



## DIAGNOSTIC LAPAROSCOPY FOR ABDOMINAL TUBERCULOSIS – A WAY FORWARD

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**ABSTRACT** In developing countries like India poor living conditions, overcrowding and limited access to health care facilities are the major causes of the disease. TB can be either pulmonary or extrapulmonary, and possess a major health burden in India even to date. Of the extrapulmonary types, abdominal is a very common type. However, it often goes unnoticed due to vague symptoms and delayed presentation. Diagnostic laparoscopy in such cases offers a more sensitive and specific diagnosis as compared to a peritoneal tap/lavage. The aim of this study was to evaluate the role of diagnostic laparoscopy in patients with suspected abdominal tuberculosis so that we can avoid unnecessary laparotomies and decrease patient morbidity.

### KEYWORDS :

#### Introduction

Tuberculosis is a disease that has been affecting mankind since time immemorial and it still continues to be a global health concern. In the year 2021, 10.6 million cases of tuberculosis was detected worldwide with a 1.6 million death result. It is the 13th leading cause of death and 2nd to COVID-19

In developing countries like India poor living conditions, overcrowding and limited access to health care facilities are the major causes of the disease. TB can be either pulmonary or extrapulmonary, and possess a major health burden in India even to date.

The primary site of infection in lungs is called Ghon's focus which may be in any lung zone and which drains via lymphatic to hilar lymph nodes, to form primary complex. Most primary complex heals with or without calcification. Further spread is via blood stream to the distant tissues and organs where secondary infective lesions develop. All parts of the body can be affected. The infection is contained at extrapulmonary sites and the potential for reactivation of infection at all the sites is always present. The risk of reactivation increases with immunosuppression. When infection spreads out of lungs then it is called extra pulmonary TB.

Extra-pulmonary form of TB accounts for 10-15% of all cases. These are lymphatic, genitourinary, bone and joint, miliary, meningeal and gastrointestinal TB. Abdomen is the sixth most common site of tuberculosis in humans. Tuberculosis can involve any part of Gastrointestinal tract from mouth to anus. The sites commonly involved in the gastrointestinal tract are the peritoneum (37.6%) and small bowel (27%).

The postulated mechanisms by which the tubercle bacilli can reach gastrointestinal tract can be by ingestion of bacilli in sputum, hematogenous spread from primary lung focus, ingestion of contaminated milk, or direct spread from adjacent organs. Intestinal tuberculosis exists in various forms, i.e., ulcerative, hypertrophic or ulcero-hypertrophic and fibrous (stricture) type, while peritoneal tuberculosis may be present in various forms such as ascitic, loculated, plastic, and purulent forms. Clinically, it can present as acute, chronic or acute on chronic form. It runs a chronic course with non-specific symptoms of fever (40-70%), pain (80-95%), diarrhea (11-20%), constipation, alternating constipation and diarrhea, weight loss (40-90%), anorexia and malaise.<sup>5</sup>

The diagnosis of abdominal tuberculosis is considered difficult because symptoms are diverse and vague with lack of specific diagnostic testing. This dilemma results in delay in diagnosis and treatment, leading to significant morbidity and mortality.

Laparoscopy has an advantage of direct visualization of the lesion in the peritoneum and viscera, while providing access to take fluid or tissue for histopathological confirmation. Along with this, septations and innocent adhesions can be released to prevent future intestinal

obstructions. Hence, this study is intended to evaluate the role of diagnostic laparoscopy in patients with suspected abdominal tuberculosis so that we can avoid unnecessary laparotomies and decrease patient morbidity.

#### Methods

This study was conducted at Sarojini Naidu Medical College, Agra. The study was done during the period January 2021 to July 2022. This study included sixty patients between the ages of 15 years to 60 years of either sex. Clinical suspicion of abdominal tuberculosis is the backbone of this study, as the presenting features are non-specific and diagnostic modalities are supportive 60 patients were taken for study.

A	B
Vague pain abdomen of more than three months	Loss of weight (subjective observation of patient)
History of Abdominal distension.	Loss of appetite
Altered bowel habit (alternate constipation and diarrhoea)	Low-grade fever

Patients already on line of treatment for abdominal tuberculosis, Peritonitis secondary to perforation/obstruction, those that were not fit for Laparoscopy (in whom anaesthesia was contraindicated), those that have undergone exploratory laparotomy and those with massive ascites.

All patients underwent routine investigations, along with x-ray and urine/stool microscopy.

Some patients were subjected to additional investigations as indicated by their specific symptomatology i.e.

1. Ascitic fluid, if present, for (ADA estimation, cytology, biochemical analysis)
2. Contrast gastro-intestinal studies
3. CT scan abdomen

Diagnostic criteria were fulfilled by getting one of the following findings: -

1. Isolation or demonstration of Mycobacteria
2. Caseating or non-caseating granuloma with Langhan's giant cell after biopsy of suspicious lesions
3. Aspiration of ascitic fluid and analysis giving direct or indirect evidence of tuberculosis

Diagnostic laparoscopy- Visual examination of the abdomen was done in a systemic and segmental manner. Pelvic examination was performed first. If free fluid was present, it was aspirated and sent for cytology, biochemistry, ADA estimation, AFB Stain and albumin estimation. The uterus and tubes were lifted and inspected. Then systematically peritoneum, liver, omentum were seen for tubercles or adhesions. Mesentery was evaluated for enlarged lymph nodes. Later 'bowel walking' was done. The caecum and appendix were inspected first. Then starting from ileocecal junction the small bowel was

inspected loop by loop, carefully handling the bowel. The whole small bowel was examined upto the duodeno-jejunal flexure. Tubercles, strictures, bands and hypervascularity of bowel were looked for. Biopsies of suspicious lesion were taken. In case of stricture the evaluation was done whether it was a passable stricture or impassable. If passable no intervention was contemplated; in cases of impassable stricture definitive procedure was performed in the same sitting either laparoscopically or by open method. In cases where apart from above findings if other pathology was detected this was also dealt with at the same sitting.

Statistics- all the data was recorded in a semi-structured proforma and entered into an MS excel spreadsheet. Data was analyzed using SPSS software v21. We considered our observation in terms of symptoms, signs, laboratory and radiological investigation, ultrasound findings in patients suffering from abdominal tuberculosis. Chi square test / Fischer's exact test was used to find out the statistical significance of our observations.

**Results**

Of total 60 cases, 33 patients were found to have abdominal tuberculosis. All patients in age group of 15 to 60 years with the following symptomatic presentation were selected for study. The 1st stage consisted of history, clinical examination, routine hematological investigations, and ultrasound whole abdomen. If diagnosis was not made, then second stage investigations were carried out in the form of radiological procedures. Cost effectiveness and limitation of various modalities were considered before embarking on these investigations. Finally, diagnostic laparoscopy was performed on all 60 patients. In our study 33 out of 60 (55%) patients were diagnosed to be suffering from abdominal tuberculosis and were detected early.

**Table 1:- symptoms wise distribution of patient**

Symptom wise distribution of patients	No. of patients presenting with symptoms (n=60)	Percentage (%)	Incidence of disease (n=33)	Percentage (%)
Abdominal pain	60	100	33	100
Altered bowel habit	29	49.75	17	51.5
Reduced appetite	25	41.45	12	36.3
Weight loss	29	49.06	16	48.4
History of distension	22	33.5	14	42.4
Fever	12	18.34	7	21.2

USG abdomen and pelvis was performed for all the patients. In that, we observed that mesenteric lymphadenopathy was the most common. This can be non-specific. However, it can show features of caseation/central necrosis.

**Table 2:- ultrasound findings of the study population**

Ultrasound whole abdomen	Present (n=60)	Percentage (%)	Incidence of TB (n=33)	Percentage (%)
Ascites	16	26	10	30.3
Dilated bowel loops	14	23.33	6	18.18
Lymphadeno pathy	22	36	14	42.42
Bowel thickness	16	26.66	9	27.27
Normal	23	38.33	9	27.27

CT scan abdomen was done in 22 patients. It showed findings in 18 patients. Mesenteric and omental thickening, dilated bowel loops, ascites, thickened terminal ileum and caecum, mesenteric lymphadenitis were seen.

**Table 3:- CT scan findings in the study population**

CT scan Findings	Present (n=22)	Percentage (%)
Ascites	9	40.9%
Peritoneal thickening	12	54.54%

Mesenteric Lymph Nodes	14	63.64%
Bowel involvement	13	59.09%
ICJ thickening	5	23%

Diagnostic laparoscopy was performed for all 60 study participants. We found that the most common findings were ascites and lymphadenopathy. Apart from that we observed tubercles, adhesions and stricture, which are features indicative of tuberculosis.

**Table 4:- diagnostic laparoscopy findings in the study participants**

Diagnostic laparoscopy findings	Present (n=60)	Percentage (%)	Incidence of TB(n=33)	Percentage (%)
Ascitic fluid	38	63.33	25	75.75
Lymph node	32	53.33	22	66.66
Stricture/ICJ thickening	24	40	16	48.48
Tubercles	18	30	16	48.48
Adhesions	14	23.33	8	24.24
Other findings (Meckel's, Appendicitis)	10	-	-	-

Ascitic fluid when present was aspirated and sent for cytology, ADA and ascitic fluid albumin estimation. Ascitic fluid analysis was done in all 38 patients. Presence of ascitic fluid (p<0.02) was found to be statistically significant.

Sensitivity and specificity of Ascitic fluid ADA was found to be 46.15% and 100% respectively.

SAAG gradient was calculated and value of <1.1g/dl which is suggestive of exudative ascites. Sensitivity and specificity of SAAG gradient was found to be 53.84% and 33.33% respectively. On statistical analysis Ascitic fluid ADA estimation was found to be marginally significant.

When we correlated the different modalities of evaluation in our study population, we find that it was statistically significant. Hence, we can draw a conclusion that diagnostic laparoscopy is a non-inferior modality to diagnose abdominal tuberculosis when compared with ADA.

**TABLE 5:- COMPARISON BETWEEN DIFFERENT MODALITIES OF EVALUATION IN A PATIENT WITH SUSPECTED ABDOMINAL TUBERCULOSIS (The chi-square statistic is 10.4. The p-value is .034203. The result is significant at <.05.)**

PATIENTS WITH SUSPECTED ABDOMINAL TUBERCULOSIS	FINDINGS PRESENT	FINDINGS ABSENT
CLINICAL	33 (30.00) [0.30]	27 (30.00) [0.30]
USG	37 (30.00) [1.63]	23 (30.00) [1.63]
CT	22 (30.00) [2.13]	38 (30.00) [2.13]
DIAGNOSTIC LAPAROSCOPY	25 (30.00) [0.83]	35 (30.00) [0.83]
ADA	33 (30.00) [0.30]	27 (30.00) [0.30]

Finally, we observed that after performing Diagnostic laparoscopy positive diagnosis was achieved in 54 (90%) patients. Thirty-three cases of early abdominal tuberculosis were detected and these patients were yet to develop any irreversible complications. We also observed five cases of bowel malignancy.

**Discussion**

Laparoscopy was first described at the turn of the last century. Many years lapsed before evolution of instrumentation and experience that allowed internal organs to be adequately viewed and biopsied. Some patients with chronic abdominal complaints constitute a difficult group in terms of diagnosis. The search for pathology in these patients usually entails a series of laboratory and non-invasive or even invasive tests and procedures. Laparoscopy provides an effective diagnostic tool avoiding a formal exploratory laparotomy. It minimizes the

surgical trauma; resulting in a better outcome and making a short stay possible.

Abdominal TB should be considered in the differential diagnosis in patients who originate from the countries where TB is endemic and who present with non-specific abdominal complaints and weight loss over a long period. The findings of the present study confirm the earlier reports on the difficulties of diagnosis; in circumstances like non-specific presenting features, unhelpful laboratory tests, negative results with tuberculin skin tests and Ziehl Nelsen staining, false negative ultrasound and CT scan.

Before the era of laparoscopy these patients used to undergo a battery of costly investigations over a period of months, while remaining in a diagnostic dilemma. The main aim of this study was to evaluate the role of laparoscopy as a major diagnostic tool.

In our study 33 out of 60(55%) patients were diagnosed to be suffering from abdominal tuberculosis and were detected early. At the same time twenty one other patients were detected to have some other pathology. Thus a total of 54 out of 60 (90%) were benefited by Diagnostic laparoscopy. The observations were noted and compared with other studies.

In the tuberculosis positive group (33 patients) the most common symptoms were abdominal pain (100%), weight loss (48.4%), loss of appetite (36.3%) and altered bowel habit (51.5%); fever was present in only 7 cases and was not a feature of abdominal tuberculosis. Jain AK 2 published an article in Medicine Update 2002, as per which, the most common symptoms and signs were abdominal pain (86%), anorexia (48%), weight loss (63%), altered bowel habit (24%), abdominal distension (37%), ascites (37%), abdominal mass (33%) and borborygmi (35%). In a study by Sharma YR 18, abdominal pain (80%), weight loss (84%), loss of appetite (72%), and irregular bowel (48%) as most frequent symptoms. Bernhard JS et al 19 has also mentioned these features as most common symptoms and signs in his series of 18 patients.

In another retrospective study by Safarpor F et al 9, 290 patients who underwent diagnostic laparoscopy, 28 patients were found to be suffering from abdominal tuberculosis. The most common symptom in his study was abdominal pain (85%), weight loss (70%), loss of appetite (72%), clinical ascites (96%) and abdominal tenderness (43%).

Uygun Bayramicli O 12 did a study on 31 patients of abdominal TB and found abdominal pain (51%), weight loss (51%), ascites (38%) and fever (12%) as most common symptoms and signs.

In our study laboratory investigations revealed raised ESR (66%) and reactive Montoux test in 45% of cases suffering from abdominal tuberculosis. Montoux test may be negative in 55% of cases due to gastrointestinal loss of proteins and anorexia, leading hypoalbuminaemia. We found that raised ESR ( $p=0.03$ ) and reactive Montoux test ( $p=0.014$ ) are significant in cases of abdominal tuberculosis.

These findings were consistent with finding of Sharma YR 18 showing anaemia (64%), reactive Montoux test (32%), hypoalbuminaemia (48%). Uygun Bayramicli O 12 in his study on lab investigations found anaemia (70.4%), raised ESR (64%) and hypoalbuminaemia as prominent features.

Radiological investigation is mainstay in making presumptive diagnosis of abdominal tuberculosis; this includes X ray chest, ultrasound whole abdomen, CT scan whole abdomen and imaging studies.

We performed X ray chest and X ray abdomen in all patients. An associated healed pulmonary lesion was detected in only one patient (6.25%). X ray abdomen revealed findings in 40% of cases in the form of dilated bowel loops and abnormal air fluid levels. 6 patients were selected for barium studies. Findings were suggestive of abdominal tuberculosis in one patient (16%).

Review article by Sharma and Bhatia 16 observed that chest X ray show evidence of concomitant pulmonary lesion in less than 25% of cases.

In our study we did ultrasound whole abdomen on 60 patients and most

common findings in patients with abdominal tuberculosis were mesenteric lymphadenitis (42.42%), ascites (30.3%), bowel thickening (27.27%). Nine patients had normal ultrasound (27%). Sensitivity and specificity of ultrasound was found to be 75% and 42.8% respectively with positive predictive value of 60%.

Uygun Bayramicli O et al 12 found in their study nonspecific findings on abdominal ultrasonography such as ascites.

We performed CT scan whole abdomen in twenty-two patients and found positive findings suggestive of abdominal tuberculosis in 18 patients (81%). However, after diagnostic laparoscopy was done fourteen patients were found to be suffering from abdominal tuberculosis. In the remaining four patients two were diagnosed as having Ulcerative Colitis and two had caecal malignancy.

In our study in one of the patients where CT was reported to be normal, ascitic fluid obtained during diagnostic laparoscopy was positive for AFB. In a study by Rustam Khan et al 25 they observed that abdominal ultrasound and CT scan have only supportive value. The findings suggestive of abdominal tuberculosis were ascites (79%), enlarged lymph nodes (35%) and thickened bowel loops (25%).

In our study we performed diagnostic laparoscopy on 60 patients and got positive findings in 54(90%) patients. This is in accordance with earlier studies. Out of these 54 patients' abdominal tuberculosis was detected in 33 patients (61.1%) cases.

All patients benefited from Diagnostic Laparoscopy in terms of diagnosis as well as treatment. Three cases were converted to laparotomy for giving definitive treatment to these patients. In six cases no pathological cause was detected and these patients were diagnosed to be suffering from nonspecific pain abdomen.

A study by Rai and Thomas 11 supports our study and work on the value of laparoscopy which is the most specific diagnostic test for abdominal TB with its advantage of histological confirmation and additional advantage of providing a definitive treatment in cases with other diagnosis.

In a study by Al-Akeely MH 17, diagnostic laparoscopy was performed on 35 patients referred by physician. He found that diagnostic laparoscopy confirmed diagnosis in all patients. He concluded that DL in hands of surgeons proved to have an impact as an investigation technique where the diagnosis remained uncertain, after the laboratory and non-invasive investigations of selected medical patients with chronic abdominal disorders.

In our study 26 patients with abdominal tuberculosis were found to have ascites. 18 out of 26 patients had exudative ascites (protein > 3gm %). Total cell count of lymphocytes was found to be increased in 69% cases and SAAG gradient < 1.1 was noted in 53.84% of cases. The presence of ascitic fluid was found to be significant ( $p=0.02$ ). Ascitic fluid lymphocytes count, protein and SAAG gradient were found to be statistically insignificant. Sensitivity and specificity of SAAG gradient was found to be 53.84% and 33.33% respectively

In our study ascitic fluid ADA was estimated in 38 patients in whom 12 patients had ADA value > 32 U/L and all these patients were found to be suffering from abdominal tuberculosis. Therefore we found sensitivity and specificity of 46.5% and 100% respectively.

In a study by Dwivedi et al 30 ADA was estimated in 49 patients in ascitic fluid. A level of 33U/L was considered for diagnosis of tubercular ascites. In this study sensitivity specificity and diagnostic accuracy was found to be 100%, 97% and 98% respectively. Another study by Bhargava et al 31, ascitic fluid ADA > 36 U/L was found suggestive of abdominal tuberculosis.

MP Sharma and Vikram Bhatia 32 in their review article mention that the yield of organism in ascitic fluid, on smear and culture is low. In his study staining of AFB was positive in < 3% cases.

In our study out of 26 patients with tubercular ascites four patients were ascitic fluid AFB positive.

In our study we did histopathological examination in 28 patients, 20 patients showed positive histology for tuberculosis (caseating granulomas, giant cells, fibroblasts and histiocytes). In a study YR

Sharma 18 performed diagnostic laparoscopy in 14 patients; tubercles were visualized in 6 patients and histopathology revealed caseating granuloma in 13 patients. In a study by Bhargav et al<sup>31</sup> visual appearance was found to be more helpful than histology (95% accurate) and caseating granuloma was found in 85%-90% cases. However in our study, on the basis of visual appearance ATT was started on 6 patients.

Safarpor F et al<sup>9</sup> found in their study that macroscopic examination by laparoscopy is the most useful method in diagnosis of abdominal tuberculosis. In their series macroscopic diagnostic rate was 82%.

### Conclusion

Diagnostic laparoscopy not only helps in diagnosis but therapeutic measures in patients with abdominal tuberculosis. It also decreases the number of laparotomies. In expert hands laparoscopy is even better option than laparotomy to visualize the entire abdomen with added benefit of video magnification.

At the same time Laparoscopy is very safe, quick, cost effective and useful diagnostic tool in undiagnosed abdominal pain. Laparoscopy shortens hospital stay and minimises hospital visits thus decreasing patient's expenses.

Our findings strengthen the evidence that in patients with a relevant background and clinical history laparoscopy is the investigation of choice.

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