

# Clinical, Imaging, and Endoscopic Profile of Patients with Abdominal Tuberculosis

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## Abstract

**Aims** The aim is to study the clinical, imaging, and endoscopic profile of patients with abdominal tuberculosis (TB) in a tertiary care center.

**Subjects and Methods** This was a prospective observational study conducted at Meenakshi Medical College Hospital, Kancheepuram, over a 3-year period, from March 2011 to February 2014. A total of 76 patients were diagnosed with abdominal TB based on their clinical, pathological, endoscopic, and radiological features. A meticulous history and physical examination with complete blood count, human immunodeficiency virus (HIV) status, chest X-ray, ultrasound abdomen, upper endoscopy, and colonoscopy was performed. Barium study, ascitic fluid analysis, and contrast-enhanced computed tomography of the abdomen and pelvis with peritoneal biopsies where need be were also obtained. All the patients received antituberculosis treatment (ATT) under close surveillance and monitoring.

**Results** The total number of patients enrolled in our study was 76 with age ranging from 18 to 75 years; 40 were male and 36 were female. There was a significant overlap of symptoms, and most of the patients presented with a multitude of complaints. Abdominal pain was the most common complaint noted in 70 patients, followed by loss of appetite and weight loss in 52, fever in 48, constipation in 28, abdominal distention in 14, and diarrhea in 6 patients. Two patients presented with acute intestinal obstruction requiring emergency surgical intervention. Fever was the most common finding followed by anemia, ascites, abdominal tenderness, and a palpable abdominal mass. A history of pulmonary Koch's was elicited in 28 patients, and 17 had defaulted on treatment. All the patients enrolled in our study received ATT although six were lost to follow-up.

**Conclusions** Abdominal TB can present with a myriad of signs and symptoms, and early diagnosis and treatment are the keys for an effective cure and for reducing the morbidity and mortality from this chronic granulomatous disease.

## Keywords

- ▶ abdominal tuberculosis
- ▶ ascites
- ▶ diagnostic laparotomy
- ▶ loss of appetite

## Introduction

Tuberculosis (TB) continues to remain a major public health problem in the Southeast Asian countries, including the Indian subcontinent, and is resurfacing as a major health issue in developed countries due to the HIV pandemic and immunosuppressive therapies. It can virtually affect any human organ and has a varied presentation, posing a diagnostic challenge

to the clinicians. The burden of extrapulmonary TB is estimated to range from 15 to 20% of all TB cases in HIV-negative patients, while in HIV-positive subjects, it accounts for 40 to 50% of new TB cases.<sup>1</sup> India is an endemic area with an increasing incidence of multidrug-resistant TB.<sup>2</sup> Abdominal TB, defined as an infection of the peritoneum, hollow or solid abdominal organs, and abdominal lymphatics with *Mycobacterium tuberculosis*, is the sixth most frequent site

of extrapulmonary involvement, with the ileocecal region being the most common site affected followed by ascending colon, jejunum, appendix, duodenum, stomach, esophagus, sigmoid colon, and rectum.<sup>3</sup>

Abdominal TB is thought to occur due to reactivation of a dormant focus. It may also be caused by swallowed bacilli traversing through the Peyer's patches of the intestinal mucosa and being transported by macrophages through the lymphatics to the mesenteric lymph nodes.<sup>4</sup> Due to its varied presentations, abdominal TB remains a diagnostic dilemma. The disease may mimic several other conditions such as lymphoma, Crohn's disease, amebiasis, and even adenocarcinoma amongst others. Imaging findings are not pathognomonic but may be highly suggestive of the disease if considered in conjunction with clinical findings, laboratory tests, immunological status, and demographic origin of the patient.<sup>5</sup>

This study was done to characterize the clinical, imaging, and endoscopic profile of patients presenting with abdominal TB at a tertiary care center.

## Subjects and Methods

This was a prospective observational study conducted at Meenakshi Medical College Hospital, Kanchipuram, over a 3-year period extending from March 2011 to February 2014. A total of 76 patients were diagnosed with abdominal TB based on their clinical, pathological, endoscopic, and radiological features. A meticulous history and physical examination with complete blood count, HIV status, chest X-ray, ultrasound of the abdomen, upper endoscopy, and colonoscopy was performed. Barium study, ascitic fluid analysis, and contrast-enhanced computed tomography (CECT) of the abdomen and pelvis with peritoneal biopsies where need be were also performed. All the patients received

antituberculosis treatment (AKT) under close surveillance and monitoring.

## Results

### Demographics

Of the total 76 patients, 40 were males and 36 females with age ranging from 18 to 75 years and majority of our patients were in the age group of 18 to 30 years (42.1%). A history of pulmonary Koch's was elicited in 28 patients of whom 17 had defaulted on AKT. While three patients tested positive for HIV, one was a chronic hepatitis B surface antigen carrier but not on any antivirals for the same. A history of close contact with a family member who was diagnosed with pulmonary Koch's was noted in 16 patients (► Fig. 1).

### Clinical Features

Abdominal pain, either localized or generalized, was the most common symptom noted in 70 patients followed by loss of appetite/weight loss in 52, fever in 48, constipation in 28, abdominal distention/ascites in 14, diarrhea in 6 patients, and 2 patients presented with intestinal obstruction requiring emergency laparotomy (one patient showed evidence of abdominal cocooning on CT and the other showed peritoneal tubercles with stricture at the ileocecal junction) (► Table 1).

Fever was the most common clinical finding noted in 42 patients followed by anemia in 35, ascites in 26, abdominal tenderness in 22, and palpable abdominal mass in 10 patients (► Table 2).

### Laboratory Findings

An elevated erythrocyte sedimentation rate (ESR) (>30 mm) was noted in 46 patients. The other laboratory findings included anemia in 38 and hypoalbuminemia (serum albumin

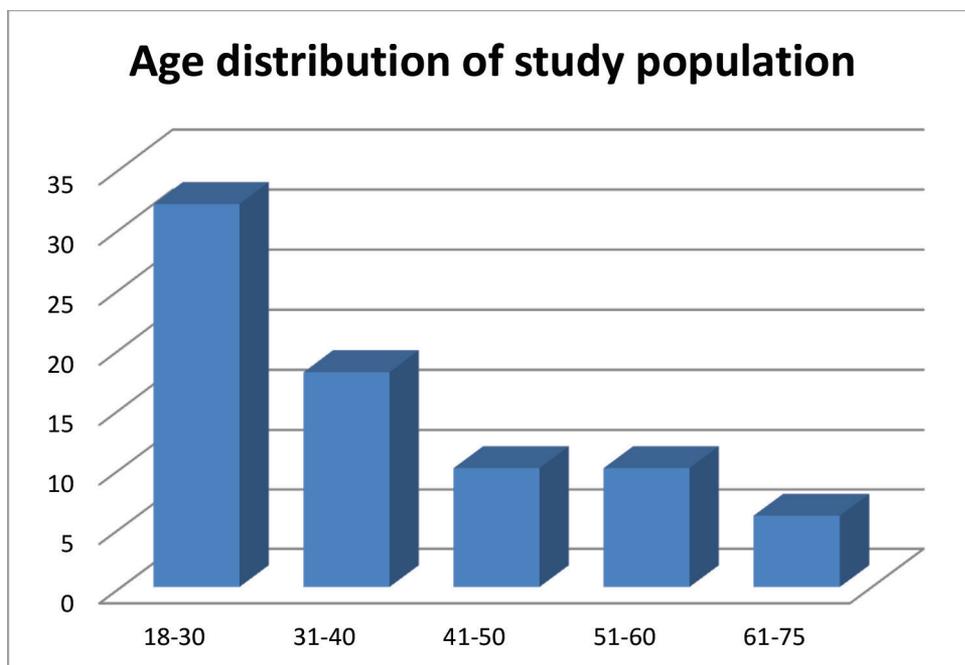


Fig. 1 Age distribution of study population.

<3.5 g/dL) in 26 patients. Ultrasound-guided ascitic fluid analysis was undertaken in 30 patients who had clinical and/or ultrasound evidence of ascites. Apart from calculating serum ascites albumin gradient (SAAG), ascitic fluid was analyzed for adenosine deaminase (ADA), AFB smear, and acid fast bacilli (AFB) culture. All 30 patients showed high protein and low SAAG ascites; while ADA was elevated in 23 patients (>33 U/L), 2 patients showed AFB on smear but none of them grew AFB on culture (►Table 3).

### Radiological Findings

A chest X-ray was done in all the patients with 8 showing stigmata of previous infection (fibrosis, pleural thickening, etc.), 14 showing parenchymal consolidation, 6 with miliary TB, and 5 showing pleural effusion (►Table 4).

**Table 1** Symptom profile of study population

Symptoms	Number of patients (%)
Pain abdomen	70 (92.1)
Loss of appetite/weight loss	52 (68.4)
Fever	48 (63)
Constipation	28 (37)
Abdominal distention	14 (18.4)
Diarrhea	6 (7.9)
Acute intestinal obstruction	2 (2.6)

**Table 2** Clinical features/findings of study population

Signs	Number of patients (%)
Fever	42 (55.26)
Pallor	35 (46)
Ascites	26 (34.2)
Abdominal tenderness	22 (28.9)
Abdominal mass	10 (13.15)

**Table 3** Laboratory findings

Investigation	Number of patients (%)
CBC	
Anemia	38 (50)
Raised ESR (>30 mm/h)	46 (60.5)
Hypoalbuminemia	26 (34.2)
Normocytic normochromic anemia	20 (26.3)
HIV (ELISA)	3
HBsAg	1
Ascitic fluid analysis	30
High protein, low SAAG ascites	30
ADA (>33 U/L)	23
Smear positive for AFB	2

Abbreviations: HIV, human immunodeficiency virus; HBsAg, hepatitis B surface antigen; SAAG, serum ascites albumin gradient; ADA, Adenosine deaminase; AFB, acid fast bacilli; CBC, complete blood count; ESR, erythrocyte sedimentation rate

Enlarged mesenteric and para-aortic lymph nodes were the most common ultrasound finding noted in 58 patients followed by ascites in 30 patients. Thickening of the mesentery and peritoneum was noted in 20 patients and thickened ileocecal region was reported in 18 patients. CECT was done in 42 patients with abdominal lymphadenopathy followed by ascites and ileocecal thickening with pulled-up and deformed cecum as the most common finding reported. One patient who tested positive for HIV had miliary TB on chest X-ray (►Fig. 2, 3 and 4) and showed similar lesions in the liver and spleen (miliary tubercles) (►Fig. 5). All our patients were subjected for colonoscopy and biopsies were obtained if any mucosal abnormality was noted (►Fig. 6).

### Endoscopic/Colonoscopic Findings

The most common site of involvement in the gastrointestinal (GI) tract was the ileocecal region with deformed ileocecal (IC) valve, and ulcers in the ileocecal region were noted in 58 patients (►Fig. 7), 5 of them had either ulcers or strictures in the ascending colon (►Fig. 8), and 2 showed transverse ulcers with luminal narrowing in the transverse colon. One patient on gastroscopy was noted to have nodular lesion of the antrum (►Fig. 9) which was biopsied and histology

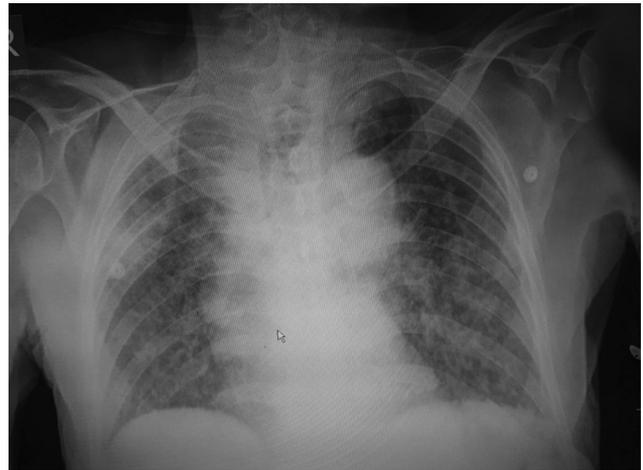
**Table 4** Radiological/imaging findings

Imaging study	Number of patients
Chest X-ray (n = 76)	
Consolidation	14
Miliary tuberculosis	6
Stigmata of healed tuberculosis (pleural thickening, upper zone fibrosis, etc.)	8
Pleural effusion	5
Ultrasound abdomen (n = 76)	
Ascites	30
Abdominal lymphadenopathy	58
Peritoneal thickening	20
Bowel wall thickening	18
Barium meal follow-through (n = 8)	
Deformed and pulled up cecum	6
Multiple strictures	2
CECT abdomen (n = 42)	
Abdominal lymphadenopathy	34
Ascites	39
Deformed and pulled up cecum	31
Abdominal cocoon	1
Splenic/liver tuberculosis	1

Abbreviation: CECT, contrast-enhanced computed tomography.



**Fig. 2** barium meal follow-through (BMFT) showing pulled up and distorted cecum with straightening of ileocecal junction



**Fig. 5** Chest X-ray showing military tuberculosis in a human immunodeficiency virus positive patient



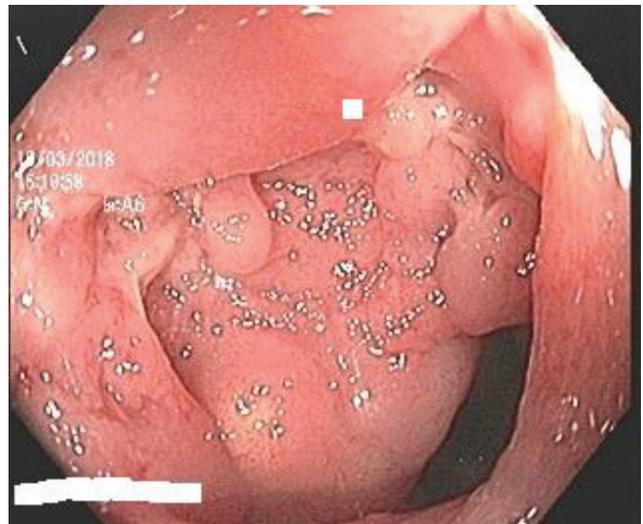
**Fig. 3** Computed tomography scan of the abdomen showing moderate free fluid in the abdomen with conglomerate of several small bowel loops within occupying the center of the abdomen



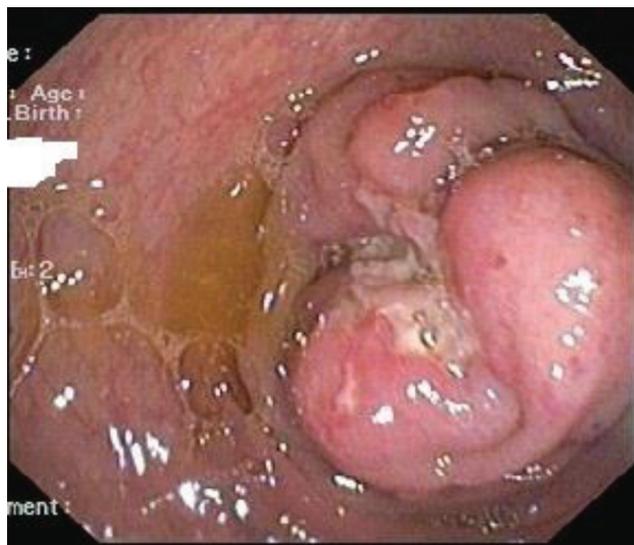
**Fig. 6** Multiple hypoattenuating lesions in the liver and spleen



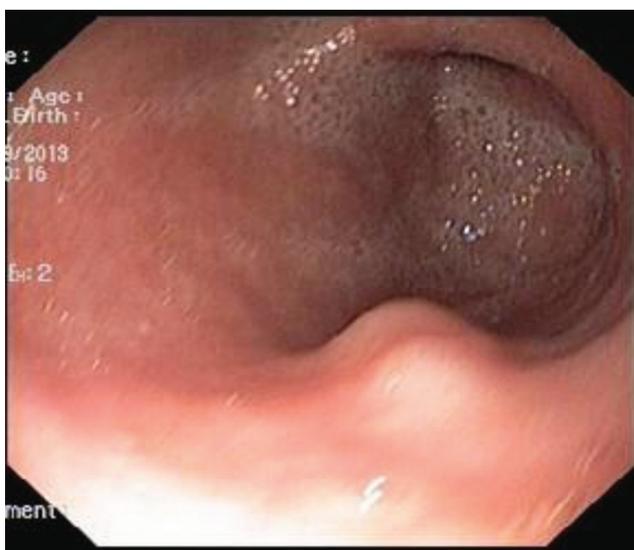
**Fig. 4** Diffuse circumferential wall thickening noted in the terminal ileum, cecum, and ascending colon causing significant luminal narrowing with paracolic and pericecal fat stranding



**Fig. 7** Colonoscopy showing deformed and narrowed IC valve with ulcers and polypoidal lesions in the cecum and ascending colon



**Fig. 8** Colonoscopy showing a stricture due to ulceroproliferative lesion in the ascending colon mimicking malignancy. Histology showed casesating granuloma with numerous AFBs



**Fig. 9** Esophagogastroduodenoscopy showing a nodular lesion in the stomach which was subsequently diagnosed to be tubercular in origin

was consistent with TB (caseating granuloma with AFB). Twenty-two patients who underwent colonoscopic biopsies showed the histological features diagnostic of TB (► **Table 5**).

### Treatment and Follow-up

All patients enrolled in this study were initiated on ATT (weight-based regimen) with close follow-up of liver function tests. Patients with miliary TB were treated with an extended 9-month regimen, and the remaining patients were initiated on 6-month ATT regimen. Six patients were lost to follow-up, of whom three could not be traced. Treatment was interrupted in eight of the patients due to drug-induced hepatotoxicity of whom seven tolerated sequential reinstitution of AKT and one patient developed acute liver failure and had to be referred to a

**Table 5** Endoscopic/colonoscopic findings

Anatomic site of affection	Number of patients
Ileocecal region with deformed IC valve and transverse ulcers, polypoidal/nodular mucosa	58
Ascending colon ulcers/strictures	5
Transverse colon ulcers	2
Multiple ulcers throughout the colon	1
Antral nodules	1

IC, ileocecal valve

tertiary liver center. Fortunately, this patient survived and had to be treated with second-line AKT and went on to complete 12 months of treatment with any further untoward events.

### Discussion

It is estimated that the Indian subcontinent is home to ~25% of the world's TB cases.<sup>2</sup> The primary site of TB is usually lung, from where it can get disseminated to other parts of the body. Abdominal TB which is the sixth most common extrapulmonary site of TB is usually diagnosed late due to its nonspecific symptoms.<sup>6</sup> Hence, a high index of suspicion by an astute clinician helps in early diagnosis and timely treatment to prevent long-term morbidity and mortality from the disease. The ileocecal region is the most common site of infection due to rich lymphatic tissue, physiological stasis, and limited digestive activity.<sup>7</sup>

Of the 76 patients in our study, there was a slight preponderance of male patients who constituted 52.6% of the subjects and 47.3% were females. Studies have shown that abdominal TB is predominantly a disease of young adults at the peak of their productive life, and about two-thirds of the affected patients are in the second to fourth decades of their lives. The same observation was reflected in our study, wherein abdominal TB was more prevalent in patients aged 18 to 40 years ( $n = 50$ ) who constituted 66% of the study population.<sup>8,9</sup>

Pain abdomen was the most common symptom noted in 70 (92.1%) of the patients; the same was also reported in previous studies.<sup>6,10,11</sup> Loss of appetite with weight loss, fever, pyrexia of unknown origin (PUO), constipation, abdominal distention, and diarrhea were the other symptoms noted in descending order of frequency.

In our study, 25 patients (32.8%) showed concomitant pulmonary findings, while previous studies have documented ~15 to 25% of cases with abdominal TB to have coexisting pulmonary TB.<sup>12,13</sup> Due to financial constraints, CECT was done only in 42 patients (55.56%) in our study, with the most common finding being mesenteric lymphadenopathy in isolation or with involvement of other GI organs and peritoneum. Similar findings were demonstrated by Suri et al, who reported mesenteric lymph nodes as the most common site

of affection in abdominal TB.<sup>14</sup> Other findings included mural thickening of the ileocecal region and peritoneal involvement (► **Figure 4**).

Although short-course (6-month) chemotherapy with ATT is usually well tolerated, drug-induced hepatotoxicity is the most common culprit, leading to interruption of treatment.<sup>15,16</sup> The reported incidence of antituberculosis drug-induced liver injury is ~8 to 36% in India.<sup>17</sup> Acute viral hepatitis should be ruled out, especially in countries like India that are endemic for it. In our study, eight patients (10.5%) developed hepatotoxicity due to ATT, seven out of whom tolerated either sequential reinitiation of AKT or modified ATT. One patient had to be referred to a tertiary liver center due to the development of ALF.

In patients with compatible ileocecal lesions and a history of exposure to TB, strong positive PPD skin test, evidence of TB on chest X-ray, or those originating from an endemic region, Wagner et al favored initiation of antituberculosis therapy.<sup>18</sup> We followed our clinical instincts and started five patients on empiric AKT as there was diagnostic dilemma due to discordance in clinical and laboratory findings, and fortunately, all five patients showed a dramatic response with ATT with complete resolution of their symptoms at the end of 6 months of treatment.

## Conclusions

Abdominal TB presents with a wide variety of nonspecific symptoms and hence requires a high index of suspicion for timely diagnosis and treatment. Early diagnosis and initiation of ATT are essential to prevent morbidity and mortality associated with this multisystem infectious disease. Chemotherapy is same as for pulmonary TB with surgery reserved for life-threatening obstructive features. A therapeutic trial of ATT is appropriate in cases of diagnostic dilemma. Although drug-induced hepatotoxicity remains a dreaded complication, close monitoring of liver function tests and regular follow-up with alteration in therapy offers an effective cure.

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Nil.

### Conflicts of Interest

None.

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