



## Original Article

# Diagnostic Accuracy of Laparoscopy to Detect Gastrointestinal Tuberculosis

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### Abstract

**Introduction:** Tuberculosis (TB) is a re-emerging global emergency which is further complicated by gastrointestinal infection. Prompt diagnosis allows an early start to anti-TB therapy, with advantages for the patient and savings to the health system. We studied to evaluate the role of laparoscopy in establishing the diagnosis of the disease at an early stage. The objective of this study was to evaluate the role of diagnostic laparoscopy and histopathological findings of different presentations of gastrointestinal TB.

**Methods:** A prospective study was conducted over a period of 18 months from January 2021 to June 2022. A total of 26 patients were included in this study. All patients underwent diagnostic laparoscopy and the peritoneum, mesenteric lymph nodes, tubercle were compared with the histopathological findings. Data were collected from these patients by a preformed questionnaire and finally the data were analyzed.

**Results:** Out of 26 patients only 19(73.08%) cases were female. Most common symptoms were weight loss 26(100%), low grade fever 11(42.30%), abdominal pain 19(73.08%), abdominal distension 16(61.54%), abdominal lump 8(30.77%) and constipation 13(50%). In diagnostic laparoscopy commonest findings were ascites 16(61.54%), peritoneal thickening 21(80.77%), miliary tubercle 21(80.77%), mesenteric lymph nodes 16(61.54%) and band and adhesions 19(30.77%). On histopathological examination, epithelioid cells and multinucleated giant cells in tubercle 21(80.77%), caseating granuloma in lymph nodes 8(30.77%), acid-fast bacilli in ascitic fluid was 1(3.85%) found.

**Conclusion:** This study has shown the feasibility of laparoscopy in most of the patients with suspected TB with a low complication and conversion rate. It has a high yield in establishing the diagnosis of gastrointestinal TB.

**Key words:** Gastrointestinal TB, Diagnostic laparoscopy.

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### Introduction

Tuberculosis (TB) is a life-threatening disease affecting almost all the organs of the body. There were an estimated 10 million new cases (incidence) of TB<sup>1</sup>. Abdominal TB may occur in four forms: gastrointestinal TB, tuberculous peritonitis, mesenteric and retroperitoneal lymph nodes (tuberculous adenitis) and solid organs, for example, liver, spleen, kidney, and pancreas<sup>2,3</sup>. The majority of cases of tuberculous peritonitis result from the reactivation of latent tuberculosis foci. These foci follow hematogenous dissemination from the primary disease in the lung and remain latent. Tuberculous peritonitis is the result of silent foci reactivation<sup>4</sup>. The diagnosis of abdominal tuberculosis is difficult. The clinical features of

abdominal disease are vague and non-specific. The usual laboratory investigations and barium studies are often not helpful<sup>5</sup>. In TB peritonitis, histopathological examination is an appropriate method both for diagnosing TB and for ruling out other diseases such as malignancy. Histopathological confirmation of abdominal tuberculosis because of sub optimal, noninvasive access to the intraperitoneal pathology is difficult. Blind percutaneous needle biopsy of the peritoneum<sup>6</sup> laparoscopic biopsy<sup>7</sup> and peritoneal biopsy with a small grid iron incision in the right iliac fossa under local anaesthesia have been advocated but are hazardous to carry out except in patients with ascites. The value of laparoscopy in diagnosis of abdominal tuberculosis is well established. Some authors consider it as the most specific diagnostic test for abdominal TB<sup>8,9</sup> due to its advantage of histological confirmation<sup>10</sup>. The aim of this study was to detect abdominal tuberculosis with the help of diagnostic laparoscopy to establish its efficacy.

From a pathophysiological perspective, gastrointestinal tuberculosis develops through mucosal invasion, lymphatic dissemination, or hematogenous seeding, followed by a granulomatous inflammatory response that may progressively distort normal bowel architecture. This inflammatory process can lead to mural thickening, ulceration, fibrosis, strictures, and serosal adhesions, producing a broad spectrum of clinical manifestations ranging from chronic abdominal discomfort to subacute intestinal obstruction. The ileocaecal region is particularly vulnerable because of its relative stasis, abundant lymphoid tissue, and prolonged contact between luminal contents and the mucosal surface. In many patients, however, the disease remains clinically silent until complications become established, which explains why diagnosis is frequently delayed despite repeated medical consultations and multiple investigations.

An additional challenge in suspected abdominal tuberculosis is the limited diagnostic precision of conventional noninvasive methods when used in isolation. Clinical assessment may suggest chronic inflammatory disease, but it rarely identifies the exact etiology. Similarly, radiological findings such as ascites, peritoneal thickening, mesenteric lymphadenopathy, and bowel wall abnormalities are supportive rather than definitive, because similar

patterns may be encountered in inflammatory bowel disease, malignancy, and other infective conditions. For this reason, direct visualization of the peritoneal cavity combined with targeted tissue sampling has particular clinical importance. Diagnostic laparoscopy not only enables recognition of characteristic intra-abdominal abnormalities, but also facilitates procurement of representative biopsy material for histopathological confirmation. This combined diagnostic advantage may shorten the interval between clinical suspicion and definitive treatment, thereby reducing disease-related morbidity and preventing unnecessary delay in therapeutic decision-making.

### Materials and methods

This was a prospective study conducted over 26 patients of abdominal tuberculosis evaluated by diagnostic laparoscopy from January 2021 to June 2022, in the department of general surgery. Both sexes above 20 years of age with abdominal pain and diagnosed as sub-acute intestinal obstruction were included in this study. Patient diagnosed with tuberculosis by another procedure for example sputum analysis or peripheral lymph node biopsies, patient unfit for laparoscopy under general anaesthesia and acute abdomen were excluded from this study. There were no ethical problems, informed consent from all the patients were taken. Diagnosis of abdominal tuberculosis was established through history along with constitutional symptoms of TB and complete clinical examination. After taking consent for the procedure the patient was investigated thoroughly. Laboratory tests and imaging included test were done for all patients. Imaging includes chest X-Ray, abdominal ultrasonography and CECT of abdomen (to exclude other intra-abdominal pathology). During laparoscopy 10mm infra-umbilical port was made for telescope to avoid injury of adhesion, another 5mm port made in right iliac fossa and right subcostal area for taking peritoneal fluid, mesenteric lymph node biopsy and peritoneal tubercle. All the ports were closed by non-absorbable suture. After the procedure, Fluid was sent for Ziehl-Neelsen and Gram-staining, lymph node and tubercle for histopathology and evaluation of report for diagnosis of abdominal tuberculosis. All the data were collected and analyzed and the results were established in a tabulated form.

## Results

A total of 26 clinically suspected cases of gastrointestinal tuberculosis were evaluated in this study by diagnostic laparoscopy and subsequent histopathological examination. The results demonstrated that the majority of patients were middle-aged adults, with a clear female predominance. Weight loss, abdominal pain, and abdominal distension were the most frequent presenting complaints, while laboratory investigations commonly revealed raised inflammatory markers and anaemia. Imaging studies provided supportive evidence of intra-abdominal pathology, particularly ascites, bowel loop adhesion, peritoneal thickening, and mesenteric lymphadenopathy; however, laparoscopic examination yielded more direct and characteristic findings, including peritoneal thickening, miliary tubercles, ascites, mesenteric lymph nodes, and adhesions. Histopathological analysis further supported the diagnosis in a substantial proportion of cases through identification of epithelioid granulomatous inflammation, multinucleated giant cells, and caseating changes. The detailed demographic, clinical, laboratory, imaging, laparoscopic, and histopathological findings are presented in the following tables (Table I).

**Table I : Demography of patients (n=26)**

| Age (years) | No. of cases | Percentage (%) |
|-------------|--------------|----------------|
| 20-30       | 2            | 7.69           |
| 31-40       | 15           | 57.69          |
| 41-50       | 8            | 30.77          |
| 51-60       | 1            | 3.85           |
| Total       | 26           | 100            |
| Sex         |              |                |
| Female      | 19           | 73.08          |
| Male        | 7            | 26.92          |

Table I shows that most patients were in the 31-40 years age group 15(57.69%), followed by 41-50 years 8(30.77%). Only 2(7.69%) patients were aged 20-30 years and 1(3.85%) was aged 51-60 years. Female patients were predominant 19(73.08%), while male patients constituted 7(26.92%).

**Table II: Common symptoms of patients (n=26)**

| Symptoms             | No. of cases | Percentage (%) |
|----------------------|--------------|----------------|
| Fever (low grade)    | 11           | 42.30          |
| Weight loss          | 26           | 100            |
| Abdominal pain       | 19           | 73.08          |
| Abdominal distension | 16           | 61.54          |
| Abdominal lump       | 8            | 30.77          |
| Constipation         | 13           | 50             |

Weight loss was present in all patients 26(100%), making it the most common symptom. Abdominal pain 19(73.08%) and abdominal distension 16(61.54%) were also frequent complaints. Constipation was found in 13(50%) cases, while low grade fever 11(42.30%) and abdominal lump 8(30.77%) (Table II) were comparatively less common. A rise in CRP was observed in all patients 26(100%), suggesting a uniform inflammatory response. Anaemia was also common and was present in 17(65.38%) patients (Table III).

**Table III: Laboratory tests (n=26)**

| Blood test    | No. of cases | Percentage (%) |
|---------------|--------------|----------------|
| Hb %(Anaemia) | 17           | 65.38          |
| CRP (Raised)  | 26           | 100            |

**Table IV: Imaging findings (n=26)**

| Name of imaging    | Findings                          | No. of cases | Percentage (%) |
|--------------------|-----------------------------------|--------------|----------------|
| CXR (P/A view)     | Normal                            | 26           | 100            |
| USG of the abdomen | Ascitic fluid                     | 16           | 61.54          |
|                    | Mesenteric lymph node             | 8            | 30.77          |
|                    | Bowel loop obstruction            | 19           | 73.08          |
| CECT of abdomen    | Ascites                           | 18           | 69.23          |
|                    | Bowel loop adhesion               | 20           | 76.92          |
|                    | Peritoneal thickening             | 20           | 76.92          |
|                    | Mesenteric lymph nodes (enlarged) | 10           | 38.46          |
|                    |                                   |              |                |

Findings on the chest X-rays were normal in all patients 26(100%). On abdominal ultrasonography, bowel loop obstruction 19(73.08%) and ascitic fluid 16(61.54%) were common findings (Table IV), while mesenteric lymph nodes were seen in 8(30.77%) cases. On CECT of the abdomen, bowel loop adhesion and peritoneal thickening were each found in 20 cases, ascites in 18(69.23%), and enlarged mesenteric lymph nodes in 10(38.46%) cases.

**Table V: Laparoscopic findings (n=26)**

| Findings               | No. of cases | Percentage (%) |
|------------------------|--------------|----------------|
| Ascites                | 19           | 73.08          |
| Peritoneal thickening  | 21           | 80.77          |
| Milliary tubercle      | 21           | 80.77          |
| Mesenteric lymph nodes | 16           | 61.54          |
| Band and adhesions     | 19           | 73.77          |

Peritoneal thickening and miliary tubercle were the most frequent laparoscopic findings, each present in 21(80.77%) patients. Ascites and band with adhesions were each found in 19 cases, whereas mesenteric lymph nodes were observed in 16(61.54%) patients (Table V).

**Table VI: Histopathological findings (n=26)**

| Specimen      | Findings                           | No. of cases | Percentage |
|---------------|------------------------------------|--------------|------------|
| Tubercle      | Epithelioid cells, multi-nucleated | 21           | 80.77      |
|               | iant cellsgiant cells              |              |            |
| Lymph node    | Caseating granuloma                | 8            | 30.77      |
|               | Non-caseating granuloma            | 8            | 30.77      |
| Ascitic fluid | Acid-fast bacilli                  | 1            | 3.85       |

Histopathological examination most commonly revealed epithelioid cells and multinucleated giant cells in tubercle specimens 21(80.77%). Both caseating granuloma and non-caseating granuloma were found in lymph node specimens in 8(30.77%) cases each (Table VI). Acid-fast bacilli were detected in ascitic fluid in only 1(3.85%) case.

## Discussion

Diagnosis of abdominal TB has remained difficult ever since because of its nonspecific clinical presentation, also in sample procurement, paucibacillary load and non-specific clinical, biochemical, and radiological features make early diagnosis difficult. The value of laparoscopy in diagnosis of abdominal tuberculosis is well established. Some authors consider it as the most specific diagnostic test for abdominal TB due to its advantage of histological confirmation<sup>10</sup>. Unfortunately, this procedure still tends to be used as the last resort<sup>10,11</sup>.

A total of 26 patients were included in this study. Abdominal tuberculosis was more common in 31-40 age group 15(57.69%) and in female patients 19(73.08%).

Our study showed most of the patients had weight loss 26(100%), low grade fever 11(42.30%), abdominal pain 19(73.08%), abdominal distension 16(61.54%), abdominal lump 8(30.77%) and constipation 13(50%). Laboratory report revealed anaemia 17(65.38%) and raised CRP 26(100%). A Mohamed, N Bhat showed 9 (69%) females and 4 males (31%), age range between 14 and 57 years with a mean age of 29 years. the mean duration of symptoms was 12 weeks(range between 2-28 weeks). The main presenting symptoms were abdominal pain (85%), weight loss (77%), nocturnal fever, sweating (61%), and gastrointestinal symptoms (nausea, vomiting and constipation)(70%). Among all patients having ascites, it was demonstrated clinically in 8 patients and sonologically in the remaining 5 patients. Palpable abdominal lumps were felt in 6(46%) patients<sup>12</sup>.

This study showed that imaging study (USG of abdomen and CECT of abdomen), the commonest findings were presence of ascitic fluid, bowel loop adhesion and presence of mesenteric lymph nodes. In CECT of the abdomen ascites 18(69.23%), bowel loop adhesion 20(76.92%) and mesenteric lymph node10(38.46%). In diagnostic laparoscopy the commonest findings were ascites 16(61.54%), peritoneal thickening 21(80.77%), miliary tubercle 21(80.77%), mesenteric lymph nodes 16(61.54%) and bands and adhesions 19(30.77%). Bhargava et al<sup>11</sup> studied 87 patients with high protein ascites, of which 38 were diagnosed as having tuberculosis. They found visual appearances to be more helpful (95% accurate) than histology, culture or guinea pig inoculation (82, 3 and 37.5% Sensitivity, respectively). Macroscopic

signs suggestive of abdominal tuberculosis in laparoscopy are small whitish tubercles over the visceral and parietal peritoneum; inflammatory adhesions on the visceral and parietal surface; thickening, hyperemia and retraction of the greater omentum and a long fibrous band extending from the parietal to the visceral peritoneum termed “stalactic” which is characteristic of abdominal tuberculosis<sup>13</sup>.

Histopathological review in this study, epithelioid cells and multinucleated giant cells in tubercle 21(80.77%) caseating granuloma in lymph node 8(30.77%). acid-fast bacilli in ascitic fluid was 1(3.85%). Clarke et al., had 23% of their patients with mesenteric lymphadenopathy. Nafeh et al.,<sup>14</sup> had 58% of their patients with tubercles. Adhesions were present in 22 patients (73%), 6 of them had caseating granuloma (30%), 4 had non-caseating granuloma (22%). Staining for acid fast bacilli is positive in less than 3 percent of cases. A positive culture is obtained in less than 20 percent of cases, and it takes 6-8 weeks for the mycobacterium colonies to appear. Singhet al advocated that processing of one litre of ascitic fluid may yield up to 80% positive results<sup>15</sup>.

## Conclusion

Histological diagnosis in gastrointestinal tuberculosis can be difficult, frequently delaying treatment. The visual appearance of the peritoneal cavity during diagnostic laparoscopy is highly suggestive of the disease and should always be supported by histological examination of peritoneal biopsies. Early Laparoscopy is safe and useful in diagnosing gastrointestinal tuberculosis in suspected cases. Deploying laparoscopy can avoid expensive and sometimes useless investigations and allow early diagnosis of the disease, facilitating the start of specific therapy.

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