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Original Research Article

Surgical management of abdominal tuberculosis in a tertiary care referral center

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ABSTRACT

Background: Abdominal tuberculosis encompasses gastrointestinal, visceral and peritoneal forms of tuberculosis in different proportions. Their clinical presentation and radiological findings are varied and non-specific often warranting surgical intervention either for confirmation of diagnosis or for definitive management. It is not very clear as of now as to which type of patients would require surgical intervention for diagnosis or treatment of abdominal tuberculosis. This study aims to profile such patients accurately to revalidate the need for surgical intervention in cases of abdominal tuberculosis.
Methods: This study is a retrospective descriptive observational study wherein the documents of patients whose final diagnosis was confirmed as 'Abdominal Tuberculosis' from January 2011 to December 2013 were analysed. Their demographic and clinical profile, hematological, biochemical and radiological investigations including barium meal follow-through, ultrasonography, CT scan abdomen, colonoscopy and biopsy, HIV status and ascitic fluid analysis were analysed. Patients in whom diagnosis was not confirmed by these investigations, and therefore underwent diagnostic laparoscopy or exploratory laparotomy were studied. Simultaneously, patients in whom, the diagnosis was confirmed, but still underwent surgical intervention for therapeutic purposes were also analysed.
Results: It was found that 44 out of 54 patients (81.4%) underwent surgical procedure. 28 (52%) required surgical intervention for confirmation of diagnosis (diagnostic procedures: diagnostic laparoscopy- 21 and exploratory laparotomy- 07) while 16 (29.4%) required therapeutic procedures (emergency- 08; elective- 08).
Conclusions: In spite of extensive investigations, many patients of abdominal tuberculosis require surgical management either minimally invasive or otherwise, both for confirmation of diagnosis and for definitive management.

Keywords: Abdominal cocoon, Functionalization of bowel, Gastrointestinal tuberculosis, Right hemicolectomy, Small bowel stricture, Stricturoplasty

INTRODUCTION

Tuberculosis is the commonest cause of death due to a single infectious agent resulting in 3 million deaths annually. Globally, an average of 10 million people fall ill with tuberculosis every year which has remained relatively stable in recent years. India accounts for over 26% of the total disease burden with an average of 199 new cases diagnosed in 2019.[1] Over the last few years there are about 400 million infected cases in the country,

out of which 12-15 million active and 0.5-0.7 million deaths occur every year.[2]

The term 'abdominal tuberculosis which is not so commonly seen as pulmonary tuberculosis, encompasses tuberculosis of the entire gastro-intestinal tract: luminal tuberculosis accounts for about 56.9%, peritoneal including mesenteric lymph nodes tuberculosis in 37.6% and digestive viscera like liver, spleen, etc., in a small proportion of cases.[3] Abdominal tuberculosis presents in myriad forms and remains a diagnostic enigma even after extensive investigations.

Even though the modalities of investigations and imaging have significantly improved in modern times, several patients require some form of surgical intervention either for confirmation of diagnosis or for therapeutic purposes.[4] There exist a felt need to accurately profile such patients who would require surgical intervention either as an emergency procedure for conditions like intestinal obstruction, perforation, bleeding, etc., or in elective setting for conditions like stricture, ulceration, etc.

The GI surgery department of the tertiary care treatment centre where this study was undertaken, receives patients referred either for confirmation of diagnosis in cases where abdominal tuberculosis is strongly suspected or for definitive surgical management in already confirmed cases like ileocecal tuberculosis, colo-rectal ulceration, bleeding or intestinal obstruction due to stricture, bands or abdominal cocoon.

This study aims to revalidate the need for surgical intervention in patients with abdominal tuberculosis either for confirmation of diagnosis or for definitive management in already confirmed cases of abdominal tuberculosis.

METHODS

This study was undertaken at Army Hospital Research and Referral, New Delhi, India, which is a tertiary care referral centre. The author undertook this study from January 2014 to April 2014. Necessary administrative clearance from appropriate hospital authority was obtained for accessing the patient records to carry out the study. Ethical clearance was obtained from the institutional ethics committee. Confidentiality of the patients whose records were obtained from hospital records section were maintained by anonymizing the personal particulars of the patients before accessing their records.

Study design was descriptive observational (retrospective) study.

The study sample comprised the case records of all patients diagnosed as confirmed cases of 'abdominal tuberculosis' from January 2011 to December 2013 as per established guidelines.

Selection criteria was patients diagnosed as confirmed cases of 'abdominal tuberculosis' as per the established clinical practice guidelines.

Universal (100%) sampling technique was used, wherein case records of all patients diagnosed and confirmed as 'abdominal tuberculosis' were included.

The case records of such patients who were diagnosed as abdominal tuberculosis from January 2011 to December 2013 were analysed retrospectively. Their symptomatology, clinical features, hematological and biochemical investigations including Mantoux test, ESR, HIV status and ascitic fluid analysis (if present) including SAAG and ADA levels were tabulated. Radiological investigations that were studied, included chest radiograph, USG abdomen, CECT abdomen, Barium meal follow-through and CT enteroclysis as indicated.

Histopathology from tissue samples of lymph nodes, mesentery, omentum, and peritoneum demonstrating caseating granulomas with Langerhan's giant cells, epitheloid cells, lymphocytes and macrophages with or without acid fast bacilli is taken as gold standard for diagnosis of abdominal tuberculosis. Patients who had positive histopathology report or ascitic fluid analysis confirming abdominal tuberculosis and did not warrant any further surgical procedures were then excluded from further analysis.

Patients who underwent surgical management were classified based on type of surgery, whether it was carried out as an emergency or elective procedure and whether it was for diagnosis or for definitive management. The type and exact nature of surgical procedure undertaken in these cases were analysed.

Statistical analysis

The data retrieved out of the case records of all patients were entered into Microsoft Excel worksheets and analysed using MS Excel Software.

RESULTS

From January 2011 to December 2013, a total of 54 cases had a final diagnosis of confirmed case of 'Abdominal Tuberculosis'. Out of 54 patients, 29 were males and 25 females (male: female ratio of 1.16:1). Their mean age was 43.4 yrs (range 16 yrs to 65 yrs) and median was 46 yrs. Age and sex distribution of cases is tabulated in Table 1.

Intermittent colicky pain abdomen was the most common symptom found in 46 of 54 patients (85.2%) followed by significant weight loss (more than 10% within 06 months) in 41 patients (75.9%). In 29 patients (53.7%) low grade fever with evening rise of temperature was present while intermittent vomiting was present in 20 patients (37.0%). Persistent diarrhoea was seen in 6

patients (11.1%). 6 of them (11.1%) presented with obstipation and 4 patients (7.4%) had lower GI bleed as presenting symptom. One patient had ileal perforation. One patient (2%) each had hepatomegaly and splenomegaly respectively. The details of clinical presentations are summarized in Table 2. All these symptoms were present in spite of non-specific medical management, with average duration of symptoms lasting for more than one month in most of them.

Table 1: Age-sex distribution of abdominal tuberculosis.

Age group (in years)	Male N (%)	Female N (%)	Total N (%)
16-25	2 (3.7)	4 (7.4)	6 (11.1)
26-35	6 (11.1)	8 (14.8)	14 (25.9)
36-45	4 (7.4)	2 (3.7)	6 (11.1)
46-55	9 (16.6)	5 (9.3)	14 (25.9)
56-65	8 (14.8)	6 (11.1)	14 (25.9)
Total	29 (53.7)	25 (46.3)	54 (100)

Table 2: Clinical features in abdominal tuberculosis.

Clinical features	No. of cases	Percentage (%)
Pain abdomen	46	85.2
Weight loss	41	75.9
Fever	29	53.7
Vomiting	20	37.0
Abdominal lymphadenopathy	10	18.5
Ascites	8	14.8
Diarrhoea	6	11.1
Bleeding per rectum	4	7.4
Obstipation	6	11.2
Hepatomegaly	1	1.9
Splenomegaly	1	1.9

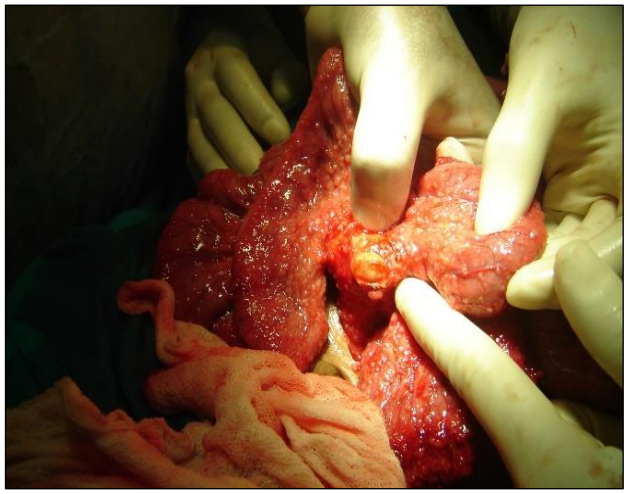

Figure 1: Miliary tuberculosis with caseating mesenteric lymph node.

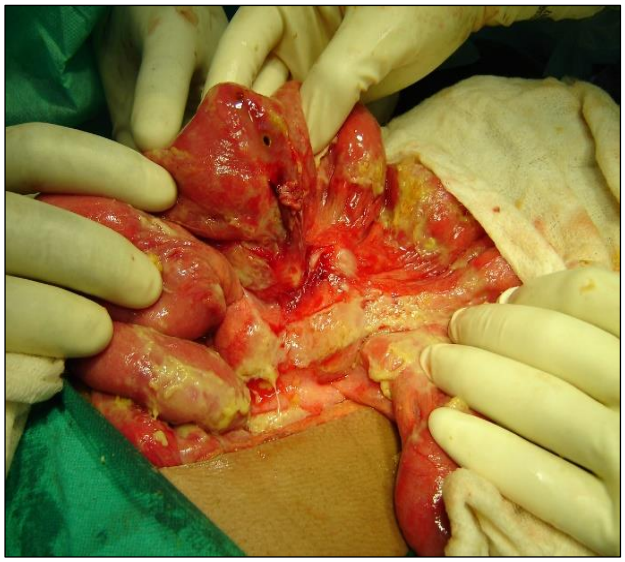

Figure 2: AIDS with tubercular Ileal perforation.

Of the total 54 patients, 22 (40.7%) were Mantoux positive (>10 mm induration at 72 hours after inoculation) and ESR was elevated in 33 cases (61.1%). 04 patients (7.4%) tested positive for HIV serology (ELISA). Chest radiograph showed old healed pulmonary tuberculosis in 3 patients. USG and CECT abdomen showed enlarged mesenteric lymph nodes in 10 cases, minimal ascites in 8, hepatomegaly and splenomegaly in 1 case each. 7 patients had low serum ascitic fluid albumin gradient (SAAG <1.1) and ADA level in ascitic fluid was raised (>33 IU/l) in 6 cases. Image guided FNAC of lymph nodes and/ or ascitic fluid analysis confirmed tuberculosis in 10 cases. They did not undergo any surgical management and were then excluded from further analysis.

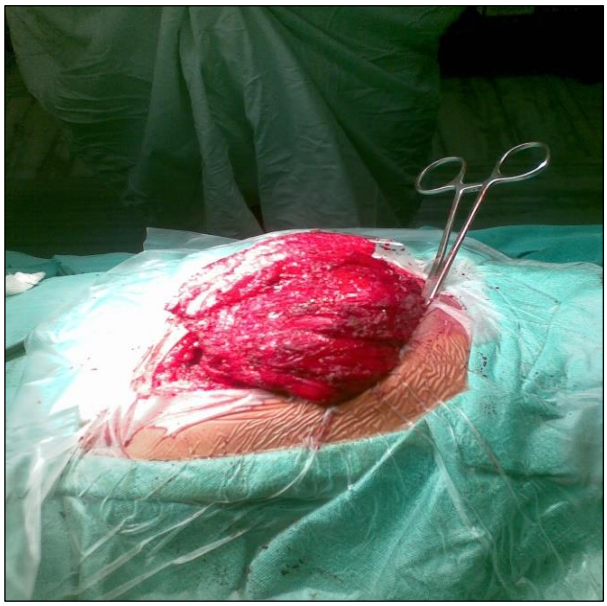

Figure 3: Abdominal cocoon.

Table 3: Summary of investigations in cases of abdominal tuberculosis.

Investigation	No. of positive cases/total no. of patients	% of positive cases
Mantoux test	22/54	40.7
Elevated ESR	33/54	61.1
HIV positive serology	04/54	7.4
Low SAAG ascites	07/08	87.5
Ascitic fluid ADA >33 IU/L	06/08	75.0
Barium meal follow-throu	04/10	40.0
CT enteroclysis	04/12	33.3
Colonoscopy	04/20	20.0

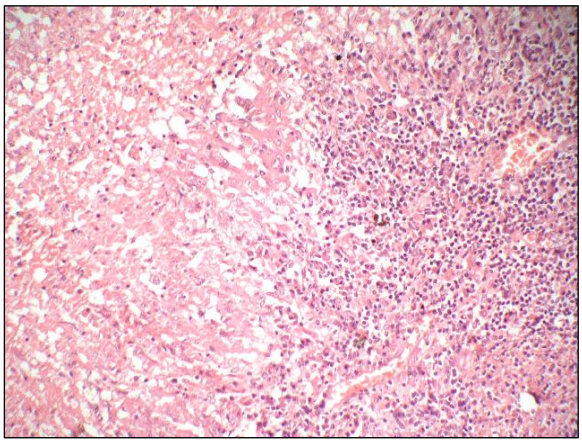

Figure 4: Splenic TB.

Barium meal follow-through was carried out in 10 cases which showed features of sub-acute small bowel obstruction in 4 cases. CT enteroclysis was performed in 12 cases who presented with features of sub-acute intestinal obstruction (SAIO) which showed significant small bowel obstruction with dilated bowel loops proximally and collapsed loops distally with definite zone of transition in 4 cases. One case of abdominal cocoon was suspected pre-operatively on CT enteroclysis which was confirmed intra-operatively. 20 patients underwent colonoscopy out of which 2 cases had ileocecal tuberculosis and 2 cases had colonic ulceration with lower GI bleed. Colonoscopic biopsy was positive for tuberculous granuloma in all four of them. Investigations carried out and their results are summarized in Table 3.

USG Abdomen and CECT Abdomen were done in all cases. Positive findings obtained as follows.

Table 4: Imaging studies.

Findings	No. of cases
Mesenteric lymph node enlargement	10
Ascites	08
Hepatomegaly	01
Splenomegaly	01

Based on low SAAG ascites (7 cases), ascitic fluid ADA levels >33 IU/l (6 cases) and image guided FNAC showing tuberculosis, a total of 10 patients were excluded from further analysis.

Surgical procedures carried out are classified into two types: 1. whether the procedure was carried out as an emergency or an elective surgery 2. whether the procedure was for confirmation of diagnosis (pre-op diagnosis: unknown) or for definitive management (pre-op diagnosis confirmed as tuberculosis). Table 5 gives the details of emergency surgeries carried out. Acute intestinal obstruction with abdominal pain, distension, vomiting and obstipation was seen in 6 patients, ileal perforation with peritonitis in 1 patient and colonic ulceration with bleeding in 1 patient. Emergency surgery was performed in all these 8 cases. Abdominal cocoon and ileocecal obstruction were present in two each, two patients had multiple small bowel strictures, one patient had ileal perforation with peritonitis and one case presented with large left colonic ulcer and massive lower GI bleed. Exploratory laparotomy with minimal adhesiolysis and ileostomy was performed for abdominal cocoon, right hemicolectomy with side to side ileotransverse anastomosis was done for ileocecal tuberculosis and emergency limited colonic resection and Hartmann's procedure was performed for colonic ulcer with bleed. Ileal resection and anastomosis was done for ileal perforation. Ileal strictures with obstruction were treated with multiple stricturoplasty (functionalization of small bowel).

Table 5: Emergency surgeries carried out.

Diagnosis	Procedure	No. of cases
Multiple small bowel strictures with intestinal obstruction	Multiple stricturoplasty (functionalization of small bowel)	02
Ileo-cecal tuberculosis with obstruction	Right hemicolectomy	02
Large colonic ulcer with bleed	Limited colon resection and Hartmann's procedure	01
Ileal perforation with peritonitis	Ileal resection and anastomosis	01
Abdominal cocoon with intestinal obstruction	Minimal adhesiolysis and ileostomy	02
Total		08

Table 6: Elective procedures carried out.

Type of procedure	S. no	Diagnosis	Procedure	No. of cases
Definitive procedure	01	Small bowel stricture	Limited resection and anastomosis	02
			Functionalization of small bowel	03
	02	Ileocecal tuberculosis	Right Hemicolectomy	02
	03	Colonic ulcer with bleed	Limited resection and Hartmann's procedure	01
	Total			08
Diagnostic procedure	04	Pre-op diagnosis unknown	Diagnostic laparoscopy and biopsy	21
			Exploratory laparotomy and biopsy	06
			Exploratory laparotomy and ileostomy for cocoon	01
	Total			28
Grand total				36

The other cases who required elective surgical management were subjected to PAC investigations prior to surgery. Details of diagnostic and therapeutic procedures carried out are tabulated in Table 6. Out of 36 cases that were operated electively, 28 were for diagnostic purpose. 21 patients underwent diagnostic laparoscopy, biopsy of mesenteric node, omentum or peritoneum which confirmed abdominal tuberculosis and ATT was commenced. 7 patients underwent exploratory laparotomy for confirmation of diagnosis as the findings were inconclusive even after diagnostic lap. Post-operatively, HPE was carried out on all 44 cases, which showed classical caseating granuloma in all cases though AFB was demonstrated only in 12 cases. All patients were started on ATT as soon as the paralytic ileus recovered. 02 months INH, rifampicin, pyrazinamide and ethambutol were given and 04 months of INH, rifampicin as per institution protocol for abdominal tuberculosis, with monthly monitoring of liver function tests.

02 patients died in the immediate post-operative period, one had abdominal cocoon with severe sepsis and the other was tubercular ileal perforation with HIV. 02 more died during follow-up between 8 - 10 months of surgery. One of them was HIV positive and the other died of an unrelated cause. 4 patients required more than one laparotomy, 3 for restoration of gut continuity (reversal of Hartmann's procedure - 2; and Rt hemicolectomy in ileal perforation, ileostomy closure) and 1 for intra-abdominal abscess drainage. 42 out of 44 patients completed ATT and 40 of them were followed-up for a median of one year (range- 04 months for the last recruited cases to 30 months for initial cases). All of them were found to have improved well with weight gain and their symptoms have subsided.

DISCUSSION

Primary intestinal tuberculosis occurs by ingestion of contaminated milk or food which is rare in India due to the habit of boiling milk before consumption.[5] Secondary infection is by hematogenous spread from active pulmonary or military tuberculosis or swallowing of infected sputum or due to contiguous spread from female genital tract.[6]

Abdominal tuberculosis affects patients in their 3rd to 4th decade of life.[4] However, median age of cases in this study was 46 yrs ranging between 16 and 65 years. Though several studies indicate a higher incidence in females especially in India, it seems that the disease affects both sexes equally.[7] There was a slight male preponderance in this study population (29 males and 25 females) with the male: female ratio of 1.16 : 1.

Abdulrahman et al in their review of 78 cases of abdominal tuberculosis showed weight loss in 85%, abdominal pain in 65% and fever in 50% patients as the predominant clinical features.[8] In this study, abdominal pain was the most common symptom seen in 85% followed by weight loss (76%) and fever in 53%. The probable reason for this variation could be that, tuberculosis involving the gut lumen tend to present with features of obstruction or alteration of bowel habits while those with mesenteric or peritoneal form of tuberculosis tend to present with abdominal pain, a doughy feel, ascites and varying degrees of intestinal obstruction.[9]

This series had intestinal tuberculosis more frequently than the peritoneal or mesenteric form and therefore the clinical picture is different from literature. Hepatomegaly and splenomegaly were found in 1 case each in this study (1.9% each) whereas isolated single organ involvement was predominant in the study by Abdulrahman et al, with liver involvement in 16.6%, spleen, pancreas, appendix and anal canal in 1.3% each.[8]

Mantoux (tuberculin) test though usually performed, is of little diagnostic value, since false positive result may be seen in cases of previous sensitization by contact or vaccination while false negative is common in elderly, undernourished, immunosuppressed patients or in cases with disseminated disease.[2,10] Rathi et al reported that HIV sero-positivity rates in India are between 0.4% to 20.1%, on the other hand, 50% of HIV positive patients

are infected with *M. tuberculosis* infection.[11] In this study, 04 patients (7.4%) tested positive for HIV serology.

Ascitic fluid analysis with SAAG levels less than 1.1 and ADA more than 33 IU/l in a non-cirrhotic patient are highly suggestive of tuberculous peritonitis with a very high sensitivity (97%) and specificity (100%).[12] Out of 8 patients with ascites in this study, 7 (87.5%) had low SAAG (<1.1) and 6 (75%) had ADA levels more than 33 IU/l corroborating with other available case series as well.

Barium studies and CT enteroclysis show characteristic features in 50% cases and include accelerated transit time, hyper segmentation and flocculation of barium, strictures with proximal dilatation, pulled-up caecum, etc.[2,13] In this study, Barium meal follow-through revealed features suggestive of intestinal tuberculosis in 4 out of 10 cases (40%) and CT enteroclysis was positive in 4 out of 12 cases (33%). Colonoscopy and biopsy of ulcer or polypoidal lesion avoids unnecessary morbidity and mortality associated with emergency surgery.[14,15] However, most important differential diagnosis for gastrointestinal tuberculosis on colonoscopy is Crohn's disease and their differentiation is of paramount importance because, treatment with corticosteroids administered mistakenly to a case of tuberculosis will have disastrous consequences.[16] This study revealed 2 cases of left colonic ulceration with bleeding and 2 cases of ileocecal tuberculosis and all were confirmed by histopathology. All patients underwent elective surgery in prepared bowel except one who was taken up as an emergency for intractable bleeding colonic ulcer.

Six of our patients (11.2%) presented with acute obstruction and underwent emergency laparotomy after plain radiograph of abdomen showed dilated small bowel loops with multiple air-fluid levels. Sharma et al reported similar rates of intestinal obstruction which is the most common complication of small bowel or ileocecal tuberculosis which accounts for 3 to 20% of all cases of bowel obstruction in India.[16]

In spite of extensive investigations, 28 out of 54 patients (51.8%) required operative intervention for confirmation of diagnosis. 21 patients (38.8%) underwent diagnostic laparoscopy and 7 patients (12.9%) underwent exploratory laparotomy for confirmation of diagnosis. Pre-op diagnosis avoids invasive diagnostic procedures. Kapoor et al reported about 50% of cases requiring diagnostic laparoscopy or exploratory laparotomy for confirmation of diagnosis.[10]

Standard short course therapy with Isoniazid, Ethambutol, Pyrazinamide and Rifampicin daily for 2 months followed by Isoniazid, Rifampicin and Ethambutol for 4 months is considered sufficient for complete treatment of abdominal tuberculosis.

CONCLUSION

Even though the modalities of investigations and imaging have significantly improved in modern times, with sophisticated and high-resolution images and radio nucleotide sequences providing better pre-operative diagnosis, abdominal tuberculosis remains obscure in significant number of patients. In such cases, operative intervention in the form of minimally invasive diagnostic laparoscopy and/or biopsy for tissue diagnosis, or exploratory laparotomy are still required for confirmation of diagnosis. In addition, surgical management provides therapeutic advantages both in emergency as well as in elective setting as definitive management in addition to anti-tubercular treatment.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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