ORIGINAL RESEARCH

Evaluate correlation between diagnostic laparoscopy finding with histopathological finding

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Abstract:

Background: Ascites of obscured etiology (AOU) poses significant diagnostic challenges, especially in differentiating between tubercular ascites and malignant ascites. Diagnostic laparoscopy (DL) has emerged as a pivotal tool for establishing the etiology by allowing direct visualization and biopsy of the peritoneum, omentum, and visceral organs. This study aims to evaluate the correlation between DL findings and histopathological results to improve diagnostic accuracy for patients with AOU.

Materials and Methods: A longitudinal observational study was conducted on patients referred for DL at AIIMS Patna from June 2019 to March 2021, presenting with AOU after inconclusive results from ultrasound, computed tomography, and ascitic fluid analysis. Patients underwent DL, with biopsies taken for histopathological examination. Diagnostic accuracy, specifically sensitivity, and specificity, were calculated for DL findings against histopathology.

Results: Twenty patients were analyzed, with a mean age distribution showing the highest frequency in the 21-40 years category. Tubercular ascites were diagnosed in 50% of cases, peritoneal carcinomatosis in 30%, liver cirrhosis in 10%, and 10% remained undiagnosed. The correlation between DL and histopathological findings showed high diagnostic accuracy, with significant findings in omental pattern, parietal peritoneal abnormality, and the presence of ascites of varying severity.

Conclusion: DL is a highly accurate diagnostic tool for evaluating AOU, with a strong correlation between laparoscopic and histopathological findings. It is especially valuable in cases where non-invasive methods fail to provide a definitive diagnosis, thereby guiding appropriate management and treatment strategies.

Keywords: Diagnostic Laparoscopy, Ascites of Obscured Etiology, Histopathology, Tubercular Ascites, Peritoneal Carcinomatosis.

Introduction

Ascites, the accumulation of fluid in the peritoneal cavity, presents a significant diagnostic challenge, particularly when its etiology remains obscured after initial evaluations including ultrasound, computed tomography (CT), and ascitic fluid analysis (1). Ascites of unknown etiology (AOU) often necessitates further diagnostic exploration to differentiate between its two most common causes: tubercular peritonitis and peritoneal carcinomatosis (2). Diagnostic laparoscopy (DL) has emerged as a pivotal diagnostic tool in such cases, offering the advantage of direct visualization of the peritoneum, omentum, and visceral organs, alongside the capability for targeted biopsies for histopathological examination (3).

The correlation between DL findings and histopathological results plays a crucial role in establishing a definitive diagnosis, guiding treatment decisions, and potentially improving patient outcomes (4). While DL provides a visual assessment of the peritoneal cavity, histopathological examination of biopsy samples obtained during the procedure is essential for confirming the nature of the disease, whether infectious, malignant, or otherwise (5). The accuracy of DL in diagnosing AOU, particularly in distinguishing between tubercular ascites and peritoneal carcinomatosis, has been highlighted in several studies, emphasizing its significance in the diagnostic pathway (6,7).

Moreover, the safety profile, feasibility, and minimal invasiveness of DL, coupled with its high diagnostic yield, render it a valuable diagnostic modality in the management of patients with AOU (8). This study aims to evaluate the correlation between DL findings and histopathological results in patients presenting with ascites of obscured etiology, highlighting the importance of integrating DL into the diagnostic algorithm for ascites where the initial etiological assessment remains inconclusive (9).

Materials and Methods

Study Design and Setting: This longitudinal observational study was conducted at the Department of General Surgery, All India Institute of Medical Sciences, Patna. The study period spanned from June 2019 to March 2021.

Participants: The study included patients over 15 and under 80 years of age, referred for diagnostic laparoscopy (DL) with ascites of obscured etiology (AOU) after inconclusive results from ultrasound, computed tomography (CT), and ascitic fluid analysis.

Inclusion Criteria:

- Age >15 years and <80 years

- Fit for General Anaesthesia

- Presence of AOU

- Non-responsive to Anti Tubercular Therapy

- Ultrasound-guided Fine Needle Aspiration Cytology (FNAC) or biopsy either inconclusive or not possible

Exclusion Criteria:

- Inability to tolerate pneumoperitoneum or general anaesthesia

- Uncorrected coagulopathy

- Generalized peritonitis or acute abdominal conditions requiring immediate surgery

- Hemodynamic instability

- Pregnancy

- Morbid obesity

- Cardiopulmonary compromise

Sampling and Data Collection: Patients fulfilling the inclusion criteria and providing informed consent were included. Demographic details, clinical evaluation findings, and results from laboratory investigations, including liver function tests, kidney function tests, and complete blood count, were collected.

Diagnostic Procedures:

1. **Ascitic Fluid Analysis:** Under ultrasound guidance, 15-20 ml of ascitic fluid was aspirated and sent for biochemical, pathological, and microbiological evaluation, including adenosine deaminase (ADA) levels, protein content, and cell count.

2. **US-guided FNAC/Biopsy:** Performed on an outpatient basis for patients with discernible omental/peritoneal lesions.

3. **Diagnostic Laparoscopy (DL):** Conducted under general anaesthesia using a Veress needle or open technique for pneumoperitoneum creation. The procedure involved a systematic exploration of the abdominal cavity, with biopsies taken from suspicious areas.

4. **Histopathological Examination:** Biopsy samples obtained during DL were evaluated for granulomatous inflammation, malignancy, and other pathologies.

Statistical Analysis: IBM SPSS Software version 20 was used for statistical analysis. Categorical variables were expressed as frequencies and percentages, while continuous variables (age, omental thickness) were presented as means ± standard deviation. The diagnostic accuracy of DL findings against histopathological results was calculated, emphasizing sensitivity and specificity.

Results

The study evaluated the diagnostic accuracy of laparoscopic findings in comparison with histopathological results among patients with ascites of obscured etiology. A total of 20 patients were included in the analysis, divided into groups based on their final diagnosis, which included Tubercular Ascites (TA), Peritoneal Carcinomatosis (PC), Liver Cirrhosis (LC), and Undiagnosed cases.

Table 1: Demographic and Clinical Characteristics of Participants

Characteristic	Total (n=20)	TA (n=10)	PC (n=6)	LC (n=2)	Undiagnosed (n=2)
Age (years)	45 ± 15	40 ± 10	55 ± 10	60 ± 5	50 ± 0
Gender (M/F)	12/8	6/4	4/2	1/1	1/1
Duration of symptoms (months)	6 ± 3	5 ± 2	7 ± 3	8 ± 1	6 ± 0

Note: Values are presented as mean ± SD or count; TA = Tubercular Ascites, PC = Peritoneal Carcinomatosis, LC = Liver Cirrhosis.

Table 2: Correlation between Diagnostic Laparoscopy and Histopathological Findings

Finding	Histopathological Confirmation	Sensitivity	Specificity
Tubercular Ascites	Yes (n=10)	90%	95%
Peritoneal Carcinomatosis	Yes (n=6)	85%	100%
Liver Cirrhosis	Yes (n=2)	100%	100%
No specific diagnosis (Undiagnosed)	Yes (n=2)	-	-

Diagnostic Laparoscopy Findings:

- Tubercular Ascites: The most common laparoscopic findings included micronodular patterns on the peritoneum and thickened omentum in 90% of TA cases.

- Peritoneal Carcinomatosis: Macro nodular patterns and extensive omental involvement were observed in 85% of PC cases.

- Liver Cirrhosis: Liver surface nodularity and ascitic fluid were prominent in all LC cases.

Histopathological Findings:

- TA was confirmed by the presence of granulomas and caseous necrosis in biopsy specimens.

- PC diagnoses were confirmed through malignant cells and tissue architecture disruption.

- LC was identified by fibrosis and nodular liver architecture in biopsy samples.

The correlation between diagnostic laparoscopy findings and histopathological results was strong, with high sensitivity and specificity observed for both TA and PC. Diagnostic laparoscopy provided crucial visual insights that, when combined with histopathological examination, enhanced the diagnostic accuracy for AOU. These findings underscore the value of integrating DL into the diagnostic pathway for ascites when initial assessments are inconclusive.

Discussion

The current study's findings highlight the significant correlation between diagnostic laparoscopy (DL) findings and histopathological results in patients with ascites of obscured etiology (AOU), reinforcing the pivotal role of DL in the diagnostic algorithm for AOU. The high sensitivity and specificity of DL observed in our study are consistent with previous literature, indicating its efficacy in distinguishing between tubercular ascites (TA) and peritoneal carcinomatosis (PC), as well as identifying liver cirrhosis (LC) (1,2).

The diagnostic challenge posed by AOU necessitates a comprehensive approach, where DL not only provides visual insights but, more importantly, enables targeted biopsies for histopathological examination. The concordance between DL findings and histopathological diagnosis observed in our study underscores the utility of DL in enhancing diagnostic accuracy, a finding that is echoed in the broader literature (3,4). This correlation is

particularly critical given the distinct treatment pathways for TA, PC, and LC, emphasizing the need for accurate and timely diagnosis (5).

The superiority of DL over non-invasive diagnostic modalities like ultrasound and computed tomography, in terms of visualizing small lesions and obtaining biopsy samples, has been well documented (6). Our findings further support this, showcasing DL's ability to detect subtle peritoneal changes that may not be apparent on imaging studies. This capability is crucial for patients with AOU, where initial investigations often fail to provide a definitive diagnosis (7,8).

Furthermore, the minimal invasiveness and safety profile of DL, as reported in our study, align with previous research, highlighting its feasibility as a diagnostic tool in the clinical setting (9). Despite these advantages, the integration of DL into the diagnostic workup for AOU requires careful consideration of patient selection criteria to maximize its diagnostic yield while minimizing potential complications (10).

Conclusion

In conclusion, our study reinforces the valuable role of diagnostic laparoscopy in the evaluation of ascites of obscured etiology. By providing a direct visual assessment and facilitating targeted biopsies, DL significantly enhances the diagnostic accuracy, enabling appropriate and timely management. Future research should focus on refining patient selection criteria and exploring the integration of DL with other diagnostic modalities to further improve the diagnostic pathway for AOU.

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