

Abdominal tuberculosis

On-going challenge to gastroenterologists

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ABSTRACT

Objective: The aim of this study is to record the observations and experience on the diagnosis and management of abdominal tuberculosis (TB) and to highlight the difficulties in the diagnosis and management of this condition.

Methods: Two hundred consecutive patients attending the Gastroenterology Department of the King Khalid National Guard Hospital, Jeddah, Kingdom of Saudi Arabia between May 1991 and May 2001, suspected with abdominal TB were investigated. A detailed clinical history and physical examination were obtained. Data of 75 confirmed cases of abdominal TB were analyzed.

Results: The most common presenting symptoms were anorexia (84%), abdominal pain (84%) and weight loss (72%). Abdominal tenderness was the most common clinical finding, followed by ascites and abdominal mass (42%). The chest radiograph suggestive of pulmonary TB was diagnosed in 24 patients (32%). Computed tomographic (CT) scanning revealed abnormalities in all

51 patients who underwent the procedure, while positive findings were observed by abdominal ultrasound in 66% of the tested patients. Histopathological examination of patients showed tuberculous granuloma, while acid fast bacilli were seen in 34%. *Mycobacterium tuberculosis* was identified by microbiological methods in 60% of patients.

Conclusion: A high index of clinical suspicion is required to make an early diagnosis of abdominal TB. Suspicion should be aroused, particularly in patients having a combination of anorexia, abdominal pain, weight loss and ascites. Diagnosis requires the utilization of a combination of various diagnostic procedures especially abdominal ultrasound, CT scan and endoscopy, which provides a high diagnostic yield in this disease. A normal chest radiograph does not exclude the presence of abdominal TB. A timely use of laparoscopy are often required to prevent surgical intervention.

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Tuberculosis (TB) is a common disease with a worldwide distribution which can affect any organ in the body. It can mimic any intra-abdominal condition; hence, a high index of suspicion is required if an early diagnosis is to be made, more so in developed countries where the disease is not prevalent. The World Health Organization (WHO) estimates that more than 10 million new cases occur annually, and over 2-3

million mortality annually due to TB.¹⁻³ It probably produces the highest mortality rate of any bacterial disease. The advent of human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) has led to the resurgence of pulmonary TB, with increasing mortality. Although *Mycobacterium tuberculosis* (*M. tuberculosis*) can affect any organ in the abdomen, the most common sites are the peritoneum and the ileocecal region as

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well as the gastrointestinal tract, abdominal lymph nodes and the liver.⁴ It has been reported that approximately 50% of abdominal TB occurs in the gastrointestinal tract, 43% in the peritoneum and 7% in the lymph nodes.⁵ Tuberculosis is caused by *M. tuberculosis* and *Mycobacterium bovis* (*M. bovis*). The latter has reduced considerably this century due to pasteurization of milk and better hygiene with higher standard of living. The incidence of TB was low in the first half of this century in industrialized countries. However, there was resurgence at the beginning of the second half of the century due to the advent of AIDS and HIV. There were no signs of similar decline in the incidence of gastrointestinal TB worldwide. The annual incidence of active TB in the Kingdom of Saudi Arabia was estimated to be 30 cases per 100,000.⁶ However in the study by Milaat et al,⁷ they found the incidence of TB in the Jeddah region as 63.4 per 100,000 whilst outside Jeddah area it was 47.0 per 100,000. The exact incidence of abdominal TB in KSA has not been determined, but it has been reported to be highly prevalent especially in the Jeddah area, probably as a result of high incidence of pulmonary TB.^{5,6,8,9} The overall incidence of abdominal TB is largely unknown particularly in less industrialized countries. The reasons are underreporting, misdiagnosis as well as confusion of TB with Crohn's disease.⁵ One of the earliest studies in the KSA has estimated the incidence of abdominal TB to be approximately 15.8% (130/820) of tuberculous patients investigated.¹⁰ It also showed that patients with alimentary tract TB accounted for the second most common site of extra-pulmonary tuberculous involvement. Later, there were very few reports of the experiences of this disease in KSA and all of them were over 10-year-old.^{8,11-13} Recently, 2 studies in 1996¹⁴ and 2001,¹⁵ reported the clinical and radiological manifestations of abdominal TB in Riyadh, the Central region of KSA. Consequently, a review of the present situation in the Western region is warranted and timely, in view of the renewed interest in TB worldwide.

The aim of this study is to record our observations on the presentation, diagnosis and management of this disease in our hospital, located in the Western region of KSA, to evaluate the usefulness of the old as well as the new diagnostic procedures currently available and to stress the point that high index of clinical suspicion is needed to reach the diagnosis of this potentially treatable disease.

Methods. Our study population was drawn from 200 consecutive patients who were suspected to have abdominal TB attending the Gastroenterology Clinic of the King Khalid National Guard Hospital, Jeddah, KSA between May 1991 and May 2001. Patients who fulfilled

any of the following criteria were included in the study: (i) caseating granulomas demonstrated histologically. (ii) positive cultures of *M. tuberculosis* or *M. bovis* from intra-abdominal biopsy material or ascitic fluid and (iii) a combination of clinical, radiological and hematological abnormalities which strongly suggested intra-abdominal TB and which completely resolved on anti-TB treatment alone. Between May 1991 and May 2001, 75 patients out of 200 patients fulfilled the above criteria for abdominal TB. After a detailed clinical history and physical examination, their biodata were obtained. Investigations were carried out included full blood count, liver function tests and sputum examination for *M. tuberculosis* when pulmonary TB was suspected. A chest x-ray was performed in all patients. Relevant radiological investigations of the abdomen were carried out when indicated including abdominal ultrasound, barium meal, small bowel series, barium enema and CT scan of the abdomen. When a gastrointestinal tract TB was suspected, the diagnosis was reached by endoscopy. The diagnosis was made through surgery only in patients who had complications such as intestinal obstruction or when the lesions were beyond the reach of the endoscope. When TB was suspected to be involving extra-intestinal, intra-abdominal organs such as peritoneum, lymph nodes, abscess, liver, spleen or pancreas the diagnosis was reached by needle biopsy or aspiration, mostly under radiological guidance. In such cases, surgery was performed to reach the diagnosis only when the needle biopsy or aspiration was negative or considered to be risky. Histopathological and microbiological examinations were carried out on all surgical materials, biopsy specimens and/or aspirates obtained from patients. Anti-TB medications in standard dosages were given to all patients entering the study for periods ranging from 6-12 months. All patients were followed up regularly during treatment.

Results. Among 75 patients admitted into the study, there were 65 Saudis and 10 non-Saudis, which were made of 42 males and 33 females with a ratio of 1.3:1. Ages of patients ranged from 19-94 years, with a mean of 52 years. The most common presenting symptoms were anorexia and abdominal pain which were observed in 63/75 (84%) each. Weight loss was the presenting symptom in 54/75 (72%) of patients. Low grade fever occurred in 27/75 (36%), while high grade fever was recorded only in 12/75 (16%). Other symptoms included vomiting (36%), sweating (36%), cough (26%), diarrhea (16%) and dysphagia (4%). Abdominal tenderness was the most common clinical sign which was observed in 55/75 (74%), followed by ascites and abdominal mass in 32/75 (42%) each. Other clinical signs included intestinal obstruction,

persistent sinuses and appendicitis in 7/75 (9.3%) each, followed by gastric outlet obstruction 6/75 (8%) and peripheral lymphadenopathy 5/75 (6%). Laboratory investigations showed 34/75 (46%) each had hemoglobin of <11 g/dl and erythrocyte sedimentation rate of >30 mm/hour, while 12/75 (16%) each showed albumin <30 g/dl and high alkaline phosphatase. Other liver functions impairment occurred in 11/75 (14%).

Out of 75 patients, 24 (32%) had chest radiograph suggestive of pulmonary TB and of these *M. tuberculosis* were recovered in the sputum of 20 patients. Other radiological procedures carried out when indicated included CT scan, which demonstrated various abnormalities in all the 51 tested patients. The Barium meal showed abnormalities in 8 of 11 patients (71%), while positive findings were observed in abdominal ultrasound in 36/54 (66%) patients. Barium enema was positive in 8/12 (62.5%), while small bowel series was positive in 9/18 (50%). Histopathological examination of materials obtained from patients showed tuberculous granuloma in 63/75 (84%), while acid fast bacilli (AFB) were seen in 26/75 (34%). *Mycobacterium tuberculosis* was cultured and identified microbiologically from the abdominal specimens in 45/75 (60%). When a gastrointestinal tract TB was suspected, the diagnosis was reached by endoscopy in 18 patients. Among 11 patients who underwent esophagogastroduodenoscopy 82% (9/11) had positive biopsies, while among the 10 who had colonoscopy 70% (7/10) had histologically positive biopsies, 2 of them from the terminal ileum. Out of the 4, who had enteroscopy 50% (2/4) had positive biopsies from the proximal jejunum. The diagnosis was made through surgery in 8 patients who had intestinal obstruction or when lesions were beyond the reach of the endoscopes (Table 1). When TB was suspected to be involving extra-intestinal, intra-abdominal organs such as peritoneum, lymph

nodes, abscess, liver, spleen or pancreas the diagnosis was achieved by needle biopsies in 12 patients, aspiration in 18 patients, surgery in 21 patients (Table 2). Most of the 8 patients who underwent surgery for gastrointestinal tract, TB were found to have other intra-abdominal organs involvement, commonly peritoneum and/or lymph nodes. Surgery was performed in another 13 patients with extra-intestinal, intra-abdominal TB, when needle biopsies or aspirations were negative or considered to be risky. In this series, we found 88 organs involvement in 75 patients due to some cases were found to have a multi-organ involvement. In few patients who had no tissue histological or microbiological diagnosis, a combination of clinical, radiological and hematological abnormalities which strongly suggested intra-abdominal TB such as splenic TB, and which completely resolved on anti-TB treatment alone were regarded as having evidence of intra-abdominal tuberculous infection. Out of 75 patients, 21 (28%) underwent laparoscopic or open surgery. At surgery, 17 patients had adhesions, inflammation or whitish nodules. A thickened peritoneum was found in 15 patients. Caseation and tumor-like masses were found in 12 patients. The surgical procedures included biopsies and/or aspiration in 15 patients, resection in 6 patients, bypass procedure and drainage of abscesses in 3 patients. Chest x-ray suggestive of TB was found in 32% (24/75) of patients, while 6% (5/75) had a peripheral lymph node involvement. No military TB was encountered in any of the patients. In our series, we found organs involved in the diagnosis of TB were esophagus (2), stomach (3), duodenum (5), small bowel (10), colon (6), peritoneum (26), lymph nodes (9), abscess (9), liver (10), spleen (5) and pancreas (3). Some patients had a multi-organ involvement (Tables 1 & 2; Figures 1-4). None of our patients were positive for HIV infection.

Table 1 - The diagnostic yield of endoscopy compared with surgery in gastrointestinal tract tuberculosis.

Organs	N of cases	Positive by endoscopy	Positive by surgery
Esophagus	2	2	0
Stomach	3	3	0
Duodenum	5	4	1
Small bowel	10	4	6
Colon	6	5	1
Total	26	18	8

Table 2 - Methods of diagnosing extra-intestinal, intra-abdominal tuberculosis (TB).

Sub-heading	N of cases	Needle biopsy or aspiration	Surgery (laparoscopic or open)	Complete response to anti-TB drugs
Peritoneum	26	12	6	8
Lymph nodes	9	2	7	-
Abscess	9	6	3	-
Liver	10	8	2	-
Spleen	5	0	2	3
Pancreas	3	2	1	-
Total	62	30	21	11

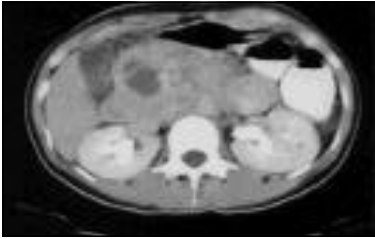


Figure 1 - Abdominal computerized tomography scan showing a multi-lobulated non-enhancing hypodense area in the head of the pancreas measuring 3.2 cm x 2 cm, proven to be due to *Mycobacterium tuberculosis*.



Figure 3 - Abdominal computerized tomography scan showing multiple hypo dense rounded non-enhancing nodules of the spleen, due to tuberculosis.



Figure 2 - Double contrast barium enema showing 8 cm long stricture in the colonic hepatic flexure and another 3 cm long one in the ascending colon, due to tuberculosis.



Figure 4 - Abdominal computerized tomography scan showing multiple, variable sizes, non-enhancing hypodense lesions of the left lobe of the liver, the largest measuring 2cm x 2cm with ascitis, due to *Mycobacterium tuberculosis*.

All patients received the standard anti-TB medications and 72 out of 75 patients completed the treatment. The length of treatment varied from 6 months (45 patients); 9 months (17 patients) to 12 months (10 patients). At follow up, the average weight of all patients before treatment was 46.5 kg and this rose to an average weight of 54.5 kg after the treatment. The percentage of weight gain in all patients was 17%. The overall response to therapy was excellent. We encountered no mortality or major morbidity among our patients.

DISCUSSION. In developed countries, the upsurge of TB has been reported due to the advent of immigrant population and the increasing prevalence of AIDS. However, in developing countries, the increase has been attributed mainly to the high prevalence of AIDS.^{11,16-18}

The pathogenesis of abdominal TB has been well described.^{5,19,20} The route of infection occurs by one of the following mechanisms: (a) swallowing of infected sputum, particularly in patients with severe pulmonary disease; (b) hematogenous spread from active pulmonary disease or miliary TB; (c)

ingestion of infected raw milk or milk products especially from goats and camels and (d) contiguous spread from adjacent abdominal organs.^{5,21-23} The evolution of the disease in a particular individual depends on the route of infection, site of involvement and the degree of immunological competence of the patient.

Abdominal TB has protean manifestations and there are no specific clinical features, peculiar to the disease.¹⁰ However from our observation in this study, suspicion should be aroused, particularly in patients having a combination of anorexia, abdominal pain, weight loss and fever. In our series, abdominal tenderness was the most common clinical finding in 74% (55/75), followed by ascites and abdominal mass in 42% (32/75). The presence of these signs should prompt the suspicion of intra-abdominal TB in the differential diagnosis and hence the utilization of the wide array diagnostic procedures currently available.

The diagnosis of abdominal TB over the years has considerably improved since the introduction of

ultrasound radiology and CT scan. Although there are no radiological features pathognomonic of abdominal TB, nevertheless, there are some characteristic features which point to the diagnosis in those patients with typical symptoms and signs suggested above and therefore, performance of more detailed investigations were needed.¹¹ The chest radiograph is useful in identifying patients with associated pulmonary TB. In our series, we encountered chest radiograph suggestive of pulmonary TB in 24 patients (32%). The majority of patients with abdominal TB shows no evidence of pulmonary involvement. In our study, the CT scan demonstrated various abnormal pathological features suggestive of TB in all the 51 patients in whom the procedure was carried out, which pointed to the diagnosis of intra-abdominal TB. We found it as the most useful diagnostic radiological procedure in this series. Furthermore, localization of the lesion was better achieved with the CT scan. The ultrasound examination of the abdomen also provided a good diagnostic yield in abdominal TB.

Table 3 - Finding's comparison in the present study with previous studies in the Kingdom of Saudi Arabia.

Symptoms, signs, site/organ involvement	Present study N=75	Yasawy et al ¹² N=55	Al-Quorain et al ⁸ N=65	Munef et al ¹⁵ N=46	Lundstedt et al ¹⁴ N=112
Most common symptoms	Anorexia, abdominal pain, weight loss, low grade fever, vomiting	Weight loss, low grade fever, anorexia, abdominal pain	Abdominal pain, anorexia, weight loss, fever, night sweats	Fever, abdominal pain, weight loss, abdominal swelling.	? ?
Most common signs	Abdominal tenderness, pallor, ascites, abdominal mass	Pallor, abdominal tenderness, Hepatomegaly, RIF mass	Abdominal pain tenderness, hepatomegaly, ascites, splenomegaly	Fever, ascites, abdominal mass, doughy abdomen.	-
Upper gastrointestinal tract					
Esophagus	2	1	-	-	1
Stomach	3	2	2	-	-
Pylorus	0	1	-	-	1
Duodenum	5	0	1	-	6
Small bowel	10	18	-	3	10
Large bowel					
Colon	6	10	-	-	-
Paracecal mass	-	3	-	-	4
Rectum and anus	-	2	-	-	40
Peritoneum	26	21	-	19	8
Ileocecal	10	-	30	-	-
Omentum/adnexia	-	-	-	6	-
Organs					
Liver	10	11	11	-	13
Spleen	5	1	-	-	11
Pancreas	3	?	1	-	3
Lungs	24	12	17	7	63
Lymph Nodes	18	9	5	9	37
Abscess	9	?	-	-	-
Genitourinary organs					
Renal	-	1	-	-	35
	-	-	-	-	17

In this study, 66% (36/54) of patients with suggestive symptoms and signs were observed to have positive findings on ultrasound leading to the diagnosis of abdominal TB. Barium meal, barium enema and small bowel series were of limited use in the diagnosis of abdominal TB but more useful when lesions were located within the gastrointestinal tract.

None of the patients with abdominal TB showed any evidence of miliary spread of *M. tuberculosis*, although miliary TB usually occurs by hematogenous spread from a pulmonary lesion. In view of the various diagnostic modalities, diagnosis should not be based solely on clinical judgment. It has been recognized by many authors that neither clinical signs, laboratory, radiological and endoscopic methods nor bacteriological and histopathological findings provide a gold standard by themselves in the diagnosis of abdominal TB.²⁴

The confirmation of clinical diagnosis of any tuberculous lesion is either by demonstration of the characteristic tuberculous granuloma, or the isolation of *M. tuberculosis* from the specimens obtained from the lesion or a combination of both procedures. In this present series, histopathological examination of materials obtained from the suspected lesions showed tuberculous granuloma in 84% (63/75), while AFB were seen in 34% (26/75). A combination of both histopathological examination and microbiological methods has confirmed their usefulness in the establishment of a diagnosis in a majority of our patients. However, few patients did not have such a confirmation and the diagnosis was concluded on the basis of a high index of clinical suspicion, lack of an alternative diagnosis with a positive and complete therapeutic response to anti-TB therapy alone.

When the gastrointestinal tract TB was suspected, the diagnosis was reached by endoscopy in 69% (18/26), while in 31% (8/26) the diagnosis was made through surgery. Endoscopy was not only able to provide localization of the tuberculous lesion but it also obtain material for examination by histological and microbiological methods. Therefore, endoscopic procedures should be considered as the first choice for the diagnosis of gastrointestinal tract TB. Endoscopy has been reported to reach up to 50% positive yield in gastrointestinal tract TB and is a valuable tool in making the diagnosis.¹² Endoscopy is easy, relatively non-invasive and a highly informative diagnostic procedure in the appropriate clinical setting of gastrointestinal disorders. We found that surgery was needed only in cases of complications such as intestinal obstruction and when the suspected lesion was beyond the endoscopic reach such as distal small bowel. Surgery could have been prevented in a number of cases if endoscopy had been performed earlier during the investigation process.

Diagnosis of abdominal TB requires the utilization of a combination of various diagnostic procedures especially CT scan and abdominal ultrasound which have a high diagnostic yield in this disease particularly for extra-intestinal intra-abdominal TB. In such cases, we found that a radiologically guided biopsy or aspiration was also useful and should be considered as the procedures of choice in obtaining material to reach the diagnosis (Figures 1, 3). Surgery is more invasive and should be considered only in cases of complications; negative or risky radiologically guided biopsy/aspiration procedures. Therefore, an extra effort is needed to confirm the diagnosis of intra-abdominal TB, by obtaining tissue or material for histological and microbiological investigations, before starting treatment. A normal chest radiograph does not exclude the presence of abdominal TB. Interestingly, our study showed a larger number of unusual organ involvement compared with other published series, (Table 3)^{8,12,15} which included duodenal TB in 5 cases, TB of the esophagus in 2 cases, splenic TB in 5 cases (Figure 3) and TB of the pancreas in 3 cases (Figure 1). Lundstedt et al¹⁴ had reported 11 cases of TB of the spleen, which is more than in our present series. The overall response to standard treatment with anti-TB drugs was excellent as almost all our patients were fully recovered. Some of them had a combined surgical and medical management, thus confirming that abdominal TB is a potentially treatable condition, provided a high index of clinical suspicion was instituted and the diagnosis was made early.

Abdominal TB is still a prevalent disease particularly in developing countries, although it is treatable. Its presentation is frequently bizarre and remains a diagnostic dilemma for most physicians. A high index of clinical suspicion is required to reach an early diagnosis in abdominal tuberculosis. It should be entertained in differential diagnosis of unusual or bizarre gastrointestinal disorders as it may mimic any gastrointestinal and intra-abdominal disorders. It is considered as one of the most difficult diagnostic areas in gastroenterological practice. Current available diagnostic facilities should be properly utilized to reach the diagnosis before starting treatment.

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