



## Laboratory Profiles and Imaging Findings of Abdominal Tuberculosis Patients: Experience of 100 Cases in Bangladesh

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### Abstract

**Background:** Variations of laboratory profiles and imaging findings may occur among the abdominal tuberculosis patients. **Objectives:** The purpose of the present study was to laboratory profiles and imaging findings of abdominal tuberculosis patients. **Methodology:** This descriptive cross sectional study was conducted in the Department of Surgery of Rajshahi Medical College Hospital, Rajshahi, Bangladesh from January 2014 to December 2015 for two years. This study included patients who were admitted in surgery units of Rajshahi Medical College Hospital, Rajshahi, Bangladesh who were diagnosed as abdominal tuberculosis with or without associated pulmonary or nodal tuberculosis. Different laboratory tests were performed and were recorded. The imaging techniques like barium meal and Ultrasonography of the abdomen were also performed during diagnosis of the patient. **Results:** A total number of 100 cases were included in the study. The most common age group was 20 to 30 Years of age group which was 52.0% cases. In this study 18 cases were positive histological examination of intestine for tuberculosis. About 12 cases were node-positive, 6 cases were ADA positive, 20 patients underwent positive colonoscopy, 26 cases were FNAC positive in caecal growth and lymphadenopathy, 12 cases were positive radiological findings, 3 cases were positive histopathology in which tissue taken by laparoscopy and remaining 3 was confirmed by isolation of organism by smear and culture for AFB of ascetic fluid. In plain X-Ray of abdomen, 48 patients had features of intestinal obstruction, 7 patients had pneumoperitoneum, 4 patients had ground glass opacity with pneumoperitoneum and only 1 patient had calcified lymph node and remaining 40 patients had normal radiological findings. **Conclusion:** In conclusion most of the abdominal tuberculosis patients are positive in histopathological examination and X-ray of abdomen.

**Keywords:** Laboratory profiles; imaging findings; abdominal tuberculosis

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### Introduction

The diagnosis of abdominal TB can often be difficult to establish because the disease may present with a wide variety of non-specific symptoms and sign<sup>1</sup>. In

addition the pattern of disease is changing and many patient with abdominal TB do not have the associated pulmonary disease that may aid diagnosis<sup>2</sup>. A high index of suspicion is therefore required to make a prompt diagnosis. Failure to do so may lead to unnecessary morbidity and mortality because of consequent delay of treatment<sup>3</sup>.

Correct and early diagnosis of abdominal tuberculosis is crucial because untreated disease carries a 50.0% mortality rate<sup>4</sup>. Unfortunately sometimes the disease may not be diagnosed before patients' death.

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Abdominal tuberculosis carries a good prognosis if promptly diagnosed and treated early. Delays diagnosis and treatment leads to various complications of abdominal tuberculosis which sometimes require surgical intervention<sup>5</sup>.

The appropriate investigation and sometimes newer technique may help in early diagnosis and may also prevent some surgery<sup>6</sup>. As there is re-emergence of abdominal tuberculosis due to incomplete treatment, occurrence of multi-drug resistant strains and an increasing incidence of HIV-AIDS it is necessary to perform a study on this particular critical disease. The purpose of the present study was to laboratory profiles and imaging findings of abdominal tuberculosis patients.

### Methodology

**Study Design and Population:** This descriptive cross-sectional study was conducted in the Department of Surgery of Rajshahi Medical College Hospital, Rajshahi, Bangladesh from January 2014 to December 2015 for two years. This study included 100 patients who were admitted in surgery units of Rajshahi Medical College Hospital, Rajshahi, Bangladesh who were diagnosed as abdominal tuberculosis with or without associated pulmonary or nodal TB. Both male and female patient of any age except pediatric age group irrespective of nutritional and socio-economic status were included in study population. Sampling was done by non-randomized, purposive, Convenience technique. All admitted patients who were diagnosed abdominal tuberculosis with or without associated pulmonary or nodal tuberculosis were included in this study. Patients of paediatric age group (<18 years), Pregnant woman or Suspected abdominal TB under trial of anti-tubercular chemotherapy were excluded from this study. The details of demographic variables like age, sex, residence and so on were recorded in a data collection sheet.

**Study Procedure:** Patients who were diagnosed as abdominal tuberculosis with or without associated pulmonary or nodal TB. Both male and female patient of any age except pediatric age group irrespective of nutritional and socio-economic status were included in study population. Detailed history of each patient under study was recorded in respect to age, sex, mode of presentation, symptoms relating to abdominal tuberculosis and its complications, present or past history regarding tuberculosis, relevant personal, family or close contact tuberculosis and socioeconomic history.

**Diagnosis of Abdominal Tuberculosis:** The diagnosis of abdominal tuberculosis in the present series was made by clinical data and investigations. Complete blood count, ESR, serum electrolytes, renal function tests, serum glucose, chest and abdominal X-rays were obtained for all patients. Two groups of patients were observed and analysed. In group I patients were presenting with acute symptoms like pain, vomiting, constipation signifying intestinal obstruction/perforation requiring urgent surgical intervention. Here the diagnosis of abdominal tuberculosis was made on the basis of suggestive per-operative findings and confirmed by histopathological examination of the operative specimens. In group II patients were presenting with chronic symptoms like pain, fever, lump and/or distension abdomen, ascitis, altered bowel habits. The investigations in these patients included additional investigations like ultrasonography (USG), sputum for AFB, fine needle aspiration cytology (FNAC), contrast gastro-intestinal studies, peritoneocentesis etc; wherever indicated. Whenever, the diagnosis was doubtful, in spite of detailed investigations, the patient was advised surgical intervention. Finally, histopathology of biopsy specimen obtained by laparotomy or laparoscopy confirms the diagnosis of abdominal tuberculosis. In all cases detailed operative findings and procedure, immediate post-operative complications were noted. Patient's postoperative outcome were assessed with remission of symptom and sign and general improvement of patient's condition.

**Statistical Analysis:** Collected data was compiled, checked and edited. Data processing and analysis was done with the help of computer using statistical software SPSS (Statistical Package for Social Science) version 15.0 for windows. The test statistic used to analyze the data was descriptive statistics and Chi-square test. The level of significance was set at 0.05 and  $P < 0.05$  was considered significant.

**Ethical Consideration:** All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the local ethics committee. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analysed using

the coding system.

**Results**

After confirmation of diagnosis 100 cases were included in the study. The most common age group was 20 to 30 Years of age group which was 52.0% cases followed by 31 to 40 Years and 41 to 50 Years of age group which was 26.0% cases and 14.0% cases respectively. However, the 51 to 60 Years and 61 to 70 Years of age group patients were in 5.0% cases and 3.0% cases respectively (Table 1).

Table 1: Age Distribution among the Study Population (n=100)

Age Group	Frequency	Percent
20 to 30 Years	52	52.0
31 to 40 Years	26	26.0
41 to 50 Years	14	14.0
51 to 60 Years	5	5.0
61 to 70 Years	3	3.0
<b>Total</b>	<b>100</b>	<b>100.0</b>

In this study, 18 cases were positive histological examinations of intestine for tuberculosis. About 12 cases were node-positive, 6 cases were ADA positive, 20 patients underwent positive colonoscopy, 26 cases were FNAC positive in caecal growth and lymphadenopathy, 12 cases were positive radiological findings, 3 cases were positive histopathology in which tissue taken by laparoscopy and remaining 3 was confirmed by isolation of organism by smear and culture for AFB of ascetic fluid (Table 2).

Table 2: Methods Used to Confirm the Diagnosis of Abdominal Tuberculosis (n=100)

Method	Frequency	Percent
Isolation of Organisms by Culture	3	3.0
ADA of peritoneal fluid	6	6.0
Nodal Biopsy and Histopathology	12	12.0
Intestinal Biopsy and Histopathology	18	18.0
Colonoscopy Biopsy and Histopathology	20	20.0
USG guided FNAC of lesion or lump	26	26.0
Laparoscopic Biopsy and Histopathology	3	3.0
Radiological (Barium series both small and large)	12	12.0

All patients were undergoing plain X-Ray of abdomen. Among them 48 patients had features of intestinal obstruction, 7 patients had pneumoperitoneum, 4 patients had ground glass opacity with pneumoperitoneum and only 1 patient had calcified lymph node and remaining 40 patients had normal radiological findings (Table 3).

Table 3: Radiological (X-Ray Abdomen) Findings (n=100)

Findings	Frequency	Percent
Features of intestinal obstruction in plane X ray	48	48.0
Pneumoperitoneum	7	7.0
Ground glass opacity with Pneumoperitoneum	4	4.0
Calcified lymph Node	1	1.0
Normal	40	40.0

Selective 10 patients under went Barium series of intestine (Small bowel). Among them 2(20.0%) patients had multiple strictures in ileum with high up caecum, 4(40.0%) patients had multiple strictures and dilatation of small bowel, 1(10.0%) patient had deformed caecum and 1(10.0%) patient had positive string sign. Remaining 2(20.0%) patients had normal radiological findings (Table 4).

Table 4: Features of Barium Radiology of Intestine (Small Bowel Series) (n=10)

Features	Frequency	Percent
Features of ileal stricture and high up caecum	2	20
Multiple strictures and dilatation of small bowel	4	40
Deformed caecum	1	10
String sign of cantor	1	10
Normal	2	20

Selective 15 patients under went Barium series of intestine (Large bowel). About 6(40.0%) patients had

Table 5: Features of Barium Radiology of Intestine (Large bowel series) (n=15)

Features	Frequency	Percent
Caecal filling defect with Pulled Up Caecum	6	40
Narrowing of Ascending Colon	3	20
Normal	6	40

caecal filling defect with pulled up caecum, 3(20.0%) patients had narrowing of ascending colon. Remaining 6 patients (40.0%) cases had normal radiological findings (Table 5).

Selected 60 patients underwent USG of the whole abdomen and out of them 45 patients had abnormal sonographic findings (Table 6).

Table 6: USG finding of Selected Cases (n=60)

Abdominal USG Findings	Frequency	Percent
Gut related Lump	16	26.66
Ascites	15	25.0
Mesenteric Lymphadenopathy	6	10.0
Thickening of Omentum and Bowel Loop	5	8.33
Calcified Lymph Node	1	1.66
Organomegaly (Liver and Spleen)	2	3.33
Normal	15	25.0

Table 7: Sputum for AFB Findings in Selected Cases (n=20)

Sputum for AFB	Frequency	Percent
Positive	10	50.0
Negative	10	50.0
<b>Total</b>	<b>20</b>	<b>100.0</b>

## Discussion

A high index of suspicion is therefore required to make a prompt diagnosis; failure to do so may lead to unnecessary morbidity<sup>7</sup>. It can have a varied presentation, frequently mimicking other common and rare diseases. Abdominal tuberculosis is predominantly a disease of the young adult. The most common site of involvement is the ileocaecal region<sup>8</sup>. The classic histological finding is a caseating granuloma. In tuberculous peritonitis, it is studded with multiple yellow white tubercles. The clinical presentation may be acute or chronic or acute on chronic. Even patient may be without symptoms.

In this study, a total 100 cases were included. Both male and female patients were included according to the selection criteria. Admitted patients in the department of surgery of Rajshahi Medical college hospital who were diagnosed with abdominal TB were selected as a sample. Detailed history and clinical examination performed of every patient. Haematological, biochemical, radiological and imaging evaluations were done for each patient according to requirement to reach the diagnosis of

abdominal TB. In some patients, histological examination confirmed the diagnosis.

This study was carried out on 100 cases of abdominal tuberculosis. Among them most of the cases 52.0% were aged between 20-30 years, 26 cases were aged between 31 to 40 years, only 3 cases were beyond 60 years. Both male and female patients were included in this study. Age varies widely among the patients of abdominal TB ranging from 20 to 70 years. Among the 100 cases 52.0% was within 20 to 30 years of age. Only 3.0% cases was found beyond the age of 60 years. Rahman et al<sup>9</sup> show most of the patients were in the age of 21 to 30 years which is similar to this present study. Sharm and Bhatia<sup>10</sup> also showed similar result. Bhargava et al<sup>11</sup> found two thirds of the patients with abdominal TB are 21 to 40 years old.

In one Indian studies age at presentation was variable with maximum cases in 21 to 40 years age group (58.0% cases) with mean age of 32.7 years<sup>9</sup>. Bolukbas et al<sup>12</sup> found age 31.4 ±15 years in their series of abdominal tuberculosis. This indicate high prevalence of tuberculosis among earlier, economically productive age group in our country. The possible cause of affected group is working in the community getting the infection from environment by organism that spread by open cases of pulmonary tuberculosis. On the other hand age incidence of elderly persons are also low possibly because of late presentation of constitutional symptoms. Sometimes neglected elderly patients of abdominal tuberculosis do not reach hospital for treatment.

In this study 18 cases were positive histological examination of intestine for tuberculosis. About 12 cases were node-positive, 6 cases were ADA positive, 20 patients underwent positive colonoscopy, 26 cases were FNAC positive in caecal growth and lymphadenopathy, 12 cases were positive radiological findings, 3 cases were positive histopathology in which tissue taken by laparoscopy and remaining 3 was confirmed by isolation of organism by smear and culture for AFB of ascetic fluid. All patients underwent Plain X-Ray of abdomen. Among them 48.0% patients had features of intestinal obstruction. It was 40.0% cases in Iqbal et al<sup>13</sup>, 30.0% cases in Thapa et al<sup>14</sup>. Again, 7.0% patients had pneumoperitoneum, Thapa et al<sup>14</sup> found 6.67% cases and 6.9% cases in bowel perforation in their studies that is similar in this study, showed perforation in 4.0% in his series that is less in my series. About 4.0% patients had ground glass opacity with pneumoperitoneum, and only 1.0% patient had calcified lymph node and remaining 40.0%

patient had normal radiological findings.

Barium radiology of gut both large and small bowel series helps very much in diagnosis of tubercular enteritis. Out of 100 cases selective 10 patients underwent Barium series of intestine (Small bowel). Rahman et al<sup>9</sup> found 20 cases and 14(70.0%) patients Barium meal and follow through revealed lesions suggestive of TB. But in our study Barium series of intestine (Small bowel) revealed 80.0% cases presents abnormal radiological findings that suggestive of TB. Among them 2 patients (20.0%) had multiple strictures in ileum with high up caecum, 4 patients (40.0%) had multiple strictures and dilatation of small bowel, 1 patient (10.0%) had deformed caecum and 1 patient (10.0%) had positive string sign. Remaining 2(20.0%) patients had normal radiological findings.

Out of 100 cases selective 15 patients underwent Barium series of intestine (Large bowel). It revealed 60% cases presents abnormal radiological findings that suggestive of TB. Of them 6 patients (40%) had caecal filling defect with pulled up caecum, 3 patients (20.0%) had narrowing of ascending colon. Remaining 6 patients (40.0%) had normal radiological findings. Thapa et al<sup>14</sup> have found nearly similar findings in their studies.

In our study selected 60 patients underwent USG of whole abdomen and out of them 45 patients (75.0%) had abnormal sonographic findings. Rahman et al<sup>9</sup> have found abnormal sonographic finding in 60.0% cases and predominant findings were ascites in 42.0% cases, lymphadenopathy in 12.0% cases. In this study sonographic findings revealed ascites in (25.0%) cases, mesenteric lymphadenopathy (10.0%) cases, gut-related lump (26.7% ) cases, thickening of omentum and bowel loop (8.3%) cases, calcified lymph Node (1.7%) cases, hepatosplenomegaly (3.3%) cases.

All patient underwent X-chest P/A view. Among them 30 cases chest X-ray revealed evidence of pulmonary TB, with 10 cases had active lesion of pulmonary TB and remaining 70 cases chest X-ray was normal. In Bolukbas et al<sup>12</sup> series evidence of pulmonary TB was present in 44.3% cases with active lesion in 27.3% cases which is higher than the present series. Other studies<sup>11-13</sup> show associated pulmonary tuberculosis in 33.0% cases in Bangladesh and in 39.0% cases in India, which is also much higher than the present series. The lower trend in our study might be due to extensive tuberculosis and leprosy control programme of Bangladesh Government and early treatment of pulmonary tuberculosis.

In our study selected 20 cases underwent sputum for AFB. Among them 10(50.0%) cases were sputum positive for AFB. Out of 10 cases of abdominal tuberculosis. It has been found in a study<sup>11</sup> that sputum for AFB positive in 5(50.0%) cases that is similar in these series but out of 88 cases of abdominal tuberculosis Bolukbas et al<sup>12</sup> found sputum for AFB positive in 11(12.6%) cases and Rahman et al<sup>9</sup> also found sputum was positive for AFB in 14.3% and 6.0% cases that doesn't correlates with the findings.

### Conclusion

In conclusion, the most useful tools for the detection of abdominal tuberculosis is ultrasonography guided FNAC of lesion or lump, colonoscopy biopsy with histopathology as well as intestinal biopsy with histopathology. The intestinal obstruction, pneumoperitoneum and the ground glass opacity with pneumoperitoneum are the most common findings among the abdominal tuberculosis in plain X-Ray of abdomen. Therefore, the suspected abdominal tuberculosis should be performed to confirm the disease.

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None

### Conflict Of Interest

The authors have no conflicts of interest to disclose.

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### Authors' contributions

Kudrat-E-Khuda IM, Momotaj MT, Hakim SMA conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Alam MA, Ahmed SS, Kundu SR, Alom MM contributed to the analysis of the data, interpretation of the results and critically reviewing the manuscript. Kudrat-E-Khuda IM, Momotaj MT involved in the manuscript review and editing. All authors read and approved the final manuscript.

### Data Availability

Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

### Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations

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