International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Research Article

Clinical, Radiological, Endoscopic, & Histopathological Profile of Abdominal Tuberculosis Patients

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OPEN ACCESS

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Received: 02-09-2025
Accepted: 24-09-2025
Available online: 13-10-2025

ABSTRACT

Background and Aims: To study the clinical, radiological, endoscopic, and histopathological profile of Abdominal Tuberculosis patients at a Tertiary Care Center.

Methods: This is a retrospective observational study conducted at HAHC Hospital, New Delhi, from January 2023 to March 2025. A total of 65 patients were diagnosed with Abdominal Tuberculosis based on radiological, endoscopic, histopathological, and clinical evidence. All patients received standard Anti-Tubercular Therapy (ATT) with timely follow-up.

Results: Of the 65 cases, 30 were males and 35 were females, with ages ranging from 15 to 75 years and most cases occurring between 15 to 30 years of age. Abdominal pain was the most common symptom reported (82%), followed by weight loss (34%), and fever (29%). Abdominal tenderness and fever were the predominant signs noted, followed by ascites and abdominal distension. Radiological evaluation frequently demonstrated abdominal lymphadenopathy and ileocecal thickening, while colonoscopy revealed terminal ileal ulcers and a deformed ileocecal valve in majority of the cases. 9 cases out of 65 had a positive GeneXpert report, of which 2 had a positive smear with AFB seen on ZN staining. Ascitic tap showed low SAAG (<1.1 g/dL), high ADA (>40 U/L), and lymphocytic predominance.

Conclusion: Abdominal tuberculosis remains a diagnostic challenge due to its varied clinical presentations and frequent overlap with other gastrointestinal pathologies. Cases were diagnosed based on microbiological, radiological, endoscopic, colonoscopic, and symptomatic evidence, thus highlighting the need for a multidisciplinary approach in its diagnosis. Early diagnosis and initiation of ATT has proven to significantly reduce mortality and morbidity.

Keywords: *Abdominal Tuberculosis, Anaemia, Ascitic Tap, Colonoscopy, Ulcers.*

INTRODUCTION

Tuberculosis (TB) is among the ten most common causes of mortality worldwide. TB was the leading cause of death from a single infectious pathogen before the COVID-19 pandemic. Of the 30 high TB burden countries harboring 87% of the global incidence, India accounts for 26% of those cases [Fig. 1] (World Health Organization, 2024). Even though pulmonary TB remains the most common form, extrapulmonary tuberculosis (EPTB) accounts for a significant proportion of cases: 15–20% in immunocompetent patients and up to 50% in those co-infected with HIV (Sharma S. K., 2004).

Among the different types of EPTB, abdominal tuberculosis (ATB) stands out as a diagnostic puzzle due to its diverse clinical presentations and lack of specific symptoms. Abdominal Tuberculosis is the sixth most frequent site of extrapulmonary involvement (Sharma M. P., 2004) Common sites of Abdominal TB are: peritoneum, lymph nodes,

intestines, and solid organs. Its clinical profile often mimics conditions like Crohn's disease, gastrointestinal tract cancers, and other chronic infections, leading to diagnostic ambiguity and delays in management (Debi, 2014).

The pathophysiology of abdominal TB involves hematogenous spread from a primary focus, ingestion of infected sputum in cases of pulmonary TB, or direct invasion from nearby organs (Rathi, 2016).
Given the variable routes of infection, incorporating multiple diagnostic modalities is often necessary to confirm clinical suspicion.

A comprehensive approach, one that integrates patient history, physical examination, imaging studies, histopathological analysis, microbiological cultures, and molecular techniques, is a must for diagnosing abdominal TB (Denkinger, 2014). Misdiagnosis and delays in seeking care remain common despite extensive medical advancements, especially in resource-poor areas where TB is endemic (Bhargava, 2012).

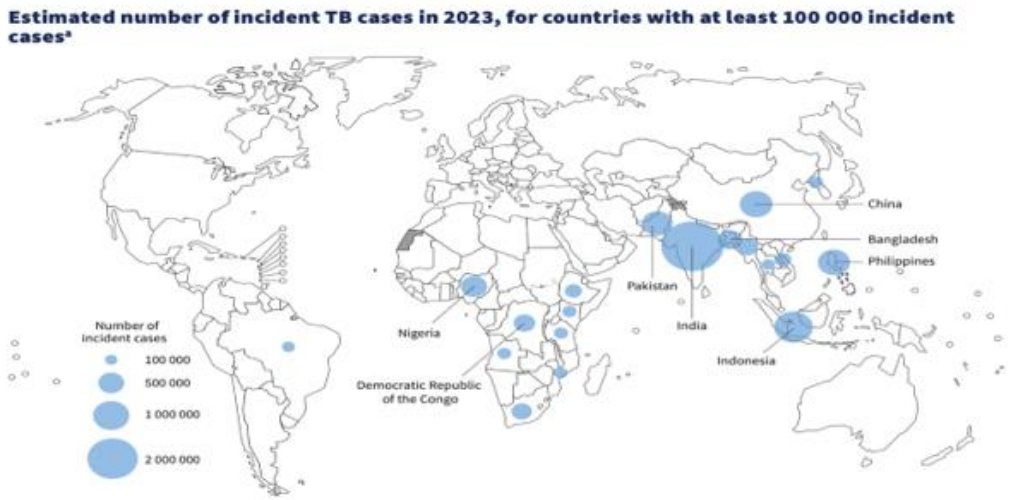


Fig. 1: Estimated Number of Tb Incident cases in 2023, for countries with at least 100000 incident cases. (Global tuberculosis report 2024. Geneva: World Health Organization; 2024. Licence: CC BY-NC-SA 3.0 IGO)

Although standard anti-tubercular therapy (ATT) is the first line treatment for abdominal TB, surgical intervention is required in cases of complications like intestinal obstruction, perforation, or abscess formation that is unresponsive to medical therapy (Jhobta, 2006).

Amidst all the diagnostic complexities and treatment difficulties, the key to improving patient outcomes is early recognition and timely initiation of therapy. This study seeks to explore the spectrum of clinical, radiological, endoscopic, and histopathological presentations in cases of abdominal tuberculosis.

Objectives

- To analyse the *clinical presentation* of patients of abdominal tuberculosis, including *presenting symptoms and relevant demographic data*.
- To study *endoscopic findings* in patients with abdominal tuberculosis.
- To evaluate *radiological features (CECT, USG, etc.)* observed in patients with abdominal tuberculosis.
- To identify *potential diagnostic challenges* pertaining to abdominal tuberculosis.

Methodology

Type of study: Retrospective Observational Study
Study Time Period: January 1st, 2023 – March 31st, 2025
Study Population*:* People diagnosed with Abdominal Tuberculosis at Hakeem Abdul Hameed Centenary (HAHC) Hospital, a tertiary care centre in New Delhi, confirmed by at least one major diagnostic modality (radiological, endoscopic, histopathological, or microbiological).
Sample size: The sample size formula for a retrospective observational study design is given below:

$$n = \frac{\left(z_{\frac{\alpha}{2}}\right)^2 p(1-p)}{d^2} \quad \ldots (1)$$

Where,

- n = Required number of sample size
- $z_{\frac{\alpha}{2}}$ = Critical value for the 95% confidence interval (typically 1.96 for α = 0.05)
- p = Prevalence of Abdominal TB in India from previous literature
- d = Desired precision or margin of error you are willing to accept (e.g., 5% to 15%).

Here, the prevalence (p) of Abdominal TB in India from previous literature 12.8% (Jha, 2023), the critical value is 1.96 at 95% confidence interval and the margin of error (d) is 8.12%. Substituting all these values in equation (1) we get,

$$\boldsymbol{n = \frac{(1.96)^2 \times 0.128 \times (1 - 0.128)}{(0.0812)^2}}$$
$$\boldsymbol{= \frac{0.42878}{0.0066}}$$
$$\boldsymbol{\approx 65}$$

Hence, the total sample size is **65**.

Case Definition:
A *confirmed* case of **Abdominal Tuberculosis (ATB)** was defined as "*a case presenting with abdominal symptoms, in the presence of conclusive histological (caseating granuloma) or microbiological evidence (positive AFB smear, GeneXpert, culture, etc.).*"
A *clinically diagnosed* case of **Abdominal Tuberculosis (ATB)** was defined as "*a case presenting with abdominal symptoms and radiological, histopathological, endoscopic, and colonoscopic evidence suggestive of tubercular aetiology.*"
Classification: ATB has been classified based on Diagnostic Category and Site of involvement.

a) Diagnostic Category:

- **Microbiologically Confirmed:** Microbiological evidence of tubercular infection
- **Confirmed:** Histopathological and/or microbiological evidence pointing towards tubercular aetiology
- **Clinically Diagnosed:** Symptomatic and/or radiological / endoscopic / colonoscopic evidence indicating tubercular aetiology and / or responding to Anti-Tubercular Therapy (ATT)

b) Site of involvement:

- **Gastrointestinal Tuberculosis**
- **Tubercular Peritonitis**
- **Tubercular Lymphadenitis**
- **Visceral Tuberculosis**

Inclusion Criteria: Patients aged 15-75 years with a *diagnosis* of **abdominal tuberculosis** based on the case definition, who were treated at HAHC Hospital within the study period, and had complete medical records including clinical presentation, radiological findings, endoscopy reports, and/or histopathology reports.

Exclusion Criteria: Patients will be excluded if:
1) Their medical records are incomplete or essential diagnostic reports are missing.
2) They are diagnosed with pulmonary tuberculosis without abdominal involvement.

Data Collection: The following data has been extracted from hospital medical records:

- Demographics: Age, Sex
- Clinical presentation and duration
- Radiological reports (USG/CT)
- Endoscopy findings
- Histopathological findings
- Microbiological test results (AFB, CBNAAT/GeneXpert MTB/RIF)
- Treatment details

Implications
Our study on Abdominal Tuberculosis offers several critical implications for clinical practice, diagnosis, and future research.

- Our study focuses on clinical presentation of abdominal tuberculosis, its primary symptoms, and patient characteristics, thus helping to identify important patterns, promoting early diagnosis, and improving patient outcomes.

- By focusing on various diagnostic modalities, our study will offer valuable insight into various gastrointestinal manifestations of abdominal tuberculosis, helping in differentiating it from other conditions with similar presentations.

RESULTS

Demographics

Out of a total of 65 cases, 35 were females and 30 were males, making the M:F ratio 1:1.17, showing a slight female predominance. The ages ranged from 15 to 75 years, with majority of the cases falling in the 15-30 years of age (52.3%). Out of 65, 4 cases were previously treated for Pulmonary Koch's and 2 had a family history of Tuberculosis.

Table 1: Age-wise distribution

Age (in years)	No. of cases	% (out of 65)
15 – 30	34	52.3%
31 – 40	13	20%
41 – 50	5	7.7%
51 – 60	9	13.8%
61-75	4	6.2%

Classification

a) Diagnostic Category:

9 cases out of 65 had a *Microbiologically Confirmed* diagnosis of Abdominal Tuberculosis with a positive GeneXpert Report, 14 were *Confirmed* based on histopathological evidence (presence of caseating granulomas), 42 were *Clinically Diagnosed* based on symptomatic presentation, radiological, endoscopic and colonoscopic evidence.
Of the 9 confirmed cases, 2 had a positive smear with AFB seen on ZN staining along with a positive Mantoux test.

b) Site of involvement:

Of the 65 cases, 48 were diagnosed with Gastrointestinal Tuberculosis, 12 had Tubercular Peritonitis, 8 had Tubercular Lymphadenopathy, and 1 had Visceral Tuberculosis (Table 2).

Table 2: Classification based on site of involvement

Classification	No. of cases	% (out of 65)
Tubercular Peritonitis	12	18%
Gastrointestinal Tuberculosis	48	74%
Tubercular Lymphadenitis	8	12%
Visceral Tuberculosis	1	2%

Clinical Features

a) Clinical Symptoms:

Abdominal pain was the most common complaint, noted in 82% of cases. Weight loss / loss of appetite was the second most common symptom noted in 34%, followed by fever in 29%, vomiting in 28%, abdominal distention in 18%, constipation in 11%, and loose stools in 11%. Respiratory symptoms were less common with shortness of breath and cough being noted in 3%. Dysphagia was noted in 1 case only (Table 3).

Table 3: Common chief complaints recorded

Chief Complaint	No. of cases	% (out of 65)
Abdominal Pain	53	82%
Weight Loss	22	34%
Fever	19	29%
Vomiting	18	28%
Abdominal Distension	12	18%
Constipation/Obstipation	7	11%
Diarrhoea	7	11%
Shortness of Breath	2	3%
Cough	2	3%
Dysphagia	1	1.5%

b) **Signs:**

Abdominal tenderness and fever were the predominant signs noted in 15 cases each, ascites was seen in 13 cases, abdominal distention in 12, pallor in 5, icterus in 2, and an abdominal mass was palpable only in 1 case.

Radiological and Colonoscopic/Endoscopic Findings:
CECT abdomen was done for 52 cases, of which 44 had abdominal lymphadenopathy, 33 showed thickening at the ileocaecal junction, 18 had ascites ranging from mild to severe, 14 had peritoneal thickening, splenomegaly and hepatomegaly were reported in 7 each. An abdominal cocoon was seen in 1 case.

USG Whole Abdomen was done for 21 cases, wherein abdominal lymphadenopathy was reported in 12 cases, ascites in 11, splenomegaly and hepatomegaly were reported in 6 cases each, and bowel wall thickening was seen in 5 cases.

Colonoscopy was done for 30 cases, of which 12 had terminal ileal ulcer(s) ± strictures, 9 had a deformed ileocaecal valve ± transverse ulcer(s), ascending colon ulcer(s) ± strictures were seen in 8 cases, and sigmoid colon / rectal ulcer(s) were seen in 2 cases.

Upper GI Endoscopy was done for 3 cases, of which 2 had oesophageal ulcers and 1 had a lesion at the gastroesophageal junction (Table 4).

Table 4: Radiological / Endoscopy / Colonoscopy findings

Imaging Study	No. of cases
CECT Findings	
Abdominal lymphadenopathy	42
Ileocaecal junction thickening	33
Ascites	18
Peritoneal thickening	14
Splenomegaly	7
Hepatomegaly	7
Abdominal cocoon	1
USG Findings	
Abdominal lymphadenopathy	12
Ascites	11
Splenomegaly	6
Hepatomegaly	6
Bowel wall thickening	5
Endoscopic/Colonoscopic Findings	
Deformed ileocaecal valve ± transverse ulcer(s)	9
Ascending colon ulcers ± strictures	8
Terminal ileal ulcer(s) ± strictures	12
Sigmoid colon / rectal ulcer(s)	2
Oesophageal Ulcers	2
Gastro-oesophageal junction lesion	1

Image 1: CECT Abdomen & Pelvis showing circumferential, enhancing, bowel wall thickening with maintained mural stratification involving the ileoceacal junction, the ceacum, and the ascending colon.

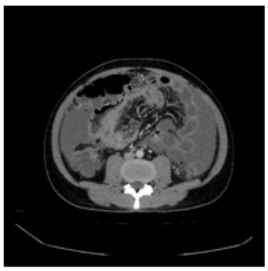


Image 2: CECT Abdomen & Pelvis showing small bowel loops clumped together, appearing to be encapsulated by a thick walled, peripherally enhancing collection, suggestive of abdominal cocoon.

Hematological Findings:
Blood reports were available for 55 cases, of which 22 had mild anemia, 15 had moderate anemia, and only 2 had severe anemia.

3 a) 3 b) 3 c)

Image 3 (a, b, c): Endoscopy revealed a submucosal lesion in the oesophagus with an overlying well-defined, deep longitudinal ulcer of tubercular aetiology.

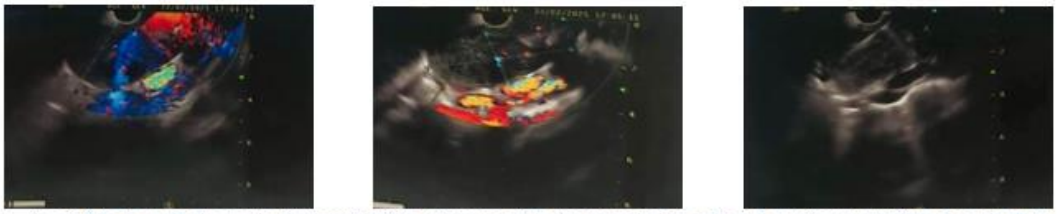
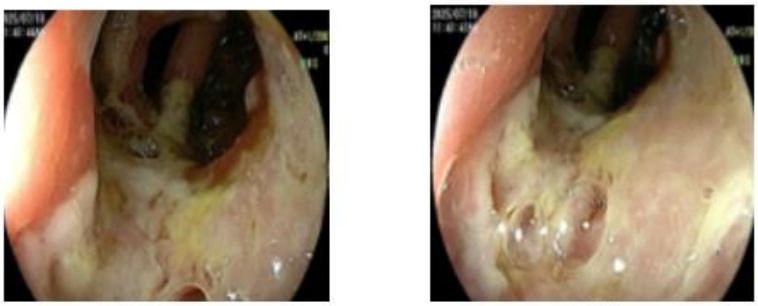


Image 4 (a, b, c): Endoscopic ultrasound of the submucosal lesion revealed an enlarged conglomerated lymph node, from which a fine needle biopsy sample was taken, which tested positive for Tuberculosis on GeneXpert.

5 a) 5 b) 5 c)

Image 5 (a, b): Colonoscopy showing a well-defined, tight, non-negotiable stricture with an overlying circumferential, necrotic slough covered ulcer (tubercular) at the ileocaecal junction and the terminal ileum. (c) Non-negotiable fibrotic stricture at ileocaecal junction, managed and negotiated with Controlled Radial Expansion (CRE) dilatation.



6 a) 6 b)

Image 6 (a, b): Well-defined, deep, necrotic slough covered ulcers with mucosal bridges, seen at caecum and terminal ileum on colonoscopy, tubercular in nature.

Table 5: Ascitic tap findings

ADA	SAAG	Lymphocyte (%)
592.9	0.1	90%
551.2	0.46	70%
87.7	0.4	60%
74	0.42	80%

61.2	0.5	90%
54	0.51	60%
53.7	0.71	70%
41	0.59	90%
42.4	0.27	80%
22.6	0.4	80%
9.1	0.51	80%
3.8	1.02	80%
2.2	1.4	80%

Ascitic Tap Findings

Ascitic tap was done for 13 cases, where ADA levels, SAAG values, and lymphocyte percentage was recorded. Of the 13 cases, 12 had low SAAG (<1.1 g/dL), 9 had high ADA levels (>40 U/L), and all 13 showed a lymphocytic predominance (Table 5).

Histopathological Findings

Biopsy was done for 32 cases, wherein 14 showed signs of granulomatous inflammation, and 18 showed signs of chronic, non-granulomatous infection.

Treatment and Follow Up

All patients were started on ATT and followed up at 2 months and 6 months, of which 44 were clinically better, their symptoms resolved and they gained weight, repeat imaging/colonoscopy was done for 7 which showed significant improvement, 3 were managed for ATT-induced toxicity and shifted to second line drugs.

DISCUSSION

In view of the diverse symptomatology of Abdominal TB, we have thoroughly reviewed available literature on its vast clinical presentations from different parts of India. Abdominal pain, weight loss, and fever are the most common presenting complaints.

Our evaluation also showed abdominal pain to be the most common complaint, noted in 82% of cases, followed by weight loss/loss of appetite in 34%, and fever in 29%.

A comparison of results from studies done at tertiary care centres in India is depicted in the table below (Table 6):

Table 6: Comparison of results from studies done at Tertiary Care Centers in India

Clinical Presentation	(Patel, 2018) [1] N 69 (Gujarat) (%) pt	(Sharma B. S., 2024) [2] N 234 (Himachal Pradesh) (%) pt	(Singh, 2019) [3] N 58 (Odisha) (%) pt
Abdominal pain	53 (76)	201 (85.9)	36 (62.1)
Weight loss	42 (60.87)	222 (94.9)	10 (17.2)
Fever	50 (72.46)	121 (51.7)	25 (43.1)
Diarrhea	20 (28.99)	72 (30.8)	9 (15.5)
Constipation	5 (7.25)	39 (16.7)	5 (8.6)
Blood in stool	10 (14.5)	25 (10.7)	*Unknown
Vomiting	*Unknown	18 (7.7)	16 (27.6)
***Unknown: Not available in the study.**			

Studies show disparities in gender-wise distribution of cases: (M:F = 1:1.38) (Lal, 2014) and (M:F = 1:2.2) (Shrestha, 2010) have reported a female predominance. Meanwhile, studies like (Darbari, 2014) (M:F = 1.3:1) and (Awasthi, 2015) (M:F = 1.4:1) showed a higher prevalence in males. Our study also reflects a slight female predominance with a M:F ratio 1:1.17.

The average age of presentation is 27.4 years (Awasthi, 2015), with majority of the patients being in the age group of 18-30 years (Syed, 2019). Higher incidence in young adults can be attributed to greater social interaction, and as a result, increased exposure, especially in areas with poor living conditions and overcrowding. In our study, ages ranged from 15 to 75 years, with most of the cases falling in the 15-30 age group (52.3%).

In the face of endless diagnostic dilemmas, even routine haematological investigations play an important role. In a study done on 300 patients over a period of 2 years, 87% had anaemia (Rana, 2015). Inflammatory mediators are implicated in

TB-associated anaemia as they impair the body's response to erythropoietin. The state of anaemia is often worsened by malabsorption and nutritional deficiencies in such individuals. Out of a total of 65 cases assessed by us, blood reports were available for 55 cases, of which 22 had mild anemia, 15 had moderate anemia, and 2 had severe anaemia.

Abdominal TB can take the form of intestinal TB, tuberculous lymphadenopathy, peritoneal disease, or visceral TB, with most patients presenting with a combination of these (Barot, 2020).Owing to factors like abundant lymphoid tissue, narrow lumen, and minimal digestive activity, the ileocecal junction remains the most common site involved (Tobin, 2025). Routine microbiological techniques like culture and AFB staining have a very low diagnostic yield, lack sensitivity, and are time-consuming.

Of the 65 cases, 48 were diagnosed with Intestinal Tuberculosis, 12 had Tubercular Peritonitis, 8 had Tubercular Lymphadenopathy, and 1 had Visceral Tuberculosis.
As for the available imaging modalities, abdominal ultrasound (USG) is good for initial assessment of lymphadenopathy, omental thickening, ascites, mesenteric changes, and bowel wall thickening, while also providing material for cytological, microbiological, histopathological evaluation (Kumar, 2019). CT findings can distinguish ileocecal involvement in TB from Crohn's disease with a sensitivity of 64% and specificity of 77% according to a systematic review of 6 studies (Jha, 2023).

CT abdomen was done for 52 cases, out of which 44 had abdominal lymphadenopathy, 33 showed thickening at the ileocaecal junction, 18 had ascites ranging from mild to severe, 14 had peritoneal thickening. An abdominal cocoon was seen in 1 case.

USG whole abdomen was done for 21 cases, wherein abdominal lymphadenopathy was reported in 12 cases, ascites in 11, splenomegaly and hepatomegaly were reported in 6 cases each, and bowel wall thickening was seen in 5 cases.
Colonoscopy helps to establish morphological patterns of involvement (ulcerations, nodularity, deformed ileocecal valve, and strictures). Colonoscopic biopsies have limited utility as histopathological findings like caseating granulomas, although highly specific and crucial for ruling out a diagnosis of Crohn's disease, have a very low sensitivity. Biopsy sample was taken for 32 cases, out of which 14 showed signs of granulomatous inflammation and 18 showed signs of chronic, non-granulomatous inflammation.

The ease and immediate yield of ascitic fluid tapping makes it a relevant tool for screening and diagnosis in the Indian context: Adenosine deaminase (ADA) levels in peritoneal fluid offers a sensitive, feasible, and highly specific test for TB peritonitis, while ascitic fluid cytology helps in ruling out differentials like pancreatic carcinomatosis (Jha, 2023). Ascitic fluid tap was done for 13 cases, and ADA, SAAG, and lymphocyte percentage was recorded, wherein 12 had low SAAG values (<1.1 g/dL), 9 had high ADA levels (>40 U/L), and all 13 showed a lymphocytic predominance.

ATT forms the mainstay of treatment as most lesions resolve with treatment, with a few studies mentioning the resolution of strictures as well, suggesting them to be inflammatory rather than fibrotic (Patel, 2018). However (Aggarwal, 2017), reported only 25% patients with strictures responding to ATT, noting that the scope of resolution depends on the location of the stricture (Aggarwal, 2017). Complications like bowel obstruction, perforation, or lack of response to ATT necessitate surgical intervention, with intestinal obstruction being the most common indication for surgery, and resection and end-to-end anastomosis being the most common intervention (Barot, 2020).

All patients in our study were started on ATT and followed up at 2 months and 6 months, of which 44 became clinically better, 7 showed improvement on imaging as well as on colonoscopy, 3 were managed for ATT-induced hepatitis and shifted to second line drugs.

Diagnosing abdominal TB is becoming increasingly challenging by the day as cases of IBD are on the rise in countries like India. An integrative approach is the need of the hour: we need to strategically combine our clinical, haematological, microbiological, histopathological, radiological, and endoscopic findings to strive for early recognition, prompt treatment, and improved patient outcomes. Nationwide studies on a larger population are needed to pinpoint new diagnostic approaches and better manage the burden of abdominal TB in India.

CONCLUSION

Abdominal tuberculosis remains a significant diagnostic challenge due to its varied clinical presentations. Most patients were diagnosed clinically by relying on nonspecific symptoms.
As a result, constitutional symptoms such as abdominal pain, weight loss, fever, altered bowels habits, in the absence of any other proven gastrointestinal pathology, must be promptly treated as a case of ***Abdominal Tuberculosis*** and empirically started on ATT.

Early diagnosis and initiation of ATT has proven essential in preventing mortality and morbidity.

Radiological findings like abdominal lymphadenopathy and ileocaecal junction thickening, alongside evidence of ulcers +/- strictures on colonoscopy and endoscopy further strengthen the diagnosis. Microbiological methods exhibited low sensitivity, thus highlighting the importance of a multidisciplinary approach to diagnosing abdominal TB.
ATT induced hepatotoxicity remains a severe complication, but close monitoring of Liver Function Tests, timely follow ups, alteration in Anti-Tubercular Therapy, and good patient compliance has been noted to provide an effective cure.

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