

ORIGINAL RESEARCH**To study the clinical diagnosis of abdominal tuberculosis**

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ABSTRACT

Background: From the beginning of time, tuberculosis (TB) has been one of the most significant contributors to poor health, and now it is one of the most common infectious agent that results in mortality. While it most often affects the lungs, it may also manifest in other locations. Around 45 percent of the world's TB burden may be attributed to the Indian subcontinent. Around fifteen percent of all cases of tuberculosis are classified as extrapulmonary tuberculosis (EPTB).

Aims and objective: To study the clinical diagnosis of abdominal tuberculosis

Materials and methods: It was determined that abdominal TB affected 50 individuals. Each patient had a full battery of diagnostic procedures, including an in-depth interview and physical examination, blood work (including a complete blood count and erythrocyte sedimentation rate [ESR]), regular biochemical testing, a skin test [Mantoux], a chest X-ray, and an (USG).

Results: There were 50 patients with abdominal TB (mean age 35.25 ± 3.69 years; 20 females, 30 men). It showed that abdominal discomfort and weight loss were the most common of them. Anemia was found in 35 patients, which is 70% of the total, an increased ESR was found in 33 patients, which is 66% of the total, and hypoalbuminaemia was found in 25 patients, which is 50% of the total. Additional results included leucocytosis in three individuals (representing 6%), a positive CRP in nine patients (representing 18%), and increased transaminases in eleven patients (representing 22%). Four of these 12 patients were chronic HBV carriers, two of them had immunity to HBV, and two of them tested positive for anti-HCV antibodies. Seven individuals, or 14%, had completely normal results on all of their laboratory testing. Ten (or twenty percent) of the patients had positive results from the Mantoux skin test. Ascites was present in 21(42%) of the cases. The ascitic fluid analysis that was done on those individuals revealed that it had an exudative nature. Moreover, acid-fast bacilli were discovered in the smear of just one patient, and BacTec was only used to culture the ascitic fluid of one patient (4%).

Conclusion: When it comes to the diagnosis of abdominal tuberculosis, neither the clinical symptoms, laboratory, radiographic, and endoscopic procedures, nor the bacteriological and histological results give a gold standard by themselves.

Keywords: Ascites, abdominal tuberculosis, CRP.

Introduction

From the beginning of time, tuberculosis (TB) has been one of the most significant contributors to poor health, and now it is one of the most common infectious agents that results in mortality. While it most often affects the lungs, it may also manifest in other locations. Around 45 percent of the world's TB burden may be attributed to the Indian subcontinent. Around fifteen percent of all cases of tuberculosis are classified as extrapulmonary tuberculosis (EPTB). [1] EPTB may manifest in a wide variety of ways, and it has the potential to result in serious illness and long-term impairment. The majority of patients with abdominal tuberculosis appear with nonspecific symptoms, which often result in a delay in treatment. This delay may result in morbidity and other life-altering problems. [2] The majority of the resources that are available for research, diagnosis, and management are directed towards pulmonary tuberculosis because it is a major public health concern and a leading cause of mortality. This leaves extrapulmonary tuberculosis (EPTB) and abdominal TB in particular with fewer opportunities. [2,3]

The major mechanisms of infection in patients with abdominal tuberculosis include ingesting contaminated sputum, hematogenous spread from a pulmonary focus, lymphatic spread from infected lymph nodes, and contiguous spread from neighbouring organs. Swallowing infected sputum is another key method of transmission.[4] Because the symptoms of abdominal TB are related to the infected site, such as abdominal pain and diarrhoea, which are seen in luminal TB, and ascites and abdominal distension, which are commonly seen with peritoneal TB, a primary care provider, such as a general physician, is in a unique position to determine the outcome of these patients.[5]

Aims and Objective

The aim of the present study was to evaluate the clinical features and diagnostic methods of abdominal TB, including luminal, peritoneal, nodal, visceral, and mixed TB.

Materials and methods

It was determined that abdominal TB affected 50 individuals. Each patient had a full battery of diagnostic procedures, including an in-depth interview and physical examination, blood work (including a complete blood count and erythrocyte sedimentation rate [ESR]), regular biochemical testing, a skin test [Mantoux], a chest X-ray, and an (USG). When these first tests came back negative, a diagnostic algorithm was employed based on the presence of certain symptoms, such as ascites, upper GI symptoms, chronic or bloody diarrhoea, a change in bowel habits, malabsorption, and further suspicious lesions in other regions of the body. Mycobacterium tuberculosis testing included removal of ascitic fluid if present. Individuals with complaints of dyspepsia, stomach discomfort, vomiting, GI bleeding, or gastric distention had an esophago-gastroduodenoscopy. During the endoscopy, three to four samples of the stomach were collected from the corpus and antrum and analysed for granulomas and mycobacterium tuberculosis. Stool was tested for bacilli and culture for mycobacterium tuberculosis was done if the patient showed symptoms indicative of intestinal TB, such as persistent diarrhoea, bloody stools, or a change in bowel pattern. The next step was a colonoscopy or, if the patient had difficulty, a barium enema. Should any lesions be discovered during a colonoscopy, eight to ten samples would be obtained for histopathologic and microbiological analysis. Small bowel series were performed to check for signs of small bowel involvement, such as malabsorption. Abdominal CT was used to assess any abnormalities seen in the abdominal organs, lymph nodes, mesentery, and peritoneum during abdominal USG. A CT scan of the abdomen was not performed since it is not standard practise. Mediastinoscopy, laparoscopy, or laparotomy was also done if required to investigate any other lesions of concern. If abnormalities were discovered, several biopsies were obtained and sent out for bacteriological and histological examinations. All cases were investigated by attempting a microbiological diagnosis. Histopathological findings of characteristic caseating granulomas were recognised as conclusive evidence of TB in cases when no microbiological diagnosis could be satisfied despite extensive testing. Patients with no definitive diagnosis but a strong clinical suspicion of abdominal tuberculosis were included in a therapeutic trial of anti-TB therapy with four drugs (Rifampicin, Ethambutol, Isoniazid, and Morphozinamide), and their response to treatment was assessed three months later. Each patient was given the conventional four-drug regimen (streptomycin or ethambutol, rifampin, pyrazinamide, isoniazid) for a period of 9-

12 months before being reevaluated. Mycobacterium tuberculosis was identified in any samples, thus a further 9-12 months of therapy was provided if symptoms did not improve.

Results

There were 50 patients with abdominal TB (mean age 35.25 ± 3.69 years; 20 females, 30 men). Ten patients (20%) had a known history of pulmonary tuberculosis that was documented in their medical records. Thirteen (26%), or first-degree relatives of the index patient, had a history of tuberculosis. There was a wide range of symptom durations among patients, with a mean of 7.25 ± 1.69 days. Table.1. A summary of the presenting symptoms and indicators is provided in Table 2. It showed that abdominal discomfort and weight loss were the most common of them.

Table 1 Basic parameter of the Patients

Gender	Number	Percentage
Male	30	60
Female	20	40
Age	35.25 ± 3.69	
Past History	10	20
Family history	13	26
Mean duration of symptoms	7.25 ± 1.69	

Table 2 Symptoms And Signs

Symptoms and signs	Number of patients	Percentage (%)
Abdominal pain	26	52
Weight loss	26	52
Ascites	19	38
Diarrhea	17	34
Cough and sputum	10	20
Vomiting and nausea	9	18
Fever	7	14
Perforation	5	10
Bone pain	4	8
Night sweats	4	8
Urinary symptoms	2	4
Mass in the lower quadrant	2	4
Cervical pain	2	4
Evisseration following laparotomy	2	4
Incidental	1	2
Operation because of brid ileus	1	2

Anemia was found in 35 patients, which is 70% of the total, an increased ESR was found in 33 patients, which is 66% of the total, and hypoalbuminaemia was found in 25 patients, which is 50% of the total. Additional results included leucocytosis in three individuals (representing 6%), a positive CRP in nine patients (representing 18%), and increased transaminases in eleven patients (representing 22%). Four of these 12 patients were chronic HBV carriers, two of them had immunity to HBV, and two of them tested positive for anti-HCV antibodies.

Seven individuals, or 14%, had completely normal results on all of their laboratory testing.

Ten (or twenty percent) of the patients had positive results from the Mantoux skin test. Ascites was present in 21(42%) of the cases. The ascitic fluid analysis that was done on those individuals revealed that it had an exudative nature. Moreover, acid-fast bacilli (ARB) were discovered in the smear of just one patient, and BacTec was only used to culture the ascitic fluid of one patient (4%).

The chest X-rays of 18 patients (or 36%) revealed lesions that were consistent with active pulmonary TB. These lesions included fibrocavitary lesions, effusions, and lymphadenopathies. Thorax CT was performed on these individuals, and the results revealed that all of them had lung abnormalities such

as pleural involvement, lymphadenopathy, or nodular infiltration. As compared to a chest X-ray, the thorax CT did not give any more information.

Every patient had an abdominal USG to complete the evaluation. The results of the USG on 50 different patients are outlined in Table 3. Forty of these individuals who had shown aberrant results in USG were subjected to an abdominal CT examination.

Table 3 Abdominal ultrasonographic findings (may be more than one in each patient) and their frequency in the patients (n = 50)

Abdominal USG findings	Number of patients	Percentage (%)
Normal	10	20
Ascites	27	54
Hepatomegaly	9	18
Thickening	6	12
Atrophic	4	8
Abdominal	4	8
Hepatosteatorsis	4	8
Splenomegaly	2	4
Pericardial	2	4
LAP	1	2
Calcifications	1	2

Among these patients, the most significant CT findings included ascites in 15 (37.5%), thickening of the mesentery in 10 (25%) cases, abdominal lymphadenopathy in 5 (12.5%), omental pathology in 5 (12.5%), lymphadenopathy in the liver hilum, cholelithiasis, destruction in the sacral bone, ovary cyst, and splenomegaly each for 2 (5%) occurrences, and lymphadenopathy in the liver. Just five individuals, or 12.5% of the total, came with a CT test that was fully normal.

A follow-up examination of the small intestine was performed on ten patients, and in one of those individuals, the bowel had been severely reduced in length as a result of extensive surgical resection. Three patients had a barium enema, and the results showed that the gut walls of two patients had irregularities and ulcers.

Endoscopies of the upper gastrointestinal tract were carried out on 30 individuals, of whom 20 had results that were not specific. Biopsies of the stomach were collected from all of the patients, however there was no evidence of acid-resistant bacilli (ARB) or granulomas in any of the tissue sections.

Colonoscopies were carried out on a total of 34 individuals. In 15 of the patients (44.12%), there was nothing abnormal found. In these individuals, stricture, polypoid lesions, granulomatous signs in terminal ileum, and rectal fistula were each identified on two instances each. Ulcers were found in 18 (52.94%) of the patients, whereas nodules were found in 4 (11.76%) of the patients.

Four patients had laparoscopy, and all of them revealed favourable results after the procedure. These individuals were found to have dilated bowel loops, thickening in the mesentery, several ulcers and tubercles on the peritoneum, all at the same time. Biopsies taken from the peritoneum of three of these individuals provided conclusive evidence that they had TB. Due to the patient's very prolonged prothrombin time, a peritoneal biopsy was unable to be performed on the fourth individual since it would have carried an extremely high risk of bleeding.

For the purpose of confirming the diagnosis, a mediastinoscopy was conducted on one patient, and a fine needle aspiration biopsy of the lymphadenopathy in the liver hilum was performed on another patient. Just two patients out of the total series needed biopsies obtained during an operation while they were under general anaesthesia for the diagnosis to be clarified.

Individuals diagnosed with tuberculosis of the abdomen were classified into one of three categories, depending on the type of involvement. 25 patients, or 50%, were diagnosed with intestinal TB, 18 patients, or 36%, were diagnosed with tuberculous peritonitis, and 7 patients, or 14%, were diagnosed with tuberculous lymphadenitis.

Microbiologic testing was successful in proving the diagnosis of abdominal TB in 9 individuals, which is an 18% success rate. Four of these patients had positive ARB smears of their sputum, two of

them had ARB in the discharge from their enterocutaneous fistulas, two of them had ARB in their ascitic fluid, and one of them had ARB in their biopsy material.

Nevertheless, none of these patients exhibited a positive culture when tested using the Lowenstein medium. The BacTec test came up positive for three individuals. Histopathology was able to diagnose 31 individuals (representing 62% of all cases), while a favourable response to antituberculous therapy was able to identify the remaining nine patients (representing 32% of all cases).

After therapy for 9-12 months, 46 individuals were found to be symptom-free. In addition, during the subsequent follow-up visits that took place after six months, there were no abnormal signs found. Although antituberculous treatment with four agents (streptomycin or ethambutol, rifampin, pyrazinamide, and isoniazid) was started, the disease had a complicated course in the remaining four patients. Mammalian abscess developed in one of them, osteomyelitis and enterocutaneous fistula in the second patient, and incisional enterocutaneous fistula in the final patient.

Discussion

Due to the reappearance of multidrug-resistant tuberculosis as well as the pandemic of AIDS, abdominal tuberculosis is once again on the increase all over the globe. The immigration of people from less developed nations, where the disease is more prevalent, has also contributed to the worsening of this health issue. Despite this, most textbooks only devote a few lines to discussing this subject; hence, our existing understanding of abdominal tuberculosis has to be revised. In past investigations, several methodologies' sensitivities have been hypothesised, but no concrete conclusions have been drawn from those hypotheses. In the current study, our objective was to investigate the relative reliability of these diagnostic tools in the context of the diagnosis of abdominal tuberculosis, a form of tuberculosis with a particularly stealthy progression. The clinical and laboratory signs of abdominal TB are proven to be nonspecific in this research, leading to the suspicion of simply a chronic infectious illness. This was shown both in the clinical setting and in the laboratory.

In the process of diagnosing abdominal tuberculosis, three diagnostic steps have been studied. The clinical assessment of the patient and the radiologic examination are the first two steps, and both of these stages provide indirect evidence of the illness. At the third step, the intrusive procedures that are used to get direct evidence are used. However, diagnosing tuberculosis presents its own unique challenges, despite the fact that these evidences typically turn out to be fairly straightforward in practise.

There have been many studies done in the past that have defined the vague nature of symptoms[4,5], and the radiographic presentation of this disease, which frequently mimics the appearance of many other conditions, has already been described[6,7]. It has been stated that the combination of a mesenteric thickening of 15 mm with associated mesenteric lymphadenopathy is a prominent sonographic finding in abdominal TB[8,9], but our study was unable to confirm this finding. In the abdominal ultrasonography, we found findings that were relatively nonspecific, such as ascites and hepatomegaly. However, it has been shown that certain CT characteristics of abdominal TB are helpful in making the diagnosis [10], and combining certain CT findings may make it easier to distinguish TB peritonitis from malignant diseases of the peritoneum [11]. The same can be said for this study; the abdominal CT scans of eighty percent of the participants yielded positive results. The findings from CT scans have been shown to be equivalent to those from USG studies that have been published [4]. The results of the abdomen CT tend to give more objective data regarding the illness in comparison to the findings of other radiological modalities.

The intrusive diagnostic instruments offer the distinct benefit of being able to examine the lesion itself either macroscopically or microscopically, depending on the desired level of detail. In therapeutic settings, however, even these more direct approaches come with their own unique set of limitations.

Colonoscopic findings of abdominal tuberculosis are complicated due to segmentary involvement of the illness [12] and due to a poor yield of granulomas as a consequence of submucosal disease. [S]egmentary involvement of the disease makes it difficult to detect granulomas. Granulomas were seen in 44% of the patients who participated in the research that was conducted by Singh and associates[13], and 19% of those individuals had caseation. It was possible for us to identify colonoscopic anomalies in 55.89% of the individuals, and TB could be confirmed histopathologically.

Nonetheless, a colonoscopy is still required in order to acquire tissue for the purpose of culturing the infectious agent, which is an extremely vital step in the process of diagnosing intestinal TB.

Endoscopic biopsies have a sensitivity that may vary anywhere from 30 to 80%, and Bhargawa et al. [14] recommend getting 8 to 10 biopsies for histology and 3 to 4 specimens for culture.

Direct fine needle aspiration cytology is another testing method that may be used on individuals who have palpable abdominal tumours [5]. Since we were unable to palpate these masses in any of our patients, it is impossible for us to employ this procedure on any of them.

It has been claimed that the laparoscopic pattern and biopsies collected from the peritoneum are more beneficial, and that this result might potentially be employed for the treatment of patients with abdominal TB without any histopathologic or bacteriologic proof [15]. In the current investigation, laparoscopy was done on four patients, and the diagnosis was validated histopathologically in three of those patients and macroscopically in the fourth patient. As a result, it seemed to be a very sensitive diagnostic tool in all of the patients that were chosen. Even a small laparotomy was revealed to be the most sensitive and specific diagnostic method in cases with abdominal tuberculosis in a research that was conducted by Lisehora et al [16].

In traditional practise, a microbiological and culture confirmation of mycobacterium tuberculosis is necessary to establish a diagnosis of abdominal tuberculosis; however, in many investigations, the diagnosis may be confirmed using histological examination. [15] In addition, the diagnosis was able to be obtained histopathologically in 62% of the patients who participated in the present investigation. Histopathological diagnosis cannot be regarded as standard if the isolation of Mycobacterium tuberculosis is considered to be a "sine qua non" for this infectious illness according to Koch's postulates. On the other hand, microbiological isolation of the causative culprit in individuals with abdominal TB is quite uncommon. It has consistently been below that threshold throughout all of the series that have been reported. The possibility of isolating bacilli in the contents of an endoscopic biopsy has been posited as being as low as nil [12,13]. It is well known that the mycobacterium that causes TB may be found in the faeces of otherwise healthy individuals on rare occasions. Because of this, specialised cleaning methods and the BacTec technology are required in order to cultivate this agent [17]. It is interesting to note that despite utilising Lowenstein medium, which was supposed to be the best growing medium for this bacterium, we were unable to establish whether or not any of our patients had the Mycobacterium TB bacteria. Even in patients who had a positive direct smear for ARB, the culture in Lowenstein did not provide a positive result; however, the BacTec approach showed a positive result in the culture of three patients. PCR was performed on endoscopic biopsy specimens acquired from a patient who had chronic diarrhoea, and the result was determined to be positive. This information was included in a case report written by Anand and associates [17].

The isolation of Mycobacterium tuberculosis using BacTec or PCR is a promising approach for the future; nevertheless, even these methods are a long way from being perfect since they are not sufficient for the treatment of the illness due to the absence of culture. In every case of extrapulmonary tuberculosis, not only histopathological but also microbiological confirmation should still be sought in order to break the vicious circle of multidrug resistance. This is something that we believe needs to be improved upon in our procedures for isolating the bacterium, and we also believe that this needs to be done.

It has been shown that individuals with abdominal TB are more likely to have a history of pulmonary tuberculosis or a family history of the disease [19], and this was also the case in our research. It is well known that individuals who harbour multidrug resistant pathogens acquired such germs after undergoing many sessions of therapy with different medications that were unsuccessful [20]. Hence, it is possible to draw the conclusion that the majority of individuals with abdominal TB have a primary resistance to the chemotherapy that is often used.

The isolation of Mycobacterium tuberculosis is also crucial for susceptibility testing, which are currently conducted on every patient with pulmonary tuberculosis because of the high prevalence of antibiotic resistance [20].

In light of our clinical experience with abdominal tuberculosis, we are able to place an emphasis on patients who have a high resistance to treatment due to the protracted nature of the illness as well as the high incidence of sequelae. In the event that a more effective method of isolating the organism is not discovered, as well as in the event that drug resistance cannot be identified prior to initiating antituberculous therapy, a rise in the number of newly diagnosed cases of tuberculosis is certain to

occur. It is also possible that in the future we may face the challenge posed by mutant strains. It is a well-established fact that two distinct mutant strains are able to coexist inside the same individual patient, which further complicates the issue of resistance. These facts should be taken into account for future directions in the diagnosis and treatment of abdominal tuberculosis even if the molecular fingerprinting of mycobacterium tuberculosis may assist to overcome these challenges to some degree [21].

Conclusion

When it comes to the diagnosis of abdominal tuberculosis, neither the clinical symptoms, laboratory, radiographic, and endoscopic procedures, nor the bacteriological and histological results give a gold standard by themselves. Yet, an algorithm of these diagnostic procedures leads to a noticeably improved level of accuracy in the identification of this sneaky illness, which principally requires a clinical awareness of this significant health issue.

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