World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Laparoscopy: An answer to ascites of undetermined origin: Retrospective study

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World Journal of Advanced Research and Reviews, 2022, 14(03), 586–596

Publication history: Received on 21 May 2022; revised on 22 June 2022; accepted on 24 June 2022

Article DOI: https://doi.org/10.30574/wjarr.2022.14.3.0609

Abstract

Background: Ascites, many of times remained unclassified by Clinical, laboratory and radiological tests. Laparoscopy provides answer to these cases as it has high diagnostic role, Pre therapeutic, Observation and staging of diseases & therapeutic roles. Diagnostic laparoscopy is a cost-effective procedure with overall high accuracy.

Methods: This was a Retrospective study including all the patients who have been explored for exudative ascites. The study was conducted at Amandeep Hospital Pathankot, Punjab, India in all patients admitted in the department of gastroenterology in collaboration with department of general surgery from June 2015 to June 2022. Fifty patients with low SAAG ascites were included for the study, who underwent laparoscopy to find out various etiologies of ascites.

Results: Most of the patients in our study were in age group of 21-40(50%) years with mean age of 38 years. 60% were females, while as 40% were males. Ascitic fluid analysis revealed a predominance of lymphocytes on cytological analysis in (75%), exudative (SAAG<1.1g/dl) in (95%) of patients. High Ascitic fluid ADA was found in (70%). Culture of ascitic fluid & ZN Staining was positive in none. Abdominal CT scan, Peritoneal and mesenteric thickening (60%) and mesenteric adenopathy (50%), peritoneal nodes in (26%) of cases. The predominant laparoscopic findings of the patients in our study were ascites (100%), peritoneal nodules (88%), adhesions (70%), and Congested peritoneum (64%). Cirrhosis was also noted in (10%) cases. Most common postoperative diagnosis of the patients were abdominal tuberculosis (60%), abdominal malignancy (24%). Cirrhosis was in (8%) cases and unremarkable in (8%) of patients.

Conclusion: It can be safely concluded that diagnostic laparoscopy is a safe, quick, and effective adjunct to diagnostic modalities, for establishing a conclusive diagnosis, but, whether, it will replace imaging studies as the primary modality for diagnosis, needs more evidence.

Keywords: Ascites; Laparoscopy; Abdominal Tuberculosis; Malignancy; Cirrhosis

1. Introduction

Ascites, although frequent clinical condition, but at-times may be difficult to diagnose. Ascites can get accumulated in conditions with normal peritoneum, classical example being cirrhosis and also in abnormal peritoneum and the prototype example is peritoneal tuberculosis. Clinically, on the basis of ascitic fluid analysis, patient is graded into High SAAG Ascites, (related to portal Hypertension) and Low SAAG ascites (Not related to portal Hypertension). Diagnostic laparoscopy is indicated for accurate diagnosis of ascites when abdominal ultrasonography, CT abdomen and diagnostic paracentesis have failed to determine the cause of ascites [1]. Laparoscopy is a minimally invasive surgical procedure because it requires a much smaller incision than traditional surgery does, causing less damage to nerves, muscles, and

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skin. It can be performed with only local anesthesia and a mild sedative. Laparoscopy is very sensitive for small malignant or benign peritoneal implants. So that is why people advocate the role of Laproscopy/ Peritoneoscopy for those patients in which we cannot find nature and etiology of ascites remained an enigma, despite the aggressive clinical, biochemical and radiological workup. In this study, we tried out to see what are the revelant findings and the exact etiology for undetermined ascites.

Aims and objective

To evaluate the role of laparoscopy in determining the etiology of undetermined ascites.

2. Material and methods

2.1. Study design

Retrospective descriptive study.

2.2. Study population

This was a Retrospective study including all the patients who have been explored for exudative ascites. The study was conducted at Amandeep Hospital Pathankot, Punjab, India in all patients admitted in the department of gastroenterology in collaboration with department of general surgery from June 2015 to june2022. Fifty patients with low SAAG ascites were selected for laparoscopy. Presenting complaints, duration of illness, finding on clinical examination, and information from the hematological, biochemical and radiological investigations were recorded. Abdominal ultrasonography was carried out. After all negative work up, patients were subjected to Diagnostic evaluation.

2.3. Inclusion criteria

Patients with exudative ascites of undetermined etiology, after recording their clinical, biochemical, hematological and radiological imaging.

2.4. Exclusion criteria

- Contraindication for pneumoperitoneum/laparoscopy.
- Contraindication to general anesthesia
- Patients with markedly distended bowel loops.
- Uncorrected coagulopathy.

2.5. Equipment

- Anesthetic setup for general anesthesia
- Laparoscopic equipment which include
  - 0 degree and 30 degree angled laparoscope either 10mm or 5 mm diameter.
  - 5 mm laparoscopic instruments including;
    - Maryland dissector
    - Blunt tip dissection forceps
    - Cut biopsy forceps
    - A-traumatic grasping forceps
    - Scissor.
  - 5 mm or 10 mm suction
  - Insufflators and light source
  - Electrocautery unit.

2.6. Method

- Informed written consent.
- Patient to be kept fasting for 12 hours pre-operatively.
- Pre-operative antibiotics to be administered intravenously in all patients with 30 minutes prior to surgery.

- General anesthesia.
- Surgery.
- Tissues biopsy obtained during laparoscopic examination was sent to department of pathology, for histopathological examinations.

3. Observation and Results

Table 1 Age Distribution of patients.

Age Group(in years)	Number patients	Percentage %	Range
15-20	5	10	15-68
21-40	25	50	
40-60	15	30	
>60	5	10	
Total	50	100	

Most of the patients in our study were in age group of 21-40(50%) years with mean age of 38 years and range 15 – 68 years.

Table 2 Gender Distribution of patients

Gender	Number	Percentage %
Male	20	40
Female	30	60
Total	50	100

60% were females, while as 40% were males.

Table 3 Symptomatology of patients

Symptom	Number of patients	Percentage%
Abdominal pain	44	88
Fever	35	70
Anorexia	33	66
Weight loss	30	60
Abdominal distention	17	56
Night sweats	15	30
Constipation	14	28
Pulmonary symptoms	5	10

Most common symptom of the patients in our study were abdominal pain (88%), Fever (70%), anorexia (66%) and weight loss (60%), abdominal distention (56%). Night sweats (30%), Constipation (28%) and pulmonary symptoms were also present.

Table 4 Clinical findings of the patients

Signs	Number of patients	Percentage %
Ascites	47	94
Fever	40	80
Pallor	39	78
Abdominal tenderness	24	48
Splenomegaly	5	10
Hepatomegaly	4	8
Peripheral lymph nodes	4	8

Most common physical findings of the patients in our study was ascites (94%), fever(80%), anemia and abdominal tenderness (48%).other findings on physical examination were splenomegaly (10%), hepatomegaly(8%) and peripheral lymph nodes in (8%).

Table 5 Laboratory results of patients

Test	Number of patients tested	Positive findings	Percentage%
Hemoglobin (g %) <10	50	40	80
Raised ESR >60	50	38	76
WBC count /mm3 >10, 000	50	36	72
Mantoux test	50	20	40
Serum albumin level(g/dl)<3	50	30	60
Sputum for AFB	50	7	14
Tumor markers	50	10	20

Low Hemoglobin was most common laboratory finding in our study (80%) cases. Raised ESR and WBC count were seen in (76%) and (72%) patients respectively .low serum albumin was found in (60%) of cases, Mantoux test was positive in (40%) of patients. sputum microscopy for AFB was positive in (14%) cases.

Table 6 Biochemical Analysis of ascitic fluid

Test	Number of patient tested	Number of patients with positive findings	Percentage
Lymphocytosis	40	30	75
SAAG(<1.1g/dl)	40	38	95
Z and N staining	40	0	0
ADA level (>36U/L)	40	28	70
Culture for MTB	40	0	0
Malignant cells	40	8	20

Ascitic fluid analysis revealed a predominance of lymphocytes on cytological analysis in (75%) of patients. Ascites was exudative (SAAG<1.1g/dl) in (95%) of patients. Ascitic fluid ADA was found in (70%) of patients. Culture of ascitic fluid was positive for MTB in (0%) of cases where as Z&N staining was positive in (0%) of patients.

Table 7 Abdominal CT scan findings of the patients**.**

CT scan findings total patients tested(50)	**Positive findings (number of patients)**	**Positive findings (percentage of patients %)**
Ascites	50	100
Peritoneal and mesenteric thickening	30	60
Mesenteric adenopathy	25	50
Peritoneal nodules	13	26
Hepatomegaly	4	8
Splenomegaly	4	8
Gallbladder stones	1	2

Majority of patients in our study had ascites (100%) as predominant finding in the abdominal CT scan, followed by peritoneal and mesenteric thickening (60%) and mesenteric adenopathy (50%), peritoneal nodes in (26%) cases. Hepatomegaly, splenomegaly in (8%) cases each and least common findings was gallbladder stones.

Table 8 Laparoscopy findings of the patients

Laparoscopy findings	**Number of patients (total =50)**	**Percentage %**
Ascites	50	100
Peritoneal nodules	44	88
Adhesions	35	70
Congested peritoneum	32	64
Cirrhosis	5	10
Normal appearance	4	8

The predominant laparoscopic findings of the patients in our study were ascites (100%) followed by peritoneal nodules (88%), adhesions (70%), congested peritoneum (64%). Cirrhosis were also noted in (10%) cases. Laparoscopic findings were unremarkable in (8%) of patients.

Table 9 Diagnosis made after Diagnostic laparoscopy

Postoperative diagnosis	**Number of patients**	**Percentage %**
Abdominal tuberculosis	30	60
Abdominal malignancy	12	24
Cirrhosis	4	8
Normal appearance	4	8

Most common postoperative diagnosis of the patients in our study were abdominal tuberculosis (60%) followed by abdominal malignancy (24%).Cirrhosis were also noted in (8%) cases and laparoscopy was unremarkable in (8%) of patients.

Histo-pathological report of laparoscopically assisted peritoneal tissue biopsy revealed chronic granulomatous inflammations in (68%) cases. Metastatic adenocarcinoma was present in (16%) patients, lymphomas in (4%) of cases and liver cirrhosis in (8%) of cases. No histo-pathological abnormality was detected in (4%) of cases.

Table 10 Histopathology Reports of the peritoneal biopsies

Histopathology report	Number of patients	Percentage %
Chronic epitheliod granulomatous inflammation	34	68
Metastatic adenocarcinoma	8	16
Lymphomas	2	4
Liver cirrhosis	4	8
Normal report	2	4

Table 11 Post-operative complications

Complications	Number	Percentage %
Prolonged ascitic fluid leakage	1	2
Port site infections	2	4

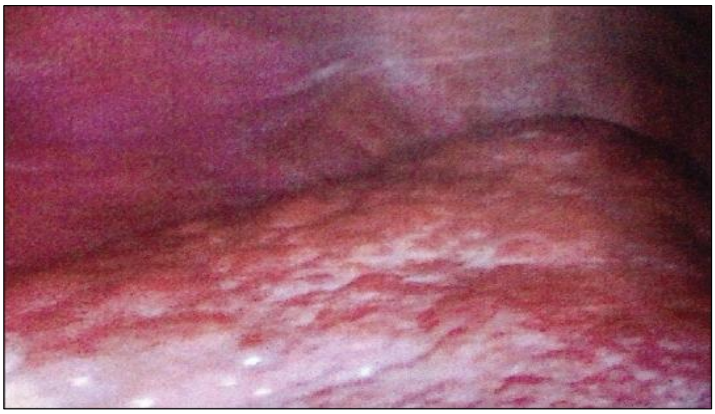

Figure 1 Cirrhosis of liver

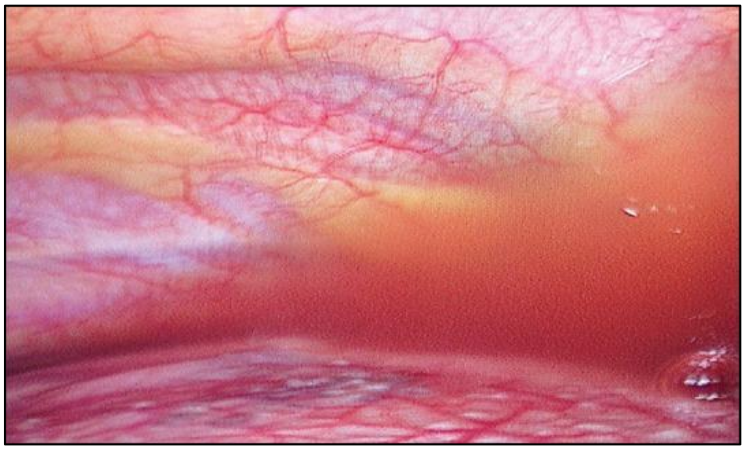

Figure 2 Abdominal tuberculosis

Figure 3 Pelvic Adhesions

Figure 4 Massive Ascitis

4. Discussion

This was a Retrospective study of the total 50 patients with ascites of unknown etiology who were subjected to diagnostic laparoscopy after thorough clinical and laboratory and radiological work-up, studied over 6 years from June 2015 to June 2022.

Exudative ascites of unknown origin in women are dominated by tuberculosis and peritoneal carcinomatosis requiring diagnosis and early care (2, 3). The means of imaging (ultrasound, CT scan, MRI) have limited coverage in the etiological diagnosis of exudative ascites (4, 5). Several series of literature (6-12), confirmed the feasibility of laparoscopy in the exploration of the ascites of unknown origin in women as well as its high sensitivity and specificity. The main advantage of laparoscopy compared with other explorations through optical magnification, it allows an excellent exploration of peritoneal surfaces and the abdomino-pelvic cavity (13). Biopsies are taken under direct control of the view, contrary to those obtained by imaging. Therefore, laparoscopy enables to distinguish between peritoneal tuberculosis and a carcinomatosis peritoneal (14).

During tuberculosis, three lesions have been described, most commonly associated in the same patient. Peritoneal granulations are color whitish or yellowish, uniform size, the size of a pin head, not exceeding 5 mm, divided equally as well at the level of the parietal peritoneum that visceral. Adhesions result from the Organization of fibrinous exudates, between two peritoneal layers. These adhesions can have an aspect cobweb or a thicker appearance like pillars or ropes (15). The inflammatory phenomena manifested by congestion, hypervascularisation and edematous state of peritoneum (16).

In our study majority of patients (50%) were in the age group of 20 to 40 years with mean age of 38 years, and age range of 15 to 68 years. Thirty (60%) cases were females and twenty (40%) cases were males (sex ratio of male/female =1.5). These figures correlate with the study conducted by, Mohammad Arif, Santosh V, ArashS. Rajput, (16).they reported a similar age distribution with 56% of their patients being in the range of 21 to 40 years , and sex ratio of male/female patients being 1.5 (number of male patients =30 , number of male patients 20).

Rooh Ul Muqin, et al (17) .also noted obvious majority of females 145 (58%) and a mean age of 37.5 years in their study of 250 patients. Abid H, et al (18).Also reported a mean age of 38 years in their study of 294 cases of peritoneal tuberculosis. Rustam Khan, (19). Studied a total of 209 patients with 123 (59%) cases being females and mean age being 33 years. Tarcoveanu E, et al (20).reported age distribution of 17 to 74 years in their study.

The commonest type of presentation of the of the patients in our study were abdominal pain in 44 (88%) cases. This figure is comparable with Rustam Khan, (19).Study who noted abdominal pain in 93% cases, Aouda H et al (21) .who also noted abdominal pain in 77% cases in their study.

In our study other common symptoms were fever70%, anorexia 66%weight loss 60%and abdominal distention in 56% of patients. These figures were consistent with the study Aouda H et al (21). Fever 68%, and weight loss 72%, anorexia 36%, Safarpor F, et al (22). 75% of cases and Abdelaal A et al, (23) also noted 56% of cases presented with weight loss in their study.

In our study other symptoms of patients were night sweats, (30%), constipation (28%), pulmonary symptoms in (10%) cases. These figures were comparable with the study conducted by Rustam Khan, (19), Aouda H et al (21) and Tarcoveanu E, et al (20). The predominant clinical findings in our study were ascites (100%), low grade fever (70%).these figures were comparable with Safarpor F, et al (22), Aouda H et al (21).

In current study pallor were noticed in 39 (78%) cases. Rai S, Thomas VM (24), noted a similar observation of anemia in >90% of cases in their study. Also observed that splenomegaly were present in (10%) cases hepatomegaly (8%) cases and peripheral lymph nodes in (8%) cases. Similar figures were noted in study by Tarcoveanu E, et al (20).And Aouda H et al (21).

In our study most common laboratory abnormality were low hemoglobin being present in 40 (80%) cases studied .Rai S, Thomas VM(24), reported a similar observation of low hemoglobin in more than 90% of cases .We also observed in our study that leukocytosis were present in 72% of patients, hypoalbuminemia in 60% cases, elevated ESR in 76% of cases . These figures were consistent with Tarcoveanu E, et al (20).study.

In our study, the ascitic fluid analysis revealed exudative type of ascites in 95% of cases. ManhorA et al (25).and Sandikci MU, et al (26) reported these figures in 96.4% and 95.5% of the cases respectively.In the current study, ascitic fluid ADA (>36U/L) were seen in 28 (70%) patients .this figure is consistent with several other studies as Bharagava DK et al (27) study.

We also observed in our study that commonest findings on CT scan were ascites 50 (100%) cases .Similar findings were noted in study conducted by Salgado Flores L, et al (29) with corresponding figures of 100%.Tarcoveanu E, et al (20). Reported corresponding figures of 89% in their study.

In our study , mesenteric lymphadenopathy were present in 25 (50%) cases and peritoneal and mesenteric thickening in 30 (60%) patients .these findings correlate with Salgado Flores L, et al (28)as 50% and 58% respectively. Abdelaal A et al, (23)in their study showed ascites in 37 patients (90%), bowel nodules in 22 (54%), peritoneal thickening and nodules in 37 (90%) and enlarged mesenteric lymph nodes in 11 (27%).M.B Mabrouk et al (29).also noted in their study with a peritoneal thickening in 32 cases (38.5%), peritoneal nodules in 15 cases (18%), and agglutination of the digestive handles in 12 cases (14.4%), intra-abdominal

Lymph nodes in 17 cases (20.5%). An ovarian mass was found in 12 cases.

In our study we note that during diagnostic laparoscopy 50 (100%) cases had ascites. These findings were consistent with the study by Sandikci MU, et al (26) who reported ascites in 129 (95.5%) from total of 135 patients.

In our study during laparoscopy, we also found that, homogenously distributed multiple, yellowish white, nodules were present in 44 (88%) cases over the peritoneum .Adhesions were seen in 35 (70%) cases congested peritoneum (in the form of thickening and hyperemia) in 32 (62%) cases. M.B Mabrouk et al (30).on diagnostic Laparoscopic noted

peritoneal nodules in 26 cases (31.3%), and peritoneal granules in 41 cases (49.4%). Other associated lesions were found: adhesions in 59 cases (71%), peritoneal hyperemia in 48 cases (57%), and agglutination of the digestive handles in 20 cases (24%). Only adhesions without nodules or granules were present in 8 cases (9.6%). similar findings on diagnostic laparoscopy were found by H Abid et al 2013) (18) in their study.

We also observed in our study that cirrhosis were present in 5 (10%) and splenomegaly4 (8%) cases. Tarcoveanu E, et al (20), In present study, there were 4 (8%) cases with normal laparoscopic appearance. Abdelaal A et al, (23). Also noted that 7% of patients had normal laparoscopic findings. We also note in our study that laparoscopic visual diagnosis were in favor of peritoneal tuberculosis in 30 (60%) cases, abdominal malignancy in 12(24%) cases and cirrhosis 4 (8%) cases. These findings were consistent with study by M.B Mabrouk et al (29), who also reported peritoneal carcinomatosis in 32 cases (38.5%), peritoneal tuberculosis in 45 cases (54.2%), and non-specific infection in 6 cases (7.3%), Luck et al(30). showed tuberculous peritonitis in 22 (66.7%) patients and carcinomatous peritonitis in 5 (15.2%) patients.

In our study, the histo-pathological findings of laparoscopic guided peritoneal biopsy established the diagnosis of peritoneal tuberculosis in 34(68%) patients whereas metastatic adenocarcinoma in 8(16%) cases and lymphoma in 2(4%) cases 4(8%) cases had cirrhosis. No histo-pathological abnormality were detected in 2 (4%) patients.

M.B Mabrouk et al (29).The histological diagnosis was a peritoneal carcinomatosis in 26 cases (31%), and peritoneal tuberculosis in 55 cases (66%), Luck et al(31). The histopathological diagnosis was granulomatous inflammation in 20(60.6%) and diagnosis of malignancy was made in 7(21.2%); one (3%) had Budd Chiari Syndrome, 4(12%) had cirrhosis of liver with super-added Hepatocellular carcinoma and biopsy was non –conclusive in 1 patient.

5. Conclusion

The etiological diagnosis of exudative ascites remains a difficult challenge despite the availability of wide range of often complex and costly complementary investigations. Currently, laparoscopy with peritoneal biopsies to establish histopathological diagnosis remains the gold standard for etiologic diagnosis.

Laparoscopy is able to achieve the final diagnosis and provide tissue diagnosis without any significant complication and less operative time. It can be safely concluded that diagnostic laparoscopy is a safe, quick, and effective adjunct to diagnostic modalities, for establishing a conclusive diagnosis, but, whether, it will replace imaging studies as the primary modality for diagnosis, needs more evidence.

Compliance with ethical standards

Acknowledgments

Department of General Surgery. Amandeep Hospital, Pathankot, Punjab, India.

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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