International Surgery Journal
Saxena P et al. Int Surg J. 2016 Aug;3(3):1557-1563
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20162747

Research Article

The role of laparoscopy in diagnosis of abdominal tuberculosis

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Received: 31 May 2016
Revised: 02 July 2016
Accepted: 04 July 2016

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ABSTRACT

Background: To study the diverse clinical picture of abdominal tuberculosis and evaluate the role of laparoscopy in confirming the diagnosis of abdominal tuberculosis.
Methods: A prospective and retrospective study of 114 patients who underwent diagnostic laparoscopy for chronic abdominal pain with unsettled diagnosis between July 2007 and December 2012 was done. Abdominal tuberculosis was diagnosed in 46 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 114 patients of chronic abdominal pain with unsettled diagnosis. Peritoneal tuberculosis was diagnosed in 46 of them, characterized by presence of ascites, multiple whitish tubercles, fibrous bands and adhesions, strictures of small intestine, hyperemic edematous bowel loops or dense adhesions etc. Peritoneal biopsy confirmed the diagnosis in 28 of the 46 (60.86 %) patients. In 18 patients due to clinical impression, radiological findings and raised ascitic fluid ADA a therapeutic trial with antituberculosis treatment was given. All patients showed good response to antitubercular treatment. Thus laparoscopy provided positive diagnosis of tuberculosis in 46 patients with positive histology in 28 (60.86 %) and inferred diagnosis in 18 (39.13%) patients of abdominal tuberculosis.
Conclusions: Laparoscopy is safe and helpful in the diagnosis of peritoneal as well as intestinal tuberculosis. In patients suspected to have abdominal tuberculosis early laparoscopy may be useful to establish a histological diagnosis with acceptably low morbidity (<5 %). An early resort to laparoscopy can resolve the diagnostic dilemma and early treatment can be instituted.

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

INTRODUCTION

Tuberculosis still remains one of the leading causes of death worldwide. According to WHO report 9.6 million people are estimated to have fallen ill with tuberculosis, of which 58% were in the South-East Asia and Western Pacific regions. India, Indonesia and China had the largest number of cases: 23%, 10% and 10% of the global total. Worldwide about 37% new cases of Tuberculosis went undiagnosed or were not reported.[1]

The problem of TB is re-emerging globally and is further complicated by AIDS/HIV infection and the use of immunosuppressant drugs. To reduce the burden of tuberculosis detection and treatment gaps must be addressed.

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.[2,3] 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, Gandhi Medical College, Bhopal, MP, India.

METHODS

This prospective and retrospective study on role of laparoscopy in diagnosis of abdominal tuberculosis was carried out in Department of Surgery, Gandhi Medical College, Bhopal, MP, India from July 2007 to Dec 2012. In this study 114 adult patients who underwent diagnostic laparoscopy for chronic abdominal pain with unsettled diagnosis were included. The study was approved by the ethical committee of our hospital and informed consents were taken from the patients.

Inclusion criteria

- Abdominal pain of more than three months duration with or without history of fever, distension of abdomen, loss of appetite or loss of weight.
- Recurrent episodes of sub-acute intestinal obstruction with or without history of previous pulmonary tuberculosis.
- Patients for evaluation of ascites with unsettled diagnosis on imaging studies.

Exclusion criteria

- Patients presenting with acute intestinal obstruction or evidence of peritonitis on clinical evaluation.
- Patients with chronic pain of abdomen and diagnosed cases of active pulmonary tuberculosis already receiving anti tubercular treatment.
- Patients with chronic liver disease, cirrhosis or obvious carcinoma.
- If laparoscopy was contraindicated.

All the patients who presented with chronic abdominal pain of more than three months duration were investigated for with complete blood picture, ESR, blood sugar, Liver function tests, kidney function tests, x-ray of chest and abdomen, sputum for AFB, serum ADA, and ultrasound of abdomen. CT scan of abdomen and enteroclysis were done whenever felt necessary. Tumor markers like CEA, CA 19-9 and CA-125 were also done in elderly patients and as per clinical suspicion. Seven of these patients also underwent colonoscopy for evaluation of thickened Cecum on imaging studies.

Abdominal tuberculosis was diagnosed in 46 of these patients. 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.

Laparoscopic technique

Laparoscopy was done under general anesthesia in all patients. A 10mm 300 laparoscope was used through umbilical port for visualization. One additional 5 mm port was inserted under vision in left lower quadrant for bowel holding forceps, biopsy forceps or aspiration of ascitic fluid. The whole of peritoneal cavity was sequentially visualized using trendelenberg and reverse trendelenberg positions, and right or left tilt as required. Starting from the pelvis the uterus, ovary, uterine adenexa in females, rectum and sigmoid colon, ileocecal region, Cecum, appendix, ascending colon were visualized and examined.

The patient was then turned in reverse trendelenberg position for examination of upper abdomen. Transverse colon, stomach, duodenum, gallbladder, liver, spleen and descending colon were serially examined. With the help of bowel grasping forceps the whole length of small bowel could be walked over for direct visualization and examination.

RESULTS

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.

Amongst 114 patients majority were females 73 (64.03 %) and 41 were males. The distribution of patients in different age groups was as per table below. Most of the patients were between 30-50 years age group (Table 1).

Clinical symptoms: Abdominal pain was the most common presentation (94.73 %), followed by low grade fever (31.57 %) and distension of abdomen (29.82%).

Signs: Physical sign on abdominal examination in were very infrequent and nonspecific. Clinically detectable ascites was seen only in 5 patients. Doughy abdominal feel & lump in abdomen were suggestive but present in a few cases only (Table 3).

Table 1: Age wise distribution of patients.

Age group Yrs	Male	Female	Total	Percentage
11-20 yrs	7	8	15	13.15%
21 -30 yrs	7	14	21	18.42%
31 -40 yrs	11	26	37	32.45%
41 -50 yrs	7	15	22	19.29%
51 -60 yrs	5	6	11	9.64%
>60	4	4	8	7.01%
Total	41 (35.96%)	73 (64.03%)	114	

Table 2: Clinical symptoms.

Symptoms	No of cases	Percentage
Abdominal pain	108	94.73 %
Vomiting	14	12.28 %
Distension of abdomen	34	29.82 %
Low grade fever	36	31.57 %
Loss of weight	18	15.78 %
Loss of appetite	18	15.78 %
Lump in abdomen	06	05.26 %

Table 3: Physical signs.

Physical signs	No of cases	Percentage
Doughy abdomen	18	15.78
Lump in abdomen	06	05.26 %
Clinically detectable free fluid. (Ascites)	05	04.38 %

Table 4: Radiological findings.

Radiological Studies	No of studies done	No of cases with abnormal findings	Abnormal Findings Seen
USG abdomen	114	54	Bowel mass lesions (4), loculated collections, ascites (septate/particulate) (21), peritoneal thickening (4), omental thickening (2), nodularity, mesenteric lymphadenopathy (15), calcified lymph node (1), hydrosalpinx/ tuboovarian mass (2), ovarian cyst (11), bulky uterus (8).
Enteroclysis	22	15	Strictures (4), dilated small intestine (15), delay in emptying (7), irregularity with narrowing of terminal ileum (string sign)(2), filling defect of Cecum/ ascending colon with or without vertical shortening(6), adhesions (4).
CTscan abdomen	52	22	Bowel mass/ pelvic mass (6), dilated small bowel loops (11), strictures (6), ascites (11), mesenteric lymph node enlargement (2), peritoneal thickening (2), omental thickening (2).

Table 5: Final diagnosis after laparoscopy.

Final Diagnosis after laparoscopy		No of cases n=114		Percentage
Abdominal tuberculosis		46		40.35%
Adenocarcinoma (stomach, pancreas, colon)		4		03.50%
Postoperative adhesions		12		10.52%
Bands		06		05.26%
Chronic appendicitis		12		10.52 %
Gynaecological pathology	Tubo-ovarian mass	02	22	19.29%
	Pelvic inflammatory disease	07		
	Bulky uterus	04		
	PCOS/ benign ovarian cysts	08		
	Endometriosis	01		
No abnormal findings		12		10.52%

Table 6: Laparoscopic findings.

Laparoscopic findings in patients diagnosed as abdominal tuberculosis	No of cases n = 46
Tubercles/nodules (Peritoneum, Omentum, Small bowel)	34
Ascites	44
Adhesions/ bands/ bowel mass	11
Stricture of small bowel	5
Hyperemic edematous bowel loops	4

Table 7: Histopathology.

Histopathology	No of cases
Granuloma with giant cell/ lymphocytes	22
Caseation	06
Adenocarcinoma	4
Nonspecific hyperplastic lymphadenitis	4
Inconclusive	2

Table 8: Therapeutic procedures done laparoscopically.

Therapeutic procedures done laparoscopically	No of cases
Laparoscopic adhesiolysis, band excision	18
Laparoscopic appendectomy	24
Total	42

Laboratory test: A moderate degree of anemia was seen in 57.01% patients. ESR was raised in 29.82%.

Radiological Studies: Chest X-ray showed abnormal findings in 7.01% patients. Radiological studies and main findings were as per table below (Table 4).

Mucosal lesions involving Cecum was noted in 4 patients. Colonoscopic biopsy was insufficient or inconclusive in 3 patients and confirmed malignancy in 1 case.

Figure 1: Adhesions, ascites and tubercles seen on laparoscopy.

Final diagnosis after laparoscopy

Laparoscopic findings and final diagnosis were considered positive if pathological lesions seen in laparoscopy could be attributed to patient′s symptoms. In our series a conclusive diagnosis could be established in 102 out of 114 patients. Thus in our study laparoscopy had a diagnostic rate of 89.47%. The most common abdominal pathologies found were abdominal tuberculosis (40.35%), Gynecological pathologies in females (19.29%), chronic appendicitis (10.52%), postoperative adhesions, bands and abdominal malignancies. Of the 46 patients diagnosed as abdominal tuberculosis 28 (60.86) were females and 18 were males (Table 5).

Twelve patients had no abnormal findings on laparoscopy and laparoscopic appendectomy was also done in these patients to avoid future diagnostic dilemma. These patients were followed for varying length of time and no ominous findings were observed in these patients.

Laparoscopic findings

At laparoscopy, 34 of these patients had peritoneal granularity, tubercles or nodules with or without adhesions & ascites. Histopathology from the peritoneal biopsy established the diagnosis of tuberculosis in 28 patients, whereas metastatic adenocarcinoma was reported in 4 cases. In two patients histopathology was inconclusive. 44 patients had ascites. Ascitic fluid was tested for microscopic examination, biochemical analysis, ADA and cytology. Other findings on laparoscopy were bowel adhesion, bands, stricture of small bowel, dilated edematous bowel loops, tuboovarian mass, hydrosalpinx, ovarian cyst, bulky uterus etc. (Table 6)

Histopathology

The diagnosis of abdominal tuberculosis was confirmed on microbiological and/or histological examination in 28 (60.86%), while the remaining 18 (39.13%) were diagnosed based on the clinical presentation, radiological imaging and ascitic fluid ADA. All patients were commenced on anti-tubercular treatment (DOTS) (Table 7).

Ascitic fluid studies

Ascitic fluid was positive for AFB in only 2 patients. Culture for mycobacterium was requested in 12 cases and was positive in one case. PCR for mycobacterial DNA was done in 6 cases and was positive in two cases. Ascitic fluid ADA was highly raised in 11, equivocal in 18 and below 37 U per Litre in 13 cases.

Therapeutic procedures done laparoscopically (Table 8)

Complications

patients in the study had umbilical port site wound infection which was controlled by antibiotics. Two patients had postoperative paralytic ileus necessitating prolongation of hospitalization. There were no major procedure or anesthesia related complications.

DISCUSSION

In our study laparoscopy provided a positive diagnosis in 102 (89.47%) of the patients of chronic abdominal pain with unsettled diagnosis. So the diagnostic dilemma could be resolved in 89.47% of cases and the remaining patients could be reassured of not having a serious abdominal illness.

The common causes of chronic abdominal pain were abdominal tuberculosis, Gynecological pathology, bands, adhesions, chronic appendicitis and abdominal malignancy in our study. In many developing countries including India infectious disease like tuberculosis is a more common cause of chronic abdominal pain than cancer. In our study also tuberculosis of abdomen (40.35%) was the most common cause for chronic abdominal pain. Many other authors have in their studies reported abdominal Tuberculosis as common cause of chronic abdominal pain. Mallik et al (72%), Al-Akeely MH (45.71%), Virendra Athavale et al (30%), Sayed ZK (21.8%).

The most common presenting complaints of abdominal tuberculosis are abdominal pain, fever, distension of abdomen and weight loss. Clinical symptoms and signs are usually insufficient, ambiguous and often misleading for a conclusive diagnosis in chronic abdominal pain. In our study radiological studies USG, Enteroclysis and CT scan did showed strictures, adhesions, dilated bowel loops, bowel wall thickening, mass lesions and presence of ascites suggesting indirectly about abdominal pathology. But most of these findings are nonspecific and not helpful in reaching a conclusive diagnosis. This fact has been experienced by many authors in different studies on laparoscopy for chronic abdominal pain.[4,5,8,12]

Conclusive diagnosis of tuberculosis requires microscopic identification of AFB after Ziehl-Neelson stain, culture on Lowenstein-Jensen medium or by characteristic histopathologic findings. Identification of AFB on smears and culture have poor yield and low sensitivity. Microscopy requires a large number of mycobacterial to be present in smear (>5000 - 10000/ml). Proportion of cases detected on microscopy is very low (<20%). Mycobacterial cultures are more sensitive than smear microscopy and require fewer bacilli (10-100/ml) but are slow and difficult to implement. Polymerase chain reaction (PCR) for mycobacterial DNA of tissue or ascitic fluid is a rapid, sensitive, and specific (98-100%) method of diagnosing tuberculosis. While the sensitivity of PCR in AFB smear-positive patients is 95%, in smear

negative patients it is very low (only 48%). Serodiagnosis for detecting Mycobacterial antigens or antibodies has largely failed to provide adequate sensitivity and specificity. Sensitivity of serological tests is much low in smear negative cases, extrapulmonary disease, HIV positive patients and children. Ascitic fluid ADA has also been used for diagnosis of abdominal tuberculosis. ADA has been used in the evaluation of lymphocytic pleural effusions or peritoneal ascites. ADA test is not specific but it may be positive even when number of Mycobacterium is very low and can be used as an adjunct test for diagnosing tuberculosis. Specimens with low ADA levels exclude tuberculosis from consideration. Tubercular pleural effusions and ascites can be diagnosed by increased levels of pleural or ascitic fluid adenosine deaminase, above 40 U per litre. However in cirrhotic patients with low protein ascites, false-negative results for ADA are quite common as well.

Laparoscopic finding in patients of abdominal tuberculosis are tiny peritoneal tubercles or nodules, ascites, bowel mass, adhesions, multiple small bowel strictures, pelvic adhesions, tuboovarian mass, hydrosalpinx, pyosalpinx, perihepatic adhesions (Fitz-Hugh-Curtis syndrome), hyperemic edematous bowel, omental thickening or nodularity and mesenteric adenopathy. Besides directly visualizing the pathology laparoscopy has the advantage of providing tissue and ascitic fluid for histopathology and more definitive tubercular testing. In our study tiny peritoneal tubercles or nodules (34 cases) and minimal ascites (44 cases) were distinctly visible on laparoscopy, and tissue and ascitic fluid were retrieved for histological, cytological or further definitive studies. Only four out of 114 patients had findings of peritoneal deposits or thickening on radiological investigations (USG and CT Scan abdomen) ($p<0.01$). USG and CT scan abdomen combined together could pick up ascites in 21 cases, whereas ascites was found in 44 cases on laparoscopic examination ($p<0.01$). Adhesions were reported in 4 cases on radiological investigations & bands could be detected in none of the patients, whereas on laparoscopy 12 patients were found to have adhesions and 6 patients had bands as the cause of chronic abdominal pain ($p<0.01$). Thus diagnostic laparoscopy clearly scores above the imaging studies in picking up tubercles, nodules, minimal ascites, bands and adhesion. And these findings were found to be clinically significant ($p<0.01$).

It is thus clear that laparoscopy provides an opportunity for the surgeon to look and see rather than rely on indirect means to presume about the surgical pathology. It also simultaneously provides tissue and ascitic fluid for the all important confirmation of histological diagnosis and definitive testing for tuberculosis. In our study abdominal tuberculosis was confirmed by histological diagnosis in 28 patients (60.86%) and on the basis of clinical features, radiological findings and ascitic fluid ADA as inferred diagnosis in 18 patients (39.13%). Finding no abnormal pathology on laparoscopic exploration in patients suspected to have malignancy or abdominal tuberculosis is also considered a useful outcome, as this provides reassurance to the patients and avoids further costly investigations & treatment. Thus our study highlights the positive role of laparoscopy in patients of chronic abdominal pain with suspicion of abdominal tuberculosis.

Similar observations have also been made by other authors from different countries. Chien Min Han et al in their study on diagnostic laparoscopy in ascites of unknown origin concluded that laparoscopy with peritoneal biopsy can clarify the causes of unexplained ascites in the majority of cases. It failed to reveal any gross abnormality in only 15% of cases. Sanai FM et al in their systematic review of tubercular peritonitis observed that diagnostic laparoscopy with peritoneal biopsy for histopathological examination is preferred both for the diagnosis of peritoneal tuberculosis and to rule out other diseases such as malignancy. Fatih Ermis et al in their study of 1484 patients, who underwent diagnostic laparoscopy over a twenty year period, observed that laparoscopy remains the most reliable, safest, and quickest method for the diagnosis of peritoneal tuberculosis. Ibrarullah et al, S Rai et al, A Mohamed et al and Bhargava et al also in their independent studies have found laparoscopy to be safe, reliable and preferred method for the diagnosis of abdominal tuberculosis. In our study also besides laparoscopy and biopsies, therapeutic surgeries were performed laparoscopically in 44 patients. There were no major laparoscopy or anesthesia related complications. Most of patients were discharged in a 2-4 days. Morbidity was 4.38% and there was no mortality.

CONCLUSION

We conclude that abdominal tuberculosis should be suspected in patients with chronic abdominal pain and ascites. A diagnostic laparoscopy should be done for histological confirmation as no clinical, laboratory or radiological finding can give a conclusive diagnosis. The role of laparoscopy is expected to become more important and mandatory in the diagnosis and management of abdominal tuberculosis. Our study establishes the role of diagnostic laparoscopy as a safe and useful adjunct to other diagnostic modalities in management of abdominal tuberculosis. Clinical Significance: Laparoscopy despite being distinctly better is still not popular and frequently used as a diagnostic tool in evaluation of patients with nonspecific chronic abdominal pain. The findings in our study underline the importance of laparoscopy in management of these patients. It is well known that abdominal tuberculosis carries good prognosis if promptly diagnosed and treated early. But in many patients presenting with chronic abdominal pain blood tests, serological tests and imaging studies fail to confirm any diagnosis. Many patients remain undiagnosed for prolong periods because conclusive diagnosis largely depends upon histology and

further evaluation of ascitic fluid, which requires invasive intervention in form of laparoscopy. This delay results in prolonged morbidity and complications like perforation & intestinal obstruction which are so common in surgical practice. It not only results in inevitable emergency abdominal surgery but is also associated with morbidity & mortality. The lack of accurate diagnosis leads to undesirable burden of human sufferings and wastage of resources. A conclusive diagnosis of abdominal tuberculosis either by histology, smear examination for AFB, culture, PCR or ascitic fluid ADA is becoming a necessity in present day scenario for initiation of antitubercular treatment. It is difficult due to need for invasive access to the involved area i.e. peritoneum, small intestine mainly terminal ileum, ileocecal region, mesenteric lymph nodes etc by means of laparoscopy and/or colonoscopy. Minimally invasive laparoscopy and peritoneal biopsy thus has an intermediary space in the diagnosis of abdominal tuberculosis. Minimally invasive laparoscopy in such patients provides an opportunity for directing visualizing the peritoneal cavity and retrieving tissue or ascitic fluid for histology or further evaluation. Laparoscopy is very safe, can obviate the need for a full exploratory laparotomy & minimize the surgical trauma in chronically ill patients. Early diagnosis with the help of laparoscopy allows an early initiation of anti tubercular therapy with advantages for the patients and savings to health care system

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Ethical Committee of Gandhi Medical College, Bhopal

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Cite this article as: Saxena P, Saxena S. The role of laparoscopy in diagnosis of abdominal tuberculosis. Int Surg J 2016;3:1557-63.