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Clinicopathological Profile Analysis of Patients with Abdominal Tuberculosis in Bangladesh: A Single Center Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: To analyze the clinicopathological profile of abdominal tuberculosis patients among 73 patients in a tertiary care hospital in Bangladesh.
Objective: To analyze the clinicopathological profileof abdominal tuberculosis patients.

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Methods: It was crosssectional obsevetional study, executed in the Department of Gastroenterology Dhaka Medical College Hospital (DMCH) in collaboration with National Tuberculosis Reference Laboratory, NIDCH, Mohakhali, Dhaka from May 2015 to April 2016. Seventy-three cases of abdominal tuberculosis were studied, which were operatedonand diagnosed. Data collection included detailed history, particularly age distribution, site of abdominal tuberculosis involvement, and distribution of histopathology.

Results: Mean age of the study subject was 33.90 ± 15.14 years (range 18-70 years). The majority of the patients (53.2%) were between 18-30 years age group, followed by 18.8% between 31-40 years age group.Based upon predominant clinical features and investigations, the site of abdominal TB involvement was intestinal in 50(68.8%), peritoneal in 18(25%), and nodal in 5(6.2%) patients. Histopathology was performed in 60(81.25%) patients and showed granulomatous inflammation consistent with TB in 27/60(46.2%) specimens. Among them non-caseating, granuloma was found in 20(75%) specimens, caseating granuloma in 7(25%) specimens and TB bacilli (AFB) was not found in any (0.0%) specimen.

Conclusion: Young age at presentation, delayed presentation, poverty, and high morbidity and mortality are among the hallmarks of the disease in this region. These challenges need to be addressed to deliver optimal care for these patients. Early diagnosis, early anti-tuberculous therapy, and surgical treatment of the associated complications are essential for survival.

Keywords: Abdominal tuberculosis; clinicopathological profile; outcome; surgical treatment.

1. INTRODUCTION

“Tuberculosis (TB) is a clinical disease caused by infection with Mycobacterium tuberculosis, which is particularly widespread in underdeveloped nations where ignorance, poverty, overcrowding, inadequate sanitation, and malnutrition are common” [1]. “It is the most important contagious illness globally, and the World Health Organization (WHO) has declared it a global emergency” [2,3]. It was also known as the "captain of all men's deaths" and the "great white plague of antiquity" [4]. “Tubercle bacilli are non-sporing, stationary, aerobic, gram-positive acid-fast bacteria” [5]. “In populations where tubercle bacilli are still present in the milk supply, or when pulmonary or other kinds of tuberculosis are common, intestinal tuberculosis is still prevalent” [6]. “One-third of the world's population is latently infected with the causative agent Mycobacterium tuberculosis, with an estimated 9 million new cases of tuberculosis diagnosed each year. Because of its infectious nature, tuberculosis is linked to more deaths than any other single infectious agent” [7,8]. “Since 2012, the number of TB cases reported in Bangladesh has increased dramatically, owing to an increase in the number of extrapulmonary and clinically confirmed pulmonary cases” [9]. “Even though tuberculosis is a serious worldwide health problem, Bangladesh is a shining example of TB control collaborating with non-governmental organizations (NGOs). The World Health Organization's (WHO) End TB Strategy is being implemented for the first time in 2016 in conjunction with the United Nations Sustainable Development Goals (SDGs) Agenda, all of which aim to eliminate the TB pandemic” [10]. “To eliminate the TB epidemic, the health and social sectors must be strengthened by achieving universal health coverage and social protection, which are stressed in the new SDG agenda. Improvements in quality-assured TB diagnosis and treatment saved 43 million lives worldwide between 2000 and 2014” [10,11]. “Tuberculosis can attack any area of the body, with the abdomen being the most prevalent place after the lungs” [12]. Abdominal TB is a significant public health concern worldwide, posing diagnostic and treatment problems for general surgeons working in low-resource settings. It primarily affects children and young people, with females being more affected [13]. “Tuberculosis can affect the gastrointestinal system, peritoneum, lymph nodes, and solid viscera in the abdomen. Extrapulmonary tuberculosis accounts for 1-3% of total TB cases, with abdominal tuberculosis (ATB) accounting for 11 percent to 16 percent of these” [14-16]. “Hematogenous spread from a primary lung focus that reactivates later or miliary tuberculosis, spread via lymphatics from infected nodes, ingestion of bacilli from sputum or infected sources such as milk products, or direct spread from adjacent organs are all modes of infection for abdominal tuberculosis” [17]. “There has also been a case of disseminated abdominal tuberculosis encompassing the gastrointestinal system, peritoneum, lymph nodes, and solid viscera” [17-19]. The early stages of abdominal

tuberculosis are challenging to diagnose since the clinical symptoms are vague and varied, and there is no definitive diagnostic test" [18,19]. "It can mimic various gastrointestinal illnesses, including inflammatory bowel disease, colonic cancer, and other gastrointestinal infections, making diagnosis difficult, especially in the absence of pulmonary infection". [18] "Abdominal TB can appear in various ways, including chronic, acute, and acuteon-chronic, or it can be discovered accidentally during a laparotomy for another reason" [20]. "The location and type of involvement determine the clinical manifestation. It usually has a slow progression and only causes issues later, such as acute or subacute intestinal blockage due to a mass (tuberculoma), stricture formation in the small gut and ileocaecal region, or gut perforation leading to peritonitis" [21]. "Despite advances in medical imaging, early detection of abdominal tuberculosis remains a challenge, with patients typically presenting after problems have occurred. General surgeons working in resource-constrained nations like Bangladesh face diagnostic and therapeutic hurdles when dealing with abdominal tuberculosis" [18]. "In many countries, a late manifestation of the disease is associated with illiteracy, poverty, overcrowding, low education, malnutrition, and a lack of sophisticated diagnostic and therapeutic facilities. Because of the greater peritoneal involvement, laparoscopy and biopsy are safe and may aid in diagnosing peritoneal TB" [22] "Because it directly visualizes the inflamed thicker peritoneum studded with whitish-yellow miliary tubercles, and (ii) biopsy of the peritoneum verifies the diagnosis, laparoscopy examination is an excellent means of identifying tubercular peritonitis" [23]. "Laparoscopy helped diagnose peritoneal TB in up to 87 percent to 92 percent of cases in various investigations" [22]. "The gold standard diagnostic for diagnosing abdominal tuberculosis is a positive AFB culture" [24]. "However, on the culture of intestinal biopsies using the Lowenstein Jensen medium and the Bactec system, a positive yield of Mycobacterium tuberculosis (MTB) complex ranges from 25% to 50%" [25]. "The percentage of AFB culture positivity in primary abdominal TB was 50.8 percent in a group of 61 patients with abdominal TB in Mumbai, India, using Bactec MGIT, and the researchers concluded that routine culture of biopsy tissue increases the diagnostic yield" [26]. "If a tuberculosis patient has a suggestive history but a negative workup, the clinical response to an anti-TB drug therapy trial (based on weight gain and general improvement in wellbeing) is used to diagnose abdominal TB" [27]. "In a study of 209 individuals with abdominal tuberculosis in Pakistan, 5(2.3%) patients were analyzed based on their reaction to anti-tubercular medication trials" [27]. "According to the research, up to 40% of patients were offered anti-TB medication therapy trials" [28]. "Anti-tuberculous therapy is used to treat abdominal tuberculosis in most cases, with surgical treatment reserved for complications such as intestinal obstruction and bowel perforation with peritonitis" [29]. Although abdominal tuberculosis and its complications are common in our environment, Bangladesh has done little research on the subject. The goal of this study was to describe the clinicopathological profile of abdominal tuberculosis in our setting and compare it to what has been described previously.

1.1 Objective

To analyze the clinicopathological profileof abdominal tuberculosis patients.

2. METHODOLOGY

This study was conducted in Gastroenterology department of Dhaka Medical College Hospital in collaboration with National Tuberculosis Reference Laboratory, NIDCH, Mohakhali, and Dhaka. All consecutive patients with abdominal tuberculosis who met the selection criteria and attended in Gastroenterology department of DMCH either through admission or referral were enrolled in this study. The patient's demographic profile, clinical features associated with other medical illnesses, family, and past history of TB was recorded. Laboratory tests, Mantoux skin test, chest and abdominal imaging results, histopathology findings, Gene Xpert, acid-fast bacilli (AFB) staining by LED fluorescence microscope and culture (MGIT 960) report, ascitic fluid analysis including ADA, findings of upper gastrointestinal endoscopy, colonoscopy with or without ileoscopy, laparotomy were collected by a structured questionnaire. Biopsy of suspicious Gastrointestinal tract tissue (5-6 samples) was collected in average saline-containing bottles for AFB staining, Gene Xpert, culture & DST and sent to National Tuberculosis Reference Laboratory, NIDCH, Mohakhali, Dhaka. Biopsies from suspicious lesions were also taken (6 to 8 samples) in formalin containing a bottle and sent for histopathological examinations to the pathology department of DMCH. An LED fluorescence microscope examined AFB

Smears. A Mycobacterial Growth Indicator Tubes (MGIT) system (BACTEC™MGIT™960TB, Becton Dickinson Biosciences, made by the U.S.A) was used on the M.TB growth for mycobacterial culture and drug susceptibility testing (DST). On the MTB growth, drug susceptibility testing was carried out. As a rapid qualitative procedure for susceptibility testing of *Mycobacterium tuberculosis,* from culture to streptomycin (STR), isoniazid (INH), rifampin (RIF), and ethambutol (EMB), the BACTEC™ MGIT™ 960 SIRE Kit was used. The BACTEC MGIT 960 SIRE Kit is a 4 -13 day qualitative test based on the growth of the *Mycobacterium tuberculosis* isolated in a drug-containing tube compared to a drug-free tube (Growth Control). The instrument continuously monitored tubes for increased fluorescence. The instrument used the analysis of fluorescence in the drug-containing tube compared to the fluorescence of the Growth Control tube to determine susceptibility results. This instrument automatically interpreted the results and reported a susceptible or resistant result. At first, DST was applied routinely on the 1st line drugs {streptomycin (STR),isoniazid (INH), rifampin (RIF), ethambutol (EMB), and pyrazinamide (PZA)}. Still, if Gene X-pert showed resistance to 1st line drugs, then DST on 2nd line drugs (kanamycin, ofloxacin, levofloxacin, gatifloxacin, amikacin, and capreomycin) was applied. Records of abdominal tissue sent for histopathology, Gene Xpert, M.TB culture and drug susceptibility testing were documented. Demographic features, clinical presentation, investigation reports and clinical response (On the basis of Weight gain and general improvement in wellbeing) to trial anti TB drugs were noted in a spreadsheet. Approval for the study was obtained from the ethics committee of DMCH.

3. RESULTS

Fig. 1 shows that most of the patients (53.2%) were in between 18-30 years age group, followed by 18.8% in between 31-40 years age group. This study also finds that the family history of treatment for tuberculosis was present in only 3(3.1%) patients. The family history of tuberculosis was found in 21(28.1%) patients. Table 1 indicates the sites of abdominal tuberculosis involvements among all of the patients.Based upon predominant clinical features and investigations, the site of abdominal TB involvement was intestinal in 50(68.8%), peritoneal in 18(25%), and nodal in 5(6.2%) patients Table 1. Site of abdominal tuberculosis involvement among the respondents in a tertiary care hospital in Bangladesh (n=73; df=2)

Fig. 2 demonstrates tuberculous granuloma. Histopathology was performed in 60(81.25%) patients and showed granulomatous inflammation consistent with TB in 27/60 (46.2%) specimens. Among them,non-caseating granuloma was found in 20(75%) specimens, caseating granuloma in 7(25%) specimens, and TB bacilli (AFB) was not found in any (0.0%) specimen.

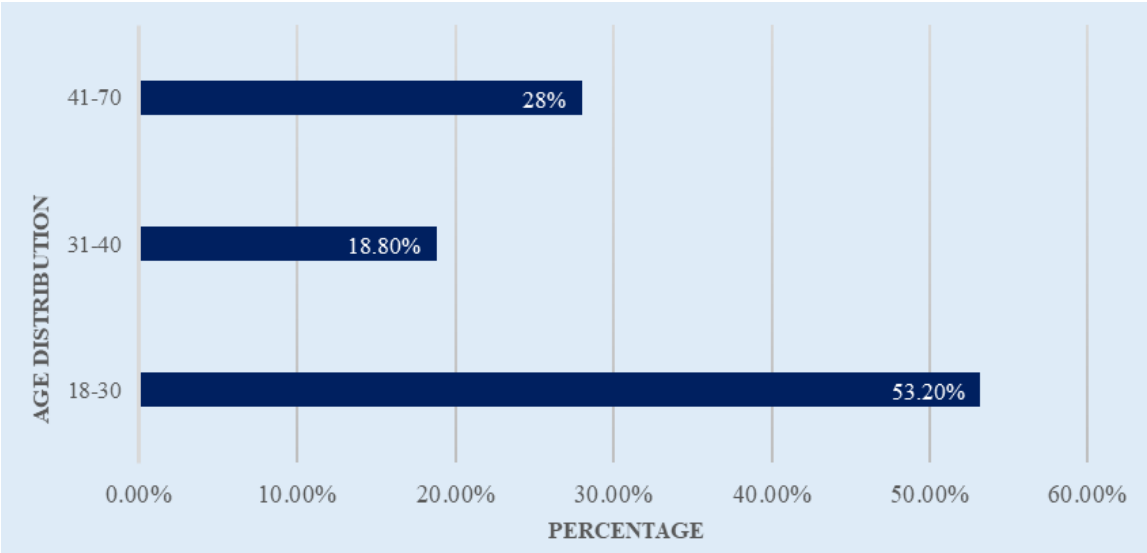

Fig. 1. Age distribution of the patients in a tertiary care hospital in Bangladesh

Table 1. Sites of abdominal tuberculosis involvements among all of the patients

Site of ATB involvement	Frequency (n)	Percentage (%)	P-value
Intestinal	50	68.8%	0.982
Peritoneal	18	25%	
Nodal	5	6.2%	

Fig. 2. Demonstration of histopathology diagnosis among patients

4. DISCUSSION

Although abdominal TB can affect anyone of any age, regardless of gender, it is most commonly observed in young adults. The majority of affected patients in a study done by Kapoor et al. were between the ages of 21 and 40, with a bit of female predominance, which was similar to our research, where the mean age of the patients was 28.21 12.13, with 52% female patients [30]. According to our findings, the average age of the study participants was 33.90 15.14 years (range 18-70 years). The majority of the patients (53.2%) were between the ages of 18 and 30, with 18.8% falling between 31 and 40. Patients with abdominal TB frequently have a history of pulmonary TB or a family history of TB [31]. Only 3(3.1%) of the patients in the current study had a family history of TB treatment, while 21(28.1%) of the patients had a family history of tuberculosis. In prior research, 13(6.2%) patients had tuberculosis therapy, and 6 patients had a family history of tuberculosis (2.9%) [27]. Another study found that 8(25.6%) of patients had a family history of tuberculosis (among first-degree relatives of the index patient) [32]. TB can affect any region of the gastrointestinal tract, but the intestine and peritoneum are the most commonly affected areas [33]. In the current study, the most common clinical characteristics and investigations revealed that the most common location of abdominal TB involvement was intestinal in 50(68.8%), peritoneal in 18(25%), and nodal in 5(6.2%) patients. Patients with abdominal TB were split into three categories based on the type of involvement in a prior study, with 15 patients (48%) having intestinal TB, 11(35.2%) patients having tuberculous peritonitis, and 5(16.8%) patients having tuberculous lymphadenitis [32]. According to another study, the site of abdominal TB involvement was intestinal in 103(49%) patients, peritoneal in 87(42%) patients, solid viscera in 10 (5%), and nodal in 9(4%) patients, based on predominant clinical symptoms and examinations [27]. Tissue diagnosis is required for effective tuberculosis treatment [34]. The most significant investigation for a definitive diagnosis of ATB is demonstrating tuberculous granuloma [27]. Histopathology was performed in 60(81.25%) of the patients in this investigation, and granulomatous inflammation compatible with tuberculosis was seen in 27/60(46.2%) of the specimens. Non-caseating granuloma was discovered in 20 (75%) of the samples, caseating granuloma in 7(25%) of the samples, and TB bacilli (AFB) was not found in any (0.0%) of the samples. This finding matches a prior study, which found that 60.8 percent of patients were diagnosedhistopathologically [32]. Another two investigations found that histology was used to diagnose 76.9% and 78.6% of patients, respectively [26,27].

5. CONCLUSION

In our setting, abdominal TB is a significant public health problem that poses a diagnostic difficulty requiring a high index of clinical suspicion. In this region, the disease is characterized by young age at presentation,

delayed manifestation, poverty, and increased morbidity and mortality. These issues must be addressed to provide the best possible treatment for these individuals. Early detection, antituberculosis treatment, and surgical treatment of accompanying problems are critical for survival.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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