant majority (74%) fell within the 21–50 years range, with the 21–30 years group being the most affected (25.3%). The results suggest that abdominal tuberculosis (ATB) associated with subacute intestinal obstruction (SAIO) primarily occurs in young to middle-aged adults. This trend aligns with the observations reported in earlier research conducted by Naganoor et al., Jain BK et al., and Maharshi et al.[6–8], on other hand studies those by Pillai et al. and Jiang W et al., with higher prevalence in individuals above 40 years of age[9,10].

Gender Distribution

In this study, 53% of the study participants belong to male and 47% belong to female, resulting in a male-to-female ratio of approximately 1.12:1. This male predominance is in agreement with outcomes reported by Malik A et al., Perea et al., and Keena M et al. [11–13]. However, contrasting data from Arunima M et al. (2014) reported a higher female predominance (61.5%)[14], suggesting regional or demographic variability.

Symptomatology

The most frequent symptom reported as abdominal pain (94%), distension (82%), vomiting (73%), constipation/obstipation (68%), altered bowel habits (65%), anorexia (43%), fever (34%), and weight loss (19%). These findings are in line with those reported by Keena M et al. and Khan BF et al., reinforcing the typical clinical presentation of abdominal tuberculosis^[13,15].

Physical Examination Findings

Abdominal tenderness was universally observed (100%). Other signs included distension (85%), exaggerated bowel sounds (49%), guarding (41%), reduced bowel sounds (26%), rigidity (3%), and a palpable mass (1%). In contrast, Urabinahatti et al. the most frequent sign reported as abdominal distension (75%), tenderness (57.5%), ascites (42.5%), and abdominal lump (17.5%)^[16].

Tuberculosis Contact History

A TB contact history was documented in only 14.9% of patients, while 85.1% had no known exposure. This suggests a significant number of cases may result from subclinical exposures or endogenous reactivation. Singh et al. and Sanju et al. similarly showed reduced level of TB contact percentage (5% and 13.6%, respectively), highlighting the possibility of undetected community transmission^[17,18].

History Of Tuberculosis

Only 2.3% of patients had a documented history of pulmonary TB. The remaining 97.7% were either newly diagnosed or previously undetected cases. Mamo JP et al. found coexisting pulmonary TB in 4 out of 17 ATB patients[129], while Nayagam et al. observed chest X-ray abnormalities in 30.8% of patients, suggesting latent or previously treated disease^[19].

Erythrocyte Sedimentation Rate (ESR)

Elevated ESR supported an inflammatory or infectious etiology. Uzunkoy et al. reported average ESR levels of 50 mm/hr in ATB patients^[20], and Indrasari et al. identified an ESR cut-off of 32.5 mm/hr as a helpful diagnostic threshold with 81% sensitivity^[21].

Mantoux Test

In this study, 63.2% of patients tested negative, 27.6% were positive, and results were unavailable in 9.2%. Despite being a traditional screening tool, Mantoux test sensitivity varies by region and immune status. Rana S et al. observed a positivity rate of 84.8% in their study, suggesting regional variation in TB exposure and immune response^[22].

Chest X-Ray Findings

In the present study, chest X-rays of 87 patients revealed normal findings in 43 patients (49.4%), indicating no evident signs of pulmonary tuberculosis or other lung pathology. Prominent bronchovascular markings were observed in 46 patients (52.8%), possibly suggestive of chronic inflammatory changes. Pleural effusion was seen in 10 patients (11.5%), a finding often associated with tuberculosis, malignancies, or other infections. No patients exhibited nodular opacities, miliary nodules, pleural thickening, or hilar lymphadenopathy, which are typical indicators of active or advanced pulmonary tuberculosis.

Tobin et al. emphasized the importance of chest radiography in assessing both active and latent pulmonary TB, underlining its diagnostic relevance in cases of suspected abdominal tuberculosis^[23]. Research by Kilic O et al., involving 35 pediatric abdominal TB cases, reported active pulmonary involvement in 31.4% of patients, supporting the notion that pulmonary signs may be absent in many abdominal TB cases^[24].

Abdominal X-Ray (Erect) Findings

Radiological evaluation using abdominal X-rays revealed that 86 patients (98.9%) demonstrated numerous air-fluid levels formation, in accordance with features of intestinal obstruction, a hallmark for abdominal tuberculosis. Abdominal distension was noted in 74 patients (85.1%), further indicating subacute intestinal obstruction (SAIO). Only one patient (1.1%) exhibited a normal radiograph.

Calcified lymph nodes were seen in 2 patients (2.3%), which could reflect prior TB infection.

Notably, none of the patients demonstrated gas under the diaphragm, thumbprinting, or evident strictures. These findings highlight that while classical radiological signs of tuberculosis may be absent, clinical suspicion remains essential.

Debi et al. described similar radiological patterns, identifying mechanical obstruction due to fibrosis and cicatrization as a significant complication of abdominal TB^[25].

Ultrasonography Findings

Ultrasound imaging revealed abnormal findings in the majority of cases:

On **whole abdomen ultrasonography**, the most frequently observed abnormality was **abdominal distention**, present in **91.9%** of patients. **Calcified lymph nodes** were noted in **25.6%**, while **gas under the diaphragm** was detected in **20.9%** of cases.

Less common findings included the **thumbprinting sign** in **1.2%**, **strictures** in **1.1%**, and a **normal ultrasound appearance** in **2.3%** of patients. According to Chakaya et al., up to 50% of peritoneal TB cases may present with ascitic fluid [139], and Sharma A et al. emphasized the diagnostic importance of mesenteric lymphadenopathy in up to 60% of abdominal TB cases^[26]. Ghoshal et al. reported bowel wall thickening in 20–35% of cases in their meta-analysis^[25].

Contrast-Enhanced CT Findings

Contrast-enhanced computed tomography (CECT) findings in this cohort further supported the diagnosis of abdominal tuberculosis. Out of the 87 patients:

Ascites was observed in 33 patients (38.4%), Mesenteric lymphadenopathy was present in 20 patients (23.3%), Bowel wall thickening was seen in 21 patients (24.4%), Ileocecal thickening, a characteristic finding, was present in 8 cases (9.3%), Calcified lymph nodes were seen in 3 patients (3.5%) and Peritoneal and omental thickening were seen in 2 (2.3%) and 1 (1.2%) patients, respectively.

These findings align with results from Sinan T et al., in which peritoneal involvement is 77.5% of abdominal TB patients and ascites in 55.2%^[27]. Lymphadenopathy and bowel wall thickening were also commonly reported in their series (46.9% and 38%, respectively), underscoring the diagnostic importance of CT imaging in abdominal TB.

Management

In this study involving 87 patients, 69 (79.3%) were managed conservatively without antitubercular therapy (ATT), 16 (18.4%) received empirical ATT based on clinical suspicion, and 2 (2.3%) were treated as confirmed tuberculosis cases. The effectiveness of **conservative management in abdominal tuberculosis** has been highlighted by Pandey Y et al. In their **prospective study involving 134 patients with intestinal obstruction, abdominal TB** was identified in **29%** of cases. Among these, approximately **60% showed improvement with non-surgical treatment**, which included **bowel rest, nasogastric decompression, intravenous fluid therapy, and anti-tubercular treatment (ATT)** where appropriate.^[28] Darbari et al. reported that among 50 abdominal TB cases, 24 (48%) were treated conservatively with a four-drug ATT regimen, covering presentations such as tuberculous peritonitis, subacute obstruction, right iliac fossa lumps, and colonic involvement^[29]. A case report by Kalbhande and Chaudhary described a acute intestinal obstruction in 17 year aged patient managed successfully with ATT, short-course steroids, and dietary changes^[30].

Empirical ATT is often initiated based on clinical judgment. Sharma et al., research of 120 study participants with controversial intestinal tuberculosis, found that 25% were started on empirical ATT, and 70% of them showed clinical improvement within 4–6 weeks, thereby avoiding surgery^[31]. Osman Abdullahi et al. observed that around 50% of patients were treated empirically despite negative sputum or GeneXpert results, with 70% showing clinical signs of TB^[32]. Webb E et al. emphasized that in cases where microbiological confirmation is lacking but clinical suspicion consistent high, study participants are categorized as suspicious for tuberculosis and initiated ATT accordingly^[33]. Pratap et al. reported that end-of treatment endoscopy in empirically treated patients showed marked or total mucosa healing in over 75% of cases conforming tuberculosis^[34]. Waikar et al. highlighted that in developing countries, where sputum negative are 50%, often necessitating empirical treatment^[35]. Melissa Davidsen et al. cautioned that while empirical ATT is common, relying solely on clinical presentation may lead to overtreatment; they advocate for the use of simple clinical parameters to assess treatment response, especially in low-resource settings, while stressing the need for larger validation studies^[36].

CONCLUSION

This research focuses on patient characteristics, including clinical signs, radiological findings, observations and demographic details

with subacute intestinal obstruction, emphasizing abdominal tuberculosis as a significant underlying cause. This condition significantly involving young to middle-aged adults, with a slight male predominance. Common symptoms included abdominal pain, distension, vomiting, and altered bowel habits. Imaging, particularly ultrasound and CT, was instrumental in identifying features such as bowel wall thickening, mesenteric lymphadenopathy, and ascites.

Most patients had no prior history or known contact with tuberculosis, reflecting its latent and often silent progression. Diagnostic tools like ESR, chest X-ray, and CBNAAT showed variable effectiveness, underscoring the difficulty in microbiological confirmation. Despite this, clinical suspicion combined with imaging remains central to diagnosis. Empirical antitubercular therapy yielded good outcomes, especially in the absence of surgical complications, and was particularly valuable in resource-limited settings. Surgery was reserved for patients with complications such as adhesions or omental thickening.

Suspicion for abdominal tuberculosis should be highlighted in patients presenting with subacute intestinal obstruction, particularly in endemic regions. Early clinical recognition, appropriate imaging, and prompt starting of empirical therapy can betterment the outcomes and minimize surgery.

Summary

This study is a hospital based, prospective design to observe a patient outcomes over the time, **conducted** at general surgery unit at Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh located in the NCR region of Uttar Pradesh, India, assessed the prevalence and clinical features of abdominal tuberculosis in 87 patients with subacute intestinal obstruction. Most patients were aged 21–30 years, with a slight male predominance. The predominant symptoms were abdominal pain, distension, vomiting, and altered bowel habits, with abdominal tenderness being a consistent physical finding. Imaging studies frequently revealed hallmark signs of abdominal TB, including mural wall thickening, enlargement in lymph nodes of mesentery, fluid distention of abdomen, dilated bowel loops.

Microbiological confirmation using CBNAAT, sputum AFB, and TB-Gold was limited; however, diagnosis and management were guided by clinical evaluation and imaging. Conservative treatment was effective in most cases, with 18.4% receiving empirical ATT and 2.3% treated for confirmed TB. Surgery was required in a minority of patients, primarily due to complications like adhesions and omental thickening.

The study underscores the diagnostic challenges of abdominal TB in resource-limited settings and reinforces the value of clinical judgment supported by imaging. It advocates for broader access to diagnostic tools and calls for further research to establish standardized treatment protocols.

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