

## Original Research Article

# Diagnostic value of computed tomography in the patients of abdominal tuberculosis

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### ABSTRACT

**Background:** Abdominal tuberculosis (ATB) is a rare form of extra-pulmonary tuberculosis which is clinically challenging. It remains difficult to diagnose due to the non-specific presentation, variable anatomical location and lack of sensitive diagnostic tools. To evaluate the diagnostic value of computed tomography (CT) in the patients of abdominal tuberculosis.

**Methods:** This was a retrospective diagnostic study design. The study was conducted among adults aged >18 years of either gender with clinical suspected ATB. The detailed demographic and clinical history was noted on pre-designed proforma. After obtaining the history, the patient was subjected to general physical and systematic examinations. The patients were then subjected to radiological evaluation that included chest X-ray, X-ray of abdomen and CT.

**Results:** A total of 55 clinically suspected adult cases of abdominal tuberculosis were enrolled in the study. 45 (81.8%) were found to be abdominal tuberculosis on final diagnosis. The abdominal tuberculosis was found to be higher in the age groups 21-40 years (64.4%). The abdominal tuberculosis was observed to be higher among female patients (62.2%) than males (37.8%). CT findings showed that the bowel wall thickening & narrowing and dilatation was found in 64.4% patients.

**Conclusions:** ATB is still a diagnosis to consider in individuals presenting with abdominal symptoms in the developing world, particularly in patients from ethnic minorities. Diagnosis can be challenging and requires a multidisciplinary approach with involvement from Radiology, Microbiology, Gastroenterology, Surgery, Infectious Diseases and Respiratory teams.

**Keywords:** Abdominal tuberculosis, Computed tomography, Diagnosis

### INTRODUCTION

Abdominal tuberculosis (ATB) is a rare form of extra-pulmonary tuberculosis which is clinically challenging. It remains difficult to diagnose due to the non-specific presentation, variable anatomical location and lack of sensitive diagnostic tools. ATB may occur anywhere within the abdomen, involving the gastrointestinal tract, visceral organs or peritoneum. There can be difficulty differentiating ATB from Cohn's disease clinically, endoscopically and histologically.<sup>1</sup> Both diseases have a

predilection for the small bowel, and cause chronic granulomatous inflammation.<sup>2</sup> There are significant clinical implications of incorrectly diagnosing tuberculosis (TB) and committing patients to a prolonged course of toxic chemotherapy; or missing TB with public health implications and causing life-threatening disseminated TB if immunosuppressant therapy is erroneously initiated.

Different authors have described abdominal CT as useful for the differential diagnosis of ascites when peritoneal

TB prevalence ranges between 30 and 90%. CT is a valuable diagnostic tool for finding lesions in the omentum, mesentery, peritoneum and mesenteric lymph nodes suggestive of peritoneal tuberculosis, yet these images may be difficult to distinguish from ovarian carcinoma or peritoneal carcinomatosis.<sup>3,4</sup> The present study was aimed to evaluate the diagnostic value of computed tomography (CT) in the patients of abdominal tuberculosis.

## METHODS

The present study was a retrospective diagnostic study design. The study was conducted among adults aged >18 years of either gender with clinical suspected ATB.

### Inclusion criteria

- Histological demonstration of caseating granuloma or acid-fast bacilli in the lesion or ascetic fluid
- Growth of Mycobacterium tuberculosis on culture of tissue or ascetic fluid
- Satisfactory therapeutic response to chemotherapy in patients with clinical/ laboratory/ radiological and operative evidence of ATB, combination of strong clinical suspicion and positive clinical/ laboratory/ histological/radiological features at extra-abdominal sites

The pregnant women, cases diagnosed for genitourinary tuberculosis and critically ill patients were excluded from the study. The consent was taken from each patient before enrolling in the study. The sample size was decided on the basis of feasibility of the study.

### Methods

The detailed demographic and clinical history was noted on pre-designed proforma. After obtaining the history, the patient was subjected to general physical and systematic examinations. The patients were then subjected to radiological evaluation that included chest X-ray, X-ray of abdomen and CT. A non-contrast and contrast enhanced CT examinations of patients was carried out using Somatom Definition CT Scanner. Scanning protocol and contrast administration was tailored according to the age, weight and built of the patient and clinical situation. Gastrointestinal tract was distended using plain water soluble contrast/milk given per rectally. Dual phase imaging, multiplanar reformation, maximum intensity projection and post-processing were done whenever required. The final diagnosis was made after considering the radiological findings with clinical and laboratory evaluations.

### Statistical analysis

The descriptive statistics are presented in the form of percentages. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

## RESULTS

A total of 55 clinically suspected adult cases of abdominal tuberculosis were enrolled in the study. The analysis of data was being done retrospectively based on the final diagnosis made. Out of the 55 suspected cases, 45 (81.8%) were found to be abdominal tuberculosis on final diagnosis.

**Table 1: Distribution of abdominal tuberculosis (ATB) patients according to age and gender.**

Age and gender	No. (n=45)	%
<b>Age in years</b>		
≤20	10	22.2
21-40	29	64.4
>40	6	13.3
<b>Gender</b>		
Male	17	37.8
Female	28	62.2

The abdominal tuberculosis was found to be higher in the age groups 21-40 years (64.4%) than ≤20 (22.2%) and >40 (13.3%) years. The abdominal tuberculosis was observed to be higher among female patients (62.2%) than males (37.8%) (Table 1).

**Table 2: Distribution of abdominal tuberculosis (AT) patients according to CT findings.**

CT findings*	No. (n=45)	%
Bowel wall thickening	29	64.4
Thickening – shouldering	25	55.6
Dilation of bowel	23	51.1
Narrowing and dilatation	29	64.4
Matting of bowel loops	8	17.8
Terminal ileum thickening/dilatation	16	35.6
RIF mass	21	46.7
IC junction thickening	9	20.0
IC junction>900	11	24.4
Enteroliths	8	17.8

\*Multiple response

CT findings showed that the bowel wall thickening & narrowing and dilatation was found in 64.4% patients. However, thickening – shouldering was seen in 55.6% patients. The findings showed that dilation of bowel and RIF mass was observed in 51.1% and 46.7% respectively. Terminal ileum thickening/dilatation and IC junction >900 was found in 35.6% and 24.4% respectively (Table 2).

## DISCUSSION

Abdominal TB is defined as TB infection involving the gastrointestinal tract, peritoneum, mesentery, abdominal lymph nodes, and solid visceral organs such as liver,

pancreas and spleen. It is sixth most common type of extrapulmonary TB, affecting primarily young adults. It is relatively rare in children.<sup>5,6</sup> While the ileocecal junction is the most common site reported for abdominal TB, the peritoneum and lymph nodes are the most common sites involved in children with abdominal TB.<sup>3,4,7</sup> *Mycobacterium tuberculosis* and *bovis* (transmitted through unpasteurized dairy products) are the main pathogens involved.

The diagnosis is often delayed because of its non-specific and protean clinical presentation.<sup>8</sup> It is a condition that mimics a variety of inflammatory, infectious and neoplastic gastrointestinal diseases.<sup>9</sup> Fever, abdominal pain and weight loss are the most common symptoms found in children with abdominal TB.<sup>8</sup> There are three patterns of clinical presentation depending on the predominant symptoms: intestinal (colicky abdominal pain, vomiting and gaseous abdominal distension), peritoneal (abdominal distension) and asymptomatic. Delay in diagnosis of abdominal TB is associated with high morbidity and mortality, if left untreated.<sup>10,11</sup>

In the present study, the incidence of ATB was 81.8%. The incidence of ATB was higher than the study by Agarwal et al in which the incidence of ATB was 65.4% (244/373).<sup>12</sup> This difference might be due to fever sample size in the present study. Patel et al also reported the incidence of ATB (63.7%) similar to Agarwal et al.<sup>12,13</sup> Further, the inclusion criteria in the present study itself was a strong basis for inclusion of highly suspicious cases of ATB and that is why such a high incidence of confirmed cases was observed.

In the present study, the majority of ATB patients were in the age group of 21-40 years. Zissin et al in their series reported the age of patients to be between 20-85 years while Oya et al in their series reported the age range of patients to be between 15-65 years.<sup>14,15</sup> The percentage of ATB was higher in females in the present study which was in agreement with the study by Uzonkoy et al.<sup>16</sup>

The CT findings in the present study showed that wall thickening was positive in higher number of ATB cases followed by terminal ileum thickening and IC junction thickening. The results of the present study was in agreement with other studies.<sup>17,18</sup>

In summary, ATB is still a diagnosis to consider in individuals presenting with abdominal symptoms in the developing world, particularly in patients from ethnic minorities. Diagnosis can be challenging and requires a multidisciplinary approach with involvement from Radiology, Microbiology, Gastroenterology, Surgery, Infectious Diseases and Respiratory teams. An increase in invasive samples being sent for microbiology may assist in improving the rates of a positive diagnosis.

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