



## Role of Laparoscopy in Diagnosis of Abdominal Tuberculosis

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### Abstract

**Background:** *Diagnosis of abdominal tuberculosis is difficult as well as its Histopathological confirmation because of suboptimal, noninvasive access to the intraperitoneal pathology. Laparoscopy provides minimally invasive access to the peritoneum.*

**Aim:** *To evaluate the potential benefits of laparoscopy with tissue biopsy in the diagnosis of suspected abdominal tuberculosis*

**Methods:** *A prospective hospital based study of 50 patients with suspicion of abdominal tuberculosis after clinical examination and baseline investigations from November 2013 to November 2015 was done in the Postgraduate Department of Surgery, Government Medical College, Srinagar.*

*Abdominal tuberculosis was diagnosed in 80% of these patients. A descriptive analysis of data collected from case records of the patients was done to study the clinical characteristics, laboratory, radiological and histological findings along with usefulness of laparoscopy to confirm the diagnosis of abdominal tuberculosis.*

**Results:** *Laparoscopy was performed in 50 patients of chronic abdominal pain with unsettled diagnosis. Laparoscopically guided peritoneal biopsies revealed the following histopathological reports: Chronic granulomatous inflammation (caseating and non-caseating) in 80% of the patients. Metastatic adenocarcinoma in 14% of the cases. Normal report in 6%.*

**Conclusions:** *Early laparoscopy is safe and useful in establishing the diagnosis of peritoneal TB in suspected cases resulting in avoiding expensive, time consuming and sometimes fruitless investigations and allowing early institution of treatment.*

**Keywords:** *Laparoscopy, Abdominal tuberculosis, Chronic abdominal pain, Nonspecific abdominal pain, Ascites.*

### Introduction

Tuberculosis (TB) continues to be a major health hazard throughout the world<sup>1</sup>. Extra-pulmonary forms of tuberculosis constitute approximately

one sixth of all cases and abdomen is a common extra-pulmonary site of involvement<sup>2</sup>. The symptoms of abdominal tuberculosis are generally vague and nonspecific. It may mimic any intra-

abdominal pathology and hence, can challenge diagnostic skills.

TB can involve the entire gastrointestinal tract (GIT) including the peritoneum and the pancreatobiliary system. The incidence and severity depends on the prevalence of TB and infection with human immunodeficiency syndrome (HIV). Abdominal TB is seen more commonly between 25 and 45 years of age. The modes of infection of the GIT include hematogenous spread from a primary lung focus that reactivates later or miliary tuberculosis, spread via lymphatics from infected nodes, ingestion of bacilli either from the sputum or from infected sources such as milk products, or by direct spread from adjacent organs. Involvement of the abdominal lymph nodes and the peritoneum may occur without other organ involvement. The most common site for abdominal TB is the ileocecal area. Infection often results in granuloma formation, caseation, mucosal ulceration, fibrosis, and scarring.<sup>3-6</sup>

Extra pulmonary tuberculosis constitutes 10-20% of all patients with active tuberculosis. Abdominal tuberculosis which involves the bowels, peritoneum, lymph node or solid viscera, constitutes up to 12% of extra pulmonary tuberculosis. Only 15-20% patients of abdominal tuberculosis have active pulmonary tuberculosis.<sup>7,8</sup> Abdominal tuberculosis tends to present with nonspecific feature and is difficult to diagnose in early stage. Imaging studies and Serological tests provide only indirect evidence of the underlying disease. AFB stain and culture of the ascites fluid give a very poor yield and are often not helpful. Thus diagnosis of abdominal tuberculosis is largely dependent on histological confirmation by laparoscopy. The role of laparoscopy in ascertaining the diagnosis of abdominal tuberculosis needs to be studied. It was with this objective that this study was conducted in our Department of Surgery, Government Medical College, Srinagar.

## Materials & Methods

A prospective hospital based study was conducted on patients admitted in the surgical wards of the Postgraduate Department of Surgery, SMHS Hospital, Government Medical College, Srinagar, from November 2013 to November 2015 with a suspicion of abdominal tuberculosis after clinical examination and baseline investigations.

All patients with clinical features suggestive of abdominal TB were subjected to a detailed history and clinical examination as per the preformed proforma. All the patients were subjected to investigations including USG abdomino-pelvis, CT abdomen, ascitic fluid analysis (including ADA levels, Z&N staining, culture and PCR for MTB) and diagnostic laparoscopy with tissue biopsy. An informed consent was taken for physical examination and investigations.

This study consisted of 50 numbers of cases of suspected abdominal tuberculosis during a period of two years, from November 2013 to November 2015 in the surgical wards of the Postgraduate Department of Surgery of SMHS Hospital, Government Medical College, Srinagar.

## Inclusion Criteria

All the patients above the age of 12 years who presented with the clinical features suggestive of abdominal tuberculosis to the Department of Surgery, SMHS Hospital, GMC, Srinagar, formed the part of the study.

## Exclusion Criteria

1. All patients with a known cause of chronic abdominal complaints like IBD (Chron's disease and Ulcerative colitis) malignancy etc.
2. Contraindications to pneumoperitoneum / laparoscopy.
3. Unoptimised coagulopathy.

## Materials

Various instruments employed in the performance of laparoscopy were:

Telescope (10 mm, 0° & 30°), Carbon dioxide insufflators, Colour monitor, Xenon light source, Universal light guide cable, Carbon dioxide cylinder with connecting pipe to insufflators,

Electrocautery (monopolar), Suction apparatus, Veress needle Trocars (5 & 10 mm), Biopsy forceps, Dissecting forceps (Straight & Maryland), Scissors (Curved & Straight), Grasping forceps (atraumatic), Harmonic scalpel, Needle holder, Normal saline, Knife with blade (15 no ), Suture material (Vicryl 2-0 & Slik 2-0) and Endoscope video recording device

### Method

Laparoscopy was performed in the patients selected on the basis of previously mentioned criteria. The procedure in these patients was performed under GA. The patient was placed in the supine position with the left side down, the right arm abducted and the left arm by the side of patient. The surgeon stands on the patient's left side, assistant on the left side of surgeon and the monitor placed on opposite side.

Pneumoperitoneum was created with the Veress needle insertion. Once 12-15 mmHg CO<sub>2</sub> pressure was created, a 30° laparoscope was introduced through a 10 mm umbilical port and the abdominal cavity was explored accurately in all the patients. Rest of the ports were placed as necessary, either in midline above the symphysis pubis or in the RLQ or LLQ as required. Whenever a serous fluid was present in abdominal cavity, it was aspirated and sent for analysis and microscopic testing. Adhesions, whenever present, were broken using electrocautery and scissors. Multiple (2 to 4) tissue biopsies were taken using a 5mm laparoscopic biopsy forceps. Various findings encountered during the performance of laparoscopy were:

1. Ascites,
2. Adhesions,
3. Thickened and hyperemic peritoneum with tubercles; various structures like spleen, liver, omentum were also studded with tubercles,
4. Thickened peritoneum without tubercles.

Umbilical fascia was closed with 2-0 vicryl and skin incisions were closed with slik and cosmopore dressings were applied over the port sites.

Tissue biopsy obtained during laparoscopy was sent to the Postgraduate Department of Pathology, GMC, Srinagar for histopathological examination to look for the evidence of tuberculosis.

The relevant data was collected by surgery residents and recorded in a database using Microsoft Office Excel. A descriptive analysis of data collected from case records of these patients was done. For statistical evaluation chi-square test and t-test were applied.

### Results & Observations

In patient with ascites, samples of fluid were obtained for routine and microscopic examination, biochemical analysis, culture and sensitivity, ascitic fluid ADA and cytology. Tissue specimen was taken from the peritoneum, omentum, bands and mesenteric lymph nodes using cupped biopsy forceps or dissection. A third port was created at right upper abdomen if a laparoscopic therapeutic procedure was required.

**Table 1:** Age Distribution of the Patients

Age Group (in years)	Number of Patients	Percentage %
15 - 20	5	10
21-40	25	50
41-60	15	30
>60	5	10
<b>Total</b>	<b>50</b>	<b>100</b>

Most of the patients in our study were in the age group of 21 – 40 years with a mean age of 38 years and an age range of 15 – 68 years.

**Table 2:** Sex Distribution of the Patients

Total Number of Patients	50
Number of Male Patients	20
Percentage of Male Patients	40%
Number of Female Patients	30
Percentage of Female Patients	60%

Our study consisted of a total of 50 patients with a preponderance (with a female-male ratio of 3:2).

**Table 3:** Symptomatology of the Patients

Symptoms	No. of patients	Percentage %
<b>Non-specific abdominal pain</b>	<b>46</b>	<b>92</b>
<b>Anorexia</b>	<b>38</b>	<b>76</b>
<b>Weight loss</b>	<b>28</b>	<b>56</b>
<b>Constipation</b>	<b>15</b>	<b>30</b>

Night sweats	9	18
Abdominal distension	9	18
Pulmonary symptoms	8	16
Diarrhea	6	12

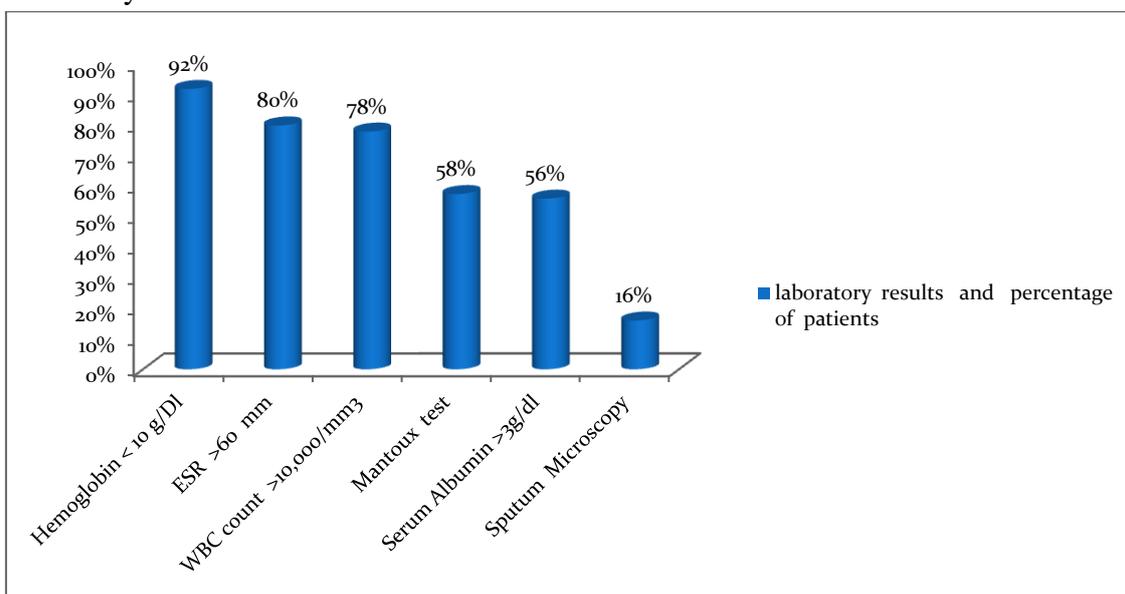
The most common symptoms of the patients in our study were abdominal pain (92 %), anorexia (76 %) and weight loss (56%). A number of patients also presented with night sweats (18 %), alteration of bowel habits [constipation (30%) and diarrhea (12%) ] and abdominal distension (18 %). A few patients also had chest symptoms (16 %) (Cough and hemoptysis).

**Table 4:** Clinical Findings of the Patients

Ascites	48	96
Pallor	46	92
Fever	38	76
Abdominal tenderness	21	42
Pleural effusion	05	10
Splenomegaly	04	8
Hepatomegaly	03	6

Most common physical findings of the patients in our study were ascites (96 %), anemia ( 92 %), fever (76%), and abdominal tenderness (42 %). Few patients had pleural effusion (10 %), splenomegaly (8%) and hepatomegaly (6%).

**Chart 5:** Laboratory Results of the Patients



Low hemoglobin was the most common laboratory finding in our patients (92%). Raised ESR (60 mm) and WBC count (>10,00/mm<sup>3</sup>) were seen in 80% and 78% of the patients respectively. Montoux test was positive in 58%

of the patients and low serum albumin (< 3 g/dl) was detected in 56% of the cases. Sputum microscopy for AFB was positive in 16% of the cases.

**Table 6A:** Abdominal Ultrasound Findings of the Patients

Abdominal Ultrasound findings (Total patients tested = 50)	Positive findings (No. of patients)	Positive findings (Percentage % of patients )
Ascites	48	96
Peritoneal thickening	15	30
Mesentric adenopathy	06	12
Gallbladder stones	3	6
Splenomegaly	4	8

The predominant finding in the abdominal ultrasound was ascites in our patients (96 %). Peritoneal thickening and mesenteric adenopathy were present in 30 % and 12 % of the cases

respectively. 3 patients (6 %) had gallbladder stones and splenomegaly was seen in 4 patients (8 %)

**Table 6B:** Abdominal CT SCAN Findings of the Patients

CT Scan findings Total patients tested = 50	Positive findings (No. of patients)	Positive findings (Percentage % of patients)
Ascites	48	96
Peritoneal and mesentric thickening	30	60
Mesentric adenopathy	25	50
Splenomegaly	4	8
Cholelithiasis	3	6

Majority of the patients in our study had ascites (96 %) as a predominant finding in the abdominal CT scan. Peritoneal and mesenteric thickening and; mesentric lymphadenopathy were present in 60 % and 50 % of the patients respectively. Other CT scan findings were cholelithiasis (6 %), and splenomegaly (8 %).

**Table 7:** Laparoscopic Findings of the Patients

Laparoscopic findings	No. of patients Total = 50	Percentage %
Ascites	48	96
Peritoneal tubercles	44	88
Adhesions	35	70
Congested peritoneum	32	64
Cirrhosis	5	10
Enlarged Spleen	4	8
Normal appearance	3	6

The predominant laparoscopic findings of the patients in our study were ascites (96%), miliary peritoneal tubercles (88%), congested peritoneum in the form of thickened and hyperemic peritoneum (64 %); and adhesions (70 %). Gross features indicative of the liver cirrhosis was seen 5 patients (10 %) and splenomegaly in 4 patients (8%). Laparoscopic findings were unremarkable in 6 % of patients.

**Table 8:** Histopathology Report of the Peritoneal Biopsies

Histopathology report	No. of patients Total = 50	Percentage %
Caseating epitheloid granulomas	28	56
Non-caseating epitheloid granulomas	12	24
Metastatic adenocarcinoma	7	14
Normal report	3	6

Histopathological report of the laparoscopically assissted peritoneal tissue biopsies revealed chronic epitheloid granulomatous inflammation (caseating and non-caseating) in 40 cases (80 %). Metastatic adenocarcinoma was present in 7 patients (14 %) and no histopathological abnormality was detected in 3 cases (6%).

### Discussion

This study consisted of a total of 50 cases of suspected abdominal tuberculosis, studied over a period of 2 years from November 2013 to November 2015. After thorough clinical observation and labarotory work-up, these patients were subjected to diagnostic laparoscopy.

### Demographic Characteristics

In our study, the majority of the patients (50%) were in the age group of 20 to 40 years with a mean age of 38 years, and an age range of 15 to 68 years. Thirty (60%) were females and twenty (40%) were males (sex ratio of female/male = 1.5). These figures correlate with the study by Mohammed Arif, Santosh V, Akarsh S. Rajput<sup>9</sup>. They reported a similar age distribution with 56 % of their patients being in the age range of 21 to 40 years, and a sex ratio of female/male patients being 1.5 (No. Female patients = 30, No. of male patients = 20).

Rooh Ul Muqim, et al.<sup>10</sup> also noted an obvious majority of females 145 (58 %) and a mean age of 37.5 years in their study of 250 patients of abdominal tuberculosis

Abid H, et al.<sup>11</sup> reported a mean age of 38 years in their study of 294 cases of peritoneal tuberculosis. Rustam Khan, et al.<sup>12</sup> studied a total of 209 patients with 123 cases (59%) being females and a mean age being 33 years.

Tarcoveanu E, et al.<sup>13</sup> reported an age distribution of 17 - 74 years in their study.

### Symptomatology of the Cases

The commonest type of presentation of the patients in our study was non-specific abdominal pain being present in 46 patients (92%). This figure is comparable with Rustam Khan, et al.<sup>12</sup> study who noted abdominal pain in 93% of cases.

In our study, the second most common complaint was anorexia (76%). According to Safarpor F, et al.<sup>14</sup> study loss of appetite was present in 75% of cases.

In the present study, night sweats, abdominal distension and pulmonary symptoms (cough and hemoptysis) were present in 18%, 18%, and 16% of the patients respectively. These figures are consistent with Tarcoveanu E, et al.<sup>13</sup> study.

In the present study, weight loss was noted in 28 patients (56%). Abdelaal A, et al.<sup>15</sup> also noted 56% of weight loss of the patients in their study.

In our study, other symptoms of the patients present were constipation (30%) and diarrhea (12%). These figures are comparable with the study by Rustam Khan, et al.<sup>12</sup>

### Clinical Findings of the Patients

The predominant clinical findings of the patients in our study were ascites (96%), low grade fever (76%) and abdominal tenderness (42%). These figures are comparable with Safarpor F, et al.<sup>14</sup> study. Abdelaal A, et al.<sup>16</sup> study also noted ascites in 90 % of the cases.

In current study, pallor was noted in 46 patients (92%). Rai S, Thomas WM<sup>17</sup> noted a similar observation of anemia in > 90 % of the cases.

In our study, pleural effusion was present in 5 patients (10%), hepatomegaly in 3 cases (6 %) and splenomegaly in 4 patients (8%). These findings are in agreement with Tarcoveanu E, et al.<sup>13</sup> study.

### Laboratory Test Results

In our study, the most common finding was low hemoglobin being present in 46 patients (92 %). Rai S, Thomas WM<sup>18</sup> reported a similar observation of low haemoglobin in > 90 % of the cases.

In the present study, leukocytosis (>10,000 /mm<sup>3</sup>) was present in 78% of patients, hypoalbuminemia ( Serum albumin < 3 g/dl ) in 56% of cases and an elevated ESR (> 60 mm) in 80% of the patients. These figures are consistent with Tarcoveanu E, et al.<sup>13</sup> study.

In the current study, Mantoux test was found positive in 58% of the patients. Sputum

microscopy detected AFB in 16% of the cases. These findings correlate with Manohar A, et al.<sup>19</sup> study as 57.6% and 18 % respectively.

In our study, the ascitic fluid analysis (in 42 patients) revealed exudative type of ascites in 95% of the patients. Manohar A, et al.<sup>19</sup> and Sandikci MU, et al.<sup>20</sup> reported this figure in 96.4% and 95.5% of the cases respectively.

In our study, Z&N staining of the ascitic fluid was performed in 42 patients and was negative in all. Rai S, Thomas WM<sup>18</sup> study also reported a similar observation.

In our study, culture of the ascitic fluid was done in 42 cases and was positive in 3 patients (8%). Rustam Khan, et al.<sup>12</sup> reported this figure in 7% of cases. Similarly, Poyrazoglu OK, et al.<sup>21</sup> study reported the tuberculous culture of ascitic fluid positive in only 2 patients.

In the present study, ascitic fluid ADA (>36 u/l) was seen in 95% of the patients. This figure is consistent with several studies such as Bhargava DK, et al.<sup>22</sup> study.

### Abdominal Ultrasound Findings

In our study, 96% of the patients had ascites, 30% had peritoneal thickening, and 12% had mesenteric adenopathy as their predominant ultrasound findings. These figures are consistent with Tarcoveanu E, et al.<sup>13</sup> study.

### Abdominal CT Scan Findings

In the present study, the commonest CT scan finding was ascites. It was present in 48 cases (96%) in variable amount. Salgado Flores L, et al.<sup>23</sup> reported the corresponding figures as 100%. Tarcoveanu E, et al.<sup>13</sup> reported the corresponding figure as 89%.

In our study, mesenteric lymphadenopathy was present in 50% of the patients; and peritoneal and mesenteric thickening in 60%. These figures correlated with Salgado Flores L, et al.<sup>23</sup> as 50% and 58% respectively.

### Laparoscopic Findings

In the current study, 48 (96%) patients had straw-coloured ascites. This finding is consistent with the study by Sandikci MU, et al.<sup>20</sup> who reported

straw-coloured ascites in 129 patients (95.5%) from a total of 135 cases.

Homogenously distributed yellowish-white miliary nodules over the peritoneum were present in 44 (88%) patients; adhesions were seen in 35 (70%) of cases and congested peritoneum (in the form of thickening and hyperemia) in 32 (62%) patients. These figures are in agreement with the study of Kharrat J, et al.<sup>24</sup>

There were 5 cases (10%) with features of liver cirrhosis and 4 (8%) cases of splenomegaly in our study. Tarcoveanu E, et al.<sup>13</sup> reported 17% of cirrhosis in their study. The lower percentage of hepatic cirrhosis in our study might be due lower consumption of alcohol this in part of the world.

In the present study, there were 3 cases (6%) with normal laparoscopic appearance. Abdelaal A, et al.<sup>16</sup> also noted that 7% of patients had normal laparoscopic findings.

#### **Histopathological Report of the Peritoneal Biopsies**

In our study, the histopathological findings of the laparoscopically guided peritoneal biopsies established the diagnosis of peritoneal tuberculosis in 40 patients (80%) whereas metastatic adenocarcinoma was seen in 7 cases (14%). No histological abnormality was detected in 3 patients (6%). These results are comparable with the study by Krishnan P, et al.<sup>25</sup> who reported an identical range of histopathological diagnoses in laparoscopically guided peritoneal biopsies in a subset of 41 patients investigated for suspected abdominal tuberculosis. Out of 41 patients, 33 patients (80%) had peritoneal tuberculosis and 6 patients (14%) had metastatic adenocarcinoma. Only 2 patients (5%) had no abnormal histopathological findings.

Verspyck E, et al.<sup>26</sup> study has reported that laparoscopy combined with peritoneal biopsy is effective for the diagnosis of tuberculosis in to 85% of cases.

Al-Mulhim AA<sup>27</sup> reported a similar observation with the use of laparoscopy in his prospective study as histological confirmation of peritoneal

tuberculosis was done in 17 patients (81%) from a total of 21 cases.

Ibrarullah M, et al.<sup>28</sup> reported in their study on 23 patients in whom laparoscopy was performed, a positive diagnosis of tuberculosis was established in 19 patients (87%).

Malik AM, et al.<sup>29</sup> also reported the corresponding figure as 82%. From a total 133 patients, 109 patients were diagnosed with abdominal tuberculosis on laparoscopy with tissue biopsy.

#### **Conclusion**

Our study emphasizes that diagnostic laparoscopy should be considered in the work up of all patients with chronic abdominal pain and suspected peritoneal form of abdominal TB because this minimally invasive technique can prevent many serious morbidities and mortalities. Unfortunately, it is still used as a last resort when all the other investigations fail to provide an accurate diagnosis.

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