



CONSERVATIVE AND SURGICAL MANAGEMENT OF ABDOMINAL TUBERCULOSIS: AN INSTITUTIONAL EXPERIENCE

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ABSTRACT

Background: Abdominal tuberculosis remains a significant surgical challenge in endemic regions. This study compares outcomes of conservative and surgical management at a tertiary care centre. **Methods:** A prospective observational comparative study of 20 patients with abdominal tuberculosis over two years. Group A (n=8) received anti-tubercular therapy (ATT) alone; Group B (n=12) underwent surgery plus ATT. Outcomes were compared using Fisher's Exact Test and Student's t-test. **Results:** Mean age was 32.4 +/- 10.6 years. The ileocaecal region was the most commonly involved site (50%). Histopathology confirmed caseating granulomas in 88.2% of specimens. Treatment success was 87.5% in Group A and 91.7% in Group B (p=0.74). The surgical group had higher complication rates (50% vs 12.5%, p=0.158) and longer hospital stay (14.6 vs 7.2 days, p=0.001). There was no mortality in either group. **Conclusion:** Both modalities yield excellent outcomes when appropriately selected. Surgery is complementary to ATT and should be reserved for complications. Early diagnosis and prompt ATT initiation remain the most effective strategies for reducing morbidity.

KEYWORDS : Abdominal Tuberculosis; Koch's Abdomen; Anti-Tubercular Therapy; Intestinal Obstruction; Perforation Peritonitis; Ileocaecal Tuberculosis.

INTRODUCTION

Tuberculosis (TB) remains one of the most significant global infectious disease burdens, with India accounting for approximately 27% of all cases worldwide.¹ Abdominal tuberculosis represents the sixth most common form of extrapulmonary TB, accounting for 5–12% of all TB cases in developing nations, and continues to pose a formidable diagnostic and therapeutic challenge.²

The condition is caused by *Mycobacterium tuberculosis* - and less commonly *Mycobacterium bovis* - affecting the gastrointestinal tract, peritoneum, mesenteric lymph nodes, and solid abdominal organs either singly or in combination. The ileocaecal region is the most frequently involved site, attributed to abundant lymphoid tissue (Peyer's patches), physiological stasis, and minimal local digestive activity.³

Clinical presentation is notoriously non-specific - encompassing abdominal pain, distension, fever, weight loss, and altered bowel habits - and closely mimics Crohn's disease, caecal carcinoma, and other granulomatous disorders, frequently resulting in diagnostic delay.⁴ The cornerstone of management is the standard NTEP regimen (2HRZE/4HR); however, a significant proportion of patients present with complications - intestinal obstruction, perforation peritonitis, or abdominal abscess - necessitating surgical intervention.⁵

Despite high disease burden, institutional data comparing conservative and surgical outcomes remain limited. This study was undertaken to analyse the clinical spectrum, diagnostic profile, and comparative treatment outcomes of abdominal tuberculosis at a tertiary care surgical centre.

MATERIALS AND METHODS

Study Design and Setting

A prospective observational comparative study was conducted in the Department of General Surgery, L. N. Medical College, Bhopal over two years (February 2024 – February 2026), following Institutional Ethics Committee. Written informed consent was obtained from all participants.

Participants

Twenty patients with abdominal tuberculosis were enrolled and allocated to Group A (conservative ATT, n=8) or Group B (surgical intervention + ATT, n=12) based on clinical presentation and treating surgeon's decision. Diagnosis was established by one or more of: histopathology (caseating granulomas with Langhans giant cells), CBNAAT (GeneXpert MTB/RIF) positivity, consistent CECT findings, or documented response to empirical ATT at 8 weeks.

Exclusion criteria: age below 12 years, HIV seropositivity, confirmed alternative diagnosis on histopathology, incomplete records, MDR-TB, and refusal of consent.

Treatment Protocol

Group A received the standard NTEP regimen: intensive phase 2HRZE (2 months) followed by continuation phase 4HR (4 months), with pyridoxine supplementation. Clinical response was assessed at 4 and 8 weeks; radiological response at 8 weeks and end of treatment. Failure was defined as absence of clinical improvement at 6 weeks or development of acute complications.

Group B underwent surgery based on standard indications (obstruction, perforation peritonitis, diagnostic uncertainty, or failure of conservative management). ATT was initiated preoperatively for 4–6 weeks in elective cases and postoperatively in emergency cases. All resected specimens were subjected to histopathology and tissue AFB culture.

Outcomes and Statistical Analysis

Primary outcome was treatment success, defined as clinical resolution, ATT completion, and absence of recurrence at 6-month follow-up. Secondary outcomes included complication rate, hospital stay, 30-day mortality, and ATT adverse effects. Fisher's Exact Test was used for categorical variables and unpaired Student's t-test for continuous variables. p<0.05 was considered significant.

RESULTS

Demographics

The mean age was 32.4 +/- 10.6 years; 65% belonged to the 21–40 year age group. The male-to-female ratio was 1.5:1 (12 male, 8 female). Seventy-five percent belonged to lower socioeconomic class (Modified Kuppuswamy Scale IV/V), 70% were from rural backgrounds, and 65% were undernourished (BMI <18.5 kg/m²). Concurrent pulmonary tuberculosis was identified in 6 patients (30%) on chest X-ray. Hypoalbuminaemia was significantly more prevalent in Group B (66.7% vs 37.5%, p=0.04).

Table 1: Age and Sex Distribution

Age Group (yrs)	Group A - Conservative (n=8)	Group B - Surgical (n=12)	Total (n=20)
12–20	1 (12.5%)	2 (16.7%)	3 (15%)
21–30	3 (37.5%)	4 (33.3%)	7 (35%)
31–40	2 (25%)	4 (33.3%)	6 (30%)
41–50	1 (12.5%)	1 (8.3%)	2 (10%)
>50	1 (12.5%)	1 (8.3%)	2 (10%)
Male : Female	5 : 3	7 : 5	12 : 8

Clinical Presentation

Mean symptom duration was 5.8 +/- 3.9 months in Group A versus 2.1 +/- 1.4 months in Group B (p=0.01), reflecting the more acute nature of surgical presentations. Abdominal pain was universal (100%). Vomiting was significantly more frequent in Group B (75% vs 25%, p=0.03). Signs of peritonitis were exclusive to Group B (41.7%).

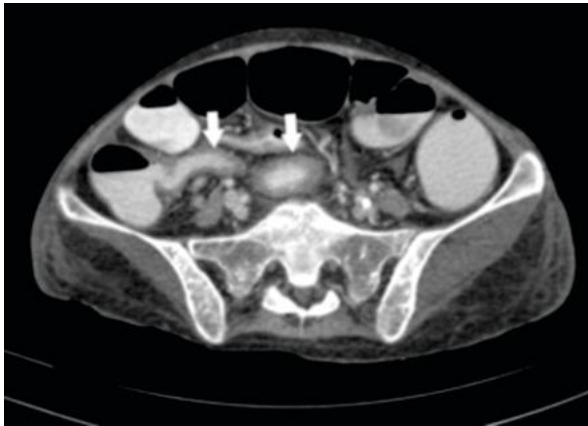
Table 2: Clinical Features at Presentation

Symptom / Sign	Group A (n=8)	Group B (n=12)	Total (n=20)
Abdominal pain	8 (100%)	12 (100%)	20 (100%)
Weight loss	7 (87.5%)	9 (75%)	16 (80%)
Fever	6 (75%)	8 (66.7%)	14 (70%)
Abdominal distension	4 (50%)	10 (83.3%)	14 (70%)
Vomiting	2 (25%)	9 (75%)	11 (55%)
Palpable mass	2 (25%)	5 (41.7%)	7 (35%)
Signs of peritonitis	0 (0%)	5 (41.7%)	5 (25%)

Investigations

Mantoux test was positive (≥ 10 mm) in 14 patients (70%). CBNAAT positivity was demonstrated in 9 of 16 tested specimens (56.2%). Mean ESR was 78.4 ± 22.6 mm/hour. Anaemia (Hb < 10 g/dL) was present in 14 patients (70%).

On CECT abdomen, mesenteric lymphadenopathy with central necrosis (pathognomonic of tuberculous lymphadenitis) was identified in 65% of patients. Pneumoperitoneum was seen exclusively in Group B (25%), all of whom underwent emergency surgery.

**Fig. 1: Circumferential Wall Thickening of the Terminal Ileum (Arrows)****Table 3: CECT Abdomen Findings**

Finding	Group A (n=8)	Group B (n=12)	Total (n=20)
Ileocaecal wall thickening	5 (62.5%)	8 (66.7%)	13 (65%)
Mesenteric LN with central necrosis	6 (75%)	7 (58.3%)	13 (65%)
Ascites	5 (62.5%)	6 (50%)	11 (55%)
Intestinal stricture	1 (12.5%)	5 (41.7%)	6 (30%)
Pneumoperitoneum	0 (0%)	3 (25%)	3 (15%)

Histopathology confirmed caseating granulomas with Langhans giant cells in 15 of 17 available specimens (88.2%). The ileocaecal region was the most commonly affected site (50%), followed by the small bowel (30%) and peritoneum (30%). Multiple site involvement was noted in 8 patients (40%).

Conservative Management Outcomes (Group A)

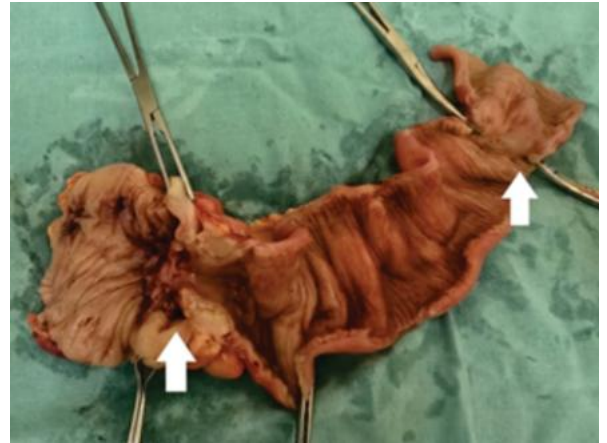
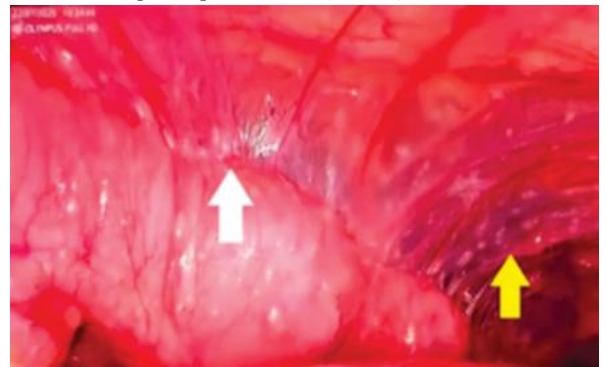
Six of 8 patients (75%) demonstrated complete clinical response by 8 weeks of ATT. One patient (12.5%) developed drug-induced liver injury (DILI), managed by temporary cessation and sequential reintroduction of ATT. One patient failed conservative management at 6 weeks and required elective surgical intervention; this patient was retained in Group A for intention-to-treat analysis. At 6-month follow-up, 7 patients (87.5%) showed complete clinical and radiological resolution. Mean hospital stay was 7.2 ± 2.4 days. There was no mortality.

Surgical Management Outcomes (Group B)

Intestinal obstruction was the most common indication for surgery (33.3%). Emergency surgery was performed in 5 patients (41.7%) - 3 with perforation peritonitis and 2 with acute complete obstruction; 7 patients (58.3%) underwent elective surgery.

In perforation peritonitis cases, diversion ileostomy was preferred over primary anastomosis given gross contamination, active sepsis, and hypoalbuminaemia; stoma reversal was performed successfully at 3 months in all 3 patients. Wound infection/SSI was the most common complication (33.3%). One anastomotic leak resolved conservatively

by day 14. One wound dehiscence required secondary suturing. Mean hospital stay was 14.6 ± 5.8 days. There was no 30-day mortality.

**Fig. 2: Resected Segment of Distal Ileum and Proximal Ascending Colon Showing Multiple Strictures (Arrows)****Fig. 3: Transverse Colon Adhered to Anterior Abdominal Wall (white Arrow) with Multiple Nodular Deposits All Over Peritoneal Cavity (Yellow Arrow)****Table 4: Surgical Indications and Procedures**

Indication	n (%)	Procedure Performed	n (%)
Intestinal obstruction	4 (33.3%)	Resection + anastomosis	4 (33.3%)
Perforation peritonitis	3 (25%)	Resection + ileostomy	3 (25%)
Ileocaecal mass	2 (16.7%)	Right hemicolectomy	2 (16.7%)
Adhesive obstruction	2 (16.7%)	Adhesiolysis	2 (16.7%)
Diagnostic uncertainty	1 (8.3%)	Diagnostic laparoscopy	1 (8.3%)

Comparative Outcomes**Table 5: Comparative Outcome Summary**

Parameter	Group A Conservative (n=8)	Group B Surgical (n=12)	p-value
Mean age (years)	34.1 ± 11.2	31.4 ± 10.3	0.54
Symptom duration (months)	5.8 ± 3.9	2.1 ± 1.4	0.01*
Hypoalbuminaemia	3 (37.5%)	8 (66.7%)	0.04*
Treatment success	7 (87.5%)	11 (91.7%)	0.74
Hospital stay (days)	7.2 ± 2.4	14.6 ± 5.8	0.001*
Complication rate	1 (12.5%)	6 (50%)	0.158
30-day mortality	0 (0%)	0 (0%)	-
Recurrence at 6 months	1 (12.5%)	1 (8.3%)	0.72

* Statistically significant ($p < 0.05$). Fisher's Exact Test used for all categorical comparisons.

Overall treatment success was 90% (18/20 patients), with comparable rates between groups (87.5% vs 91.7%, $p = 0.74$). The complication rate was higher in Group B (50% vs 12.5%), though this did not reach statistical significance ($p = 0.158$), likely reflecting the limited sample size. Hospital stay was significantly longer in the surgical group ($p = 0.001$). ATT completion was 100% in both groups. There was no mortality in either group.

DISCUSSION

The present study demonstrates that both conservative and surgical management yield excellent outcomes (90% overall success) in abdominal tuberculosis when appropriately selected - consistent with published literature from Indian and global tertiary surgical centres.^{6,7}

The demographic profile - predominantly young adults from lower socioeconomic backgrounds with significant undernutrition - reflects the well-established epidemiological associations of tuberculosis in the Indian subcontinent.^{1,2} Hypoalbuminaemia was significantly more prevalent in the surgical group ($p=0.04$), underscoring the critical role of nutritional optimisation before elective operative intervention to reduce wound complications and anastomotic failure.⁸

The longer symptom duration in Group A (5.8 vs 2.1 months, $p=0.01$) is explained by the insidious onset of uncomplicated TB, which delays presentation, while complications such as obstruction or perforation compel earlier hospitalisation in surgical patients. This highlights the importance of maintaining a high clinical index of suspicion for abdominal TB in patients presenting with non-specific gastrointestinal symptoms in endemic regions.^{3,4}

Histopathology remained the definitive diagnostic modality (88.2% yield), consistent with reports by Debi et al. and Pettengell et al.^{9,10} CBNAAT demonstrated positivity in 56.2% of specimens, in keeping with published sensitivities of 45–70% for GeneXpert in extrapulmonary TB. The ileocaecal region was the most commonly involved site (50%), attributed to its abundant Peyer's patches, physiological stasis, and favourable milieu for mycobacterial adherence.³

ATT alone (NTEP 2HRZE/4HR) was effective in 87.5% of conservatively managed patients - consistent with Mandavdhare et al., who reported objective response in the majority of abdominal TB patients on 6-month ATT.¹¹ One patient (12.5%) developed DILI, within the published hepatotoxicity range of 5–28% in Indian cohorts.¹²

Intestinal obstruction was the most common surgical indication (33.3%), consistent with published rates of 50–75%.^{8,13} In perforation peritonitis cases, staged surgery with diversion ileostomy was preferred over primary anastomosis - a decision supported by Kapoor et al. and Wig et al., who recommend deferring anastomosis until nutritional rehabilitation and adequate ATT coverage are achieved.^{2,13} Wound infection (33.3%) was the most common postoperative complication, attributable to malnutrition, immunosuppression, and contaminated operative fields - comparable to figures in published Indian surgical series.⁸

The complication rate was higher in Group B (50% vs 12.5%, $p=0.158$) without reaching statistical significance, likely owing to the limited sample size of this study. This represents the principal limitation of the present work, and larger multicentre prospective studies are warranted to establish definitive comparative data. Additional limitations include single-centre design, incomplete microbiological confirmation in some patients, and a follow-up period restricted to 6 months.

The fundamental principle established by this study is that surgery in abdominal tuberculosis is complementary to ATT - not a substitute - and should be reserved for complications unresponsive to conservative management or acute life-threatening presentations. A multidisciplinary approach integrating surgery, medicine, radiology, and microbiology within the NTEP framework remains the optimal strategy for managing this ancient yet persistent disease.

CONCLUSION

Abdominal tuberculosis is eminently treatable with an overall success rate of 90% when managed with appropriate selection of conservative or surgical modalities. Anti-tubercular therapy alone is adequate for uncomplicated disease; surgical intervention, when indicated, should be conservative, bowel-preserving, and staged wherever possible. Early diagnosis, prompt ATT initiation, and preoperative nutritional optimisation are the most effective strategies for reducing morbidity in this condition.

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