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Etiological Profile of Exudative Ascites

Alaeeddine Hmina *, Hicham El bacha, Manal Cherkaoui Malki, Salma Mechhor, Nadia Benzzoubeir and Ikram Errabih

Independent researcher.

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Abstract

Introduction: Exudative ascites, unlike cirrhotic ascites, result from various—often severe—pathologies and require a rigorous diagnostic approach.

Objective: To determine the etiological profile of exudative ascites in a series of patients hospitalized in a gastroenterology department.

Methods: A retrospective, descriptive, monocentric study including 61 patients hospitalized for exudative ascites between July 2018 and July 2023 at Ibn Sina University Hospital in Rabat.

Results: The mean age was 52 years, with a male predominance (M/F sex ratio = 1.17). The main symptoms were abdominal distension (78.68%), impaired general condition (68.85%), and night sweats (16.39%). Ascitic fluid was lymphocytic in 90.16% of cases. The most frequent etiologies were peritoneal carcinomatosis and peritoneal tuberculosis. Laparoscopy was required in 65.57% of cases.

Conclusion: The etiological diagnosis of exudative ascites remains complex and often relies on laparoscopy. The two main identified causes were peritoneal carcinomatosis and tuberculosis.

Keywords: Exudative Ascites; Peritoneal Carcinomatosis; Peritoneal Tuberculosis; Diagnostic Laparoscopy

1. Introduction

Ascites is the pathological accumulation of fluid in the peritoneal cavity. While cirrhotic ascites represent the most common cause, exudative ascites—characterized by a high protein concentration (>25 g/L)—reflect diverse pathologies such as neoplasms, peritoneal infections, or inflammatory diseases [1]. The etiological diagnosis of exudative ascites is a true clinical challenge due to the wide range of possible causes and the often nonspecific presentation. The objective of this study was to describe the main etiologies diagnosed in our center and to assess the methods used to identify them [2].

2. Materials and Methods

We conducted a retrospective, descriptive, monocentric study within the Department of Hepato-Gastroenterology at Ibn Sina University Hospital in Rabat. Included were all patients hospitalized between July 2018 and July 2023 with a diagnosis of exudative ascites, defined as a protein level >25 g/L.

* Corresponding author: Alaeeddine Hmina

The data collected included:

- Demographic data (age, sex)
- Clinical presentation
- Biochemical and cytological characteristics of ascitic fluid
- Complementary investigations performed (imaging, laparoscopy, biopsies)
- Final etiological diagnosis

3. Results

3.1. Demographic characteristics

- Total number of cases: 61
- Mean age: 52 years
- Sex ratio (M/F): 1.17 (male predominance)

3.2. Clinical presentation

- Abdominal distension: 48 cases (78.68%)
- Impaired general condition: 42 cases (68.85%)
- Night sweats: 10 cases (16.39%)

3.3. Ascitic fluid analysis

- Protein: mean 49 g/L
- Lymphocytic cellularity: 55 cases (90.16%)
- Tuberculosis screening:
  - Positive in sputum, urine, or ascitic fluid in 7 cases (12.48%)
  - Interferon-gamma assay positive in 8 cases

3.4. Complementary Investigations

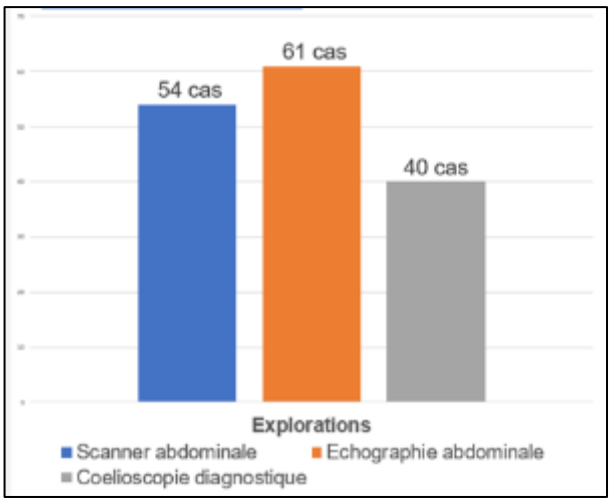

Figure 1 Type of Imaging Performed

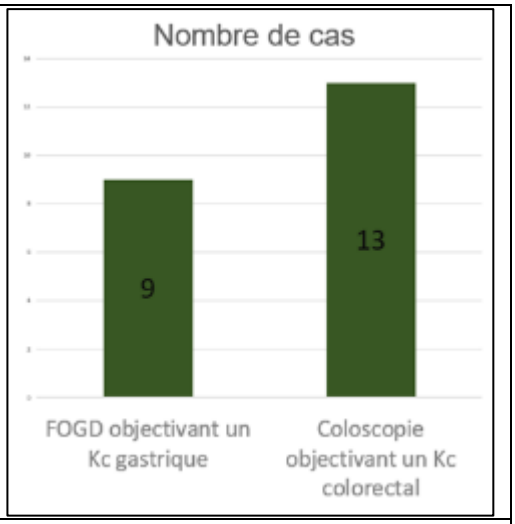

Figure 2 Results of Digestive Endoscopy

4. Identified Etiologies

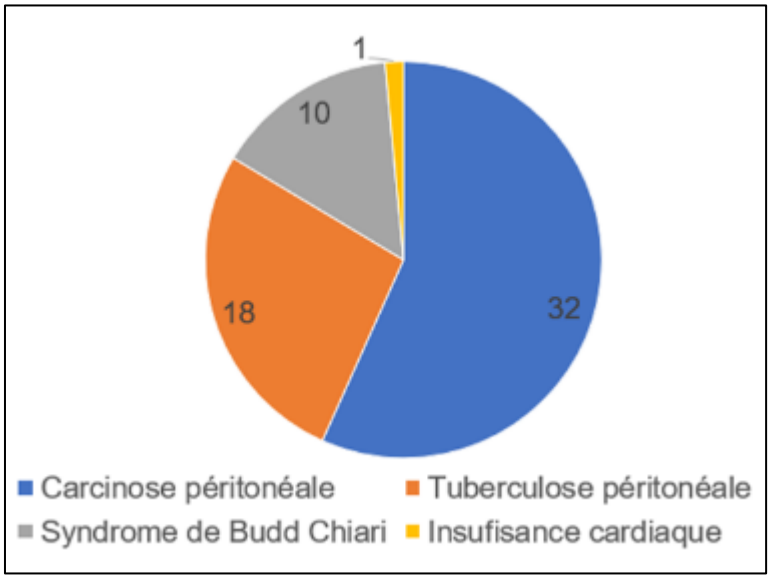

Figure 3 Identified Etiologies

5. Discussion

5.1. Initial Diagnostic Strategy

The evaluation of exudative ascites is primarily based on the clinical context. In our series, the majority of patients presented with abdominal distension (78.68%), often the revealing sign of a significant ascitic volume. Impaired general condition (68.85%) and night sweats (16.39%) were also observed, both representing warning signs suggestive of systemic or infectious causes. These findings are consistent with those reported in other studies, where such symptoms are frequently associated with tuberculous or neoplastic ascites [3,4].

From a paraclinical standpoint, abdominal ultrasound remains the first-line investigation, allowing confirmation of ascites and initial etiological orientation (peritoneal abnormalities, masses, lymphadenopathy). It is often complemented by abdominal CT, particularly for the assessment of peritoneal carcinomatosis or lymph node involvement [5].

5.2. Ascitic Fluid Analysis

Biochemical and cytological analysis of ascitic fluid is fundamental. In our cohort, the mean protein concentration was 49 g/L, confirming the exudative nature according to Light's criteria (protein > 25 g/L). More discriminatory still, the serum-ascites albumin gradient (SAAG) is typically <11 g/L in ascites not related to portal hypertension, as observed in peritoneal tuberculosis and carcinomatosis [6].

The lymphocytic predominance, found in 90.16% of our patients, is a strong etiological indicator, suggesting either tuberculous or neoplastic ascites—consistent with the main causes identified. Additional tests such as adenosine deaminase (ADA) or interferon-gamma assays can help guide toward tuberculosis. In our study, 8 patients tested positive for interferon-gamma, a useful though not yet fully standardized marker [7]. Detection of Mycobacterium tuberculosis in ascitic fluid or urine was positive in only 7 cases, highlighting the low sensitivity of direct microbiological tests (reported sensitivity <35%) [8].

5.3. Cytological and Microbiological Analysis

Cytological examination of ascitic fluid for malignant cells should be systematic in cases of exudative ascites. However, its sensitivity is variable, ranging from 50% to 90% across studies. In malignant ascites, cellularity is often mixed, but a lymphocyte-predominant pattern does not exclude malignancy, particularly in lymphoma. The use of immunocytochemistry can increase diagnostic yield [9].

Microbiological evaluation remains limited: cultures for *Mycobacterium tuberculosis* are slow (3–6 weeks) and poorly sensitive, while PCR is faster with moderate sensitivity (60–80%) but high specificity. Despite these tools, many cases remain undiagnosed after standard workup.

5.4. Role of Diagnostic Laparoscopy

In our series, diagnostic laparoscopy was performed in 65.57% of cases, confirming its central role in the evaluation of exudative ascites. It provides direct visualization of the peritoneum, allows targeted biopsies, and yields a definitive histological diagnosis [10]. In peritoneal tuberculosis, laparoscopy typically reveals whitish granular or nodular lesions with adhesions, while carcinomatosis presents as diffuse nodules or infiltrative plaques. The diagnostic yield of laparoscopy exceeds 95% in reported series, particularly when the standard workup is inconclusive [11].

5.5. Etiological Profile in Our Series

Our results confirm the predominance of neoplastic and infectious causes of exudative ascites:

- **Peritoneal carcinomatosis:** the leading etiology. The most frequent primary cancers were ovarian, gastric, and colonic. Pathogenesis involves increased vascular permeability, lymphatic obstruction, and occasionally tumor-associated hypoalbuminemia. Such ascites are often recurrent, protein-rich, and may or may not contain malignant cells [12].
- **Peritoneal tuberculosis:** the second most common cause, still frequent in our endemic context. Clinical presentation is often misleading, and negative cultures should not delay diagnosis when clinical and cytological features (lymphocytic ascites) are suggestive. Diagnosis often relies on laparoscopy with biopsies showing epithelioid granulomas with caseous necrosis [13].

Other potential causes, not found in our cohort, include:

- **Chylous ascites:** milky fluid rich in triglycerides, secondary to lymphatic trauma or neoplastic lymphatic obstruction (e.g., lymphoma).
- **Connective tissue diseases:** lupus, Sjögren's syndrome, or vasculitis, usually with moderate protein-rich ascites, sometimes eosinophilic.
- **Cardiac ascites:** typically protein-rich with a high albumin gradient. Rarely confounded with exudative ascites but possible in atypical cases.

5.6. Therapeutic Management of Exudative Ascites

Management primarily targets the underlying disease, as diuretics alone have limited efficacy. Strategies vary according to etiology and must consider recurrence and patient condition [14].

5.6.1. Peritoneal Carcinomatosis

Multidisciplinary oncologic care is essential.

- **Ovarian cancer:** cytoreductive surgery followed by systemic chemotherapy remains the standard, with hyperthermic intraperitoneal chemotherapy (HIPEC) considered in selected cases.
- **Gastric, colonic, or pancreatic cancer:** systemic chemotherapy, with targeted therapies depending on molecular profiles.

For refractory ascites, repeated paracentesis may be necessary, though it carries risks of hypoproteinemia, infection, or parietal seeding. Intraperitoneal drainage can be offered in palliative settings. Experimental approaches such as intraperitoneal immunotherapy (e.g., catumaxomab, anti-EpCAM) have shown some benefit but remain limited by cost and toxicity.

5.6.2. Peritoneal Tuberculosis

Treatment follows standard anti-tuberculosis therapy for 6 months:

- **Intensive phase:** isoniazid, rifampicin, pyrazinamide, and ethambutol for 2 months.
- **Continuation phase:** isoniazid and rifampicin for 4 months. Clinical response is generally rapid, with resolution of ascites within 2–4 weeks. Adjunct corticosteroid therapy (e.g., prednisone 0.5 mg/kg/day for 4–6

weeks) may reduce peritoneal fibrosis, though its benefit in extrapulmonary TB remains debated. Drug resistance testing is essential to guide therapy in multidrug-resistant cases [15].

5.7. Recurrent Malignant Ascites

Palliative options include:

- Repeated paracentesis
- Tunneled peritoneal catheters (e.g., PleurX®) for home drainage
- Intraperitoneal chemotherapy (especially in ovarian cancer)
- Novel targeted intraperitoneal immunotherapy under evaluation

The goal is quality-of-life improvement while considering oncologic prognosis.

5.8. Rare Etiologies

- **Chylous ascites:** requires dietary management (low-fat, medium-chain triglyceride diet, protein supplementation), pharmacological therapy (somatostatin/octreotide), or surgical correction if thoracic duct injury is identified [16].
- **Connective tissue disease-related ascites:** treated with immunosuppressive regimens (corticosteroids, cyclophosphamide, rituximab).
- **Cardiac ascites:** requires management of the underlying heart disease, anticoagulation, or porto-systemic shunt (TIPS) in selected cases.

6. Conclusion

The etiological diagnosis of exudative ascites remains a clinical challenge. Peritoneal carcinomatosis and peritoneal tuberculosis are the two leading causes in our context. Diagnostic laparoscopy remains indispensable when the origin of exudative ascites is unclear.

A systematic diagnostic algorithm incorporating imaging, cytology, and laparoscopy may help improve early diagnosis and guide more effective management.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Statement of informed consent

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

Author contributions

All authors have contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript.

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