Conceptual paper
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Diagnostic challenges of peritoneal tuberculosis in women presenting to gynaecology: a retrospective descriptive study in a tuberculosis-endemic region

Abstract

Background: Peritoneal tuberculosis (PTB) is a rare form of extrapulmonary tuberculosis that poses significant diagnostic challenges in Gynaecological practice due to its resemblance to ovarian malignancies. In regions endemic for tuberculosis, timely diagnosis is crucial to avoid misdiagnosis and unnecessary surgical intervention.

Objective: To describe the clinical presentation, diagnostic pathways, and treatment outcomes of four consecutive cases of PTB encountered in a Gynaecology unit at a teaching hospital in Sri Lanka between 2019 and 2023.

Methods: This retrospective descriptive study reviewed medical records of a cohort of four histologically or microbiologically confirmed cases of PTB. Data collected included clinical symptoms, imaging findings, laboratory parameters (including CA-125 and ESR), Mantoux test results, peritoneal fluid analysis, laparoscopy findings, histopathology, TB PCR, culture results, and treatment response.

Results: Patients ranged in age from 18 to 51 years and presented with abdominal distension, subfertility, postpartum fever, or chronic pelvic pain. All had a positive Mantoux test, and two showed elevated CA-125 levels suggestive of malignancy. Peritoneal fluid analysis supported the diagnosis in three cases, although AFB smear and culture were negative. Laparoscopy revealed miliary tubercles in all cases and facilitated biopsy, which confirmed caseating granulomatous inflammation. TB PCR and tissue cultures confirmed *Mycobacterium tuberculosis* in every case. All patients responded excellently to standard anti-tuberculosis therapy.

Conclusion: PTB, although uncommon in Gynaecology, should be considered in women presenting with ascites, elevated CA-125, or infertility, especially in endemic regions. Laparoscopy with histopathological sampling remains essential for definitive diagnosis, enabling timely treatment and preventing unnecessary surgical procedures. Standard ATT dosing ensures excellent outcomes while avoiding radical surgery.

Keywords: Peritoneal tuberculosis; Gynaecology; laparoscopy; CA-125; subfertility; extrapulmonary TB; Sri Lanka; diagnostic challenge

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Walawe Nayaka S
Post graduate institute of Medicine, University of Colombo, Sri Lanka

Correspondence: Walawe Nayaka S (Post graduate institute of Medicine, University of Colombo, Sri Lanka, Tel +94716422822

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Abbreviations: PTB, peritoneal tuberculosis; ATT, anti-tuberculosis therapy; HRZE, isoniazid, rifampicin, pyrazinamide, ethambutol; HR, isoniazid, rifampicin; AFB, acid-fast bacilli; PCR: polymerase chain reaction; ESR, erythrocyte sedimentation rate; ADA, adenosine deaminase; CA-125, cancer antigen-125

Introduction

Peritoneal tuberculosis (PTB) is a rare but clinically significant form of extrapulmonary tuberculosis, accounting for approximately 1–2% of all tuberculosis cases and 3–6% of extrapulmonary cases globally.[1] In Gynaecological practice, PTB presents a diagnostic challenge due to its resemblance to advanced ovarian malignancies or primary peritoneal carcinoma. Common symptoms include non-specific pelvic or abdominal pain, ascites, menstrual irregularities, and systemic features such as weight loss and fever.[2,3]

In women, PTB may result from haematogenous or lymphatic dissemination, or direct extension from infected pelvic organs, particularly the fallopian tubes.[4] The clinical picture often overlaps with that of ovarian cancer due to elevated CA-125 levels, adnexal masses, and peritoneal thickening on imaging,[3] leading to frequent misdiagnosis and potentially unnecessary surgical interventions.[2]

Diagnosis is particularly challenging due to the paucibacillary nature of the disease and the low sensitivity of conventional microbiological methods. A combination of imaging (ultrasound, CT scan), ascitic fluid analysis (e.g. adenosine deaminase levels), molecular testing (e.g. GeneXpert MTB/RIF), and histopathological confirmation via laparoscopy or laparotomy is commonly used.[5,6] Histology typically reveals granulomatous inflammation with caseous necrosis, while molecular diagnostics provide more rapid confirmation.[7]

Management primarily involves standard anti-tuberculosis therapy (ATT), with surgical intervention reserved for complications such as adhesions or diagnostic uncertainty.[8] Early recognition is critical to avoid overtreatment, particularly in tuberculosis-endemic regions.[9] This study aims to retrospectively analyze the clinical presentation, diagnostic strategies, and management outcomes of four consecutive Gynaecological patients diagnosed with PTB between 2019 and 2023, contributing to the existing body of evidence on this under-recognized condition.

Materials and methods

This retrospective descriptive study was conducted at a teaching hospital in Sri Lanka, evaluating a cohort of four consecutive cases of

peritoneal tuberculosis managed within the Gynaecology unit between 2019 and 2023. Data were extracted from patient records, operative notes, laboratory reports, and histopathology documents. Inclusion criteria comprised patients with histologically or microbiologically confirmed peritoneal tuberculosis who were primarily managed by the Gynaecology department. Patients with incomplete documentation or unconfirmed diagnoses were excluded.

Variables collected included age, presenting symptoms, constitutional signs, chest X-ray and Mantoux test results, imaging findings, laboratory parameters (CA-125, ESR, white blood cell count), peritoneal fluid analysis, laparoscopy findings, TB PCR, histological examination, tissue culture results, and response to treatment. Ethical approval was obtained from the institutional ethics review committee. All patient data were anonymized to ensure confidentiality.

Results

Table 1

The study included four female patients aged 18 to 51 years. Clinical presentation varied: one patient was diagnosed post-total abdominal hysterectomy, one incidentally during investigation for subfertility, one in the postpartum period, and one during adolescence with chronic pelvic pain. Two patients presented with abdominal distension, one with subfertility, and another with pyrexia of unknown origin. Constitutional symptoms such as loss of appetite, weight loss, or lethargy were reported by three patients. Only one had evidence of pulmonary TB (pleural effusion on chest X-ray). All four had positive Mantoux tests. Imaging showed ascites in two patients and an adnexal mass in one. CA-125 levels were elevated in two patients (102 IU/mL and 285 IU/mL), raising suspicion of malignancy.

Table 1 Summary of the gathered data.

Characteristics	Case 1	Case 2	Case 3	Case 4
Presentation time and age	After an TAH (51year)	Incidental (25year)	Post-partum period after a vaginal delivery. (30 year)	teenage (18 years)
Main symptoms	Abdominal distention	Primary subfertility	PUO and abdominal distention	Chronic pelvic pain
Features of Pulmonary TB	Pleural effusions, Shortness of breath	No	No	No
Constitutional symptoms	Feverish feeling	Generalized body weakness, lethargy	Loss of appetite, loss of weight, PUO	Loss of appetite, loss of weight
Chest X ray	Pleural effusion	Normal	Normal	Normal
Mantoux test	Positive	Positive	Positive	Positive
Pelvic ultra sound scan	Ascites only	Normal.	Ascites only	Left adenexial mass.
White cell counts in peripheral blood (4000-11000per ul)	9050	7800	6480	8800
CA 125 level (<35iu/ml)	102	47	285	Not done
ESR (<20mm/1st hour)	54	85	80	60
Sputum for AFB	Negative	Negative	Negative	Negative
Peritoneal fluid for AFB	Negative	Negative	Negative	Negative
Peritoneal fluid analysis	Supported in diagnosis. But culture negative.	Not done.	Supported in diagnosis. But culture negative.	Supported in diagnosis. But culture negative.
ADA in peritoneal fluid. (<40u/l)	75	88	65	58
Role of laparoscopy	Helped to confirm the diagnosis and allowed to take tissue samples	Helped to confirm the diagnosis and allowed to take tissue samples	Helped to confirm the diagnosis and allowed to take tissue samples	Helped to confirm the diagnosis and allowed to take tissue samples.
Presence of gross ascites in laparoscopy	Present	Absent	Present.	Absent.
Presence of miliary tubercles in laparoscopy	Present.	Present	Present	Present
TB PCR from peritoneal fluid	Positive	Not done	Positive	Not done.
Histology of biopsies	Caseous granuloma present.	Caseous granuloma present.	Caseous granuloma present.	Caseous granuloma present.
Culture of tissue specimen obtained during laparoscopy	Positive for Tuberculosis	Positive for Tuberculosis	Positive for Tuberculosis	Positive for Tuberculosis
Response to anti TB treatment*	Excellent.	Excellent.	Excellent.	Excellent.

*Standard WHO six to twelve months rifampicin-based ATT: intensive phase for two months (Isoniazid 5 mg/kg, Rifampicin 10 mg/kg, Pyrazinamide 25 mg/kg, Ethambutol 15 mg/kg daily), followed by four months continuation phase (Isoniazid + Rifampicin). Vitamin B6 supplementation (pyridoxine) was given in at-risk individuals to reduce neuropathy risk

Peritoneal fluid analysis was performed in three patients and supported the diagnosis, although Ziehl-Neelsen staining and culture were negative in all cases. TB PCR was positive in two patients. Laparoscopy was instrumental in diagnosing all cases, revealing miliary tubercles in all and gross ascites in two. Histological analysis of laparoscopic biopsies confirmed caseating granulomas in all patients. Mycobacterial culture of tissue specimens was positive for *Mycobacterium tuberculosis* in every case.

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All patients received standard anti-tuberculosis therapy and responded excellently, with full resolution of symptoms and no reported complications or relapses during follow-up. Second patient who presented with subfertility was referred to a subfertility specialist for further management of tubal factor subfertility.

Discussion

Peritoneal tuberculosis remains an important but under-recognized differential diagnosis in Gynaecological practice, particularly in tuberculosis-endemic regions. This study demonstrates the variable and non-specific presentation of PTB, which may mimic ovarian malignancy or present with subtle symptoms such as subfertility or chronic pelvic pain.

Our retrospective cohort highlights the diagnostic complexity of PTB in women presenting with nonspecific gynecological symptoms. Elevated CA-125 levels (>100 IU/mL in two cases) parallels other studies in which median CA-125 in PTB is 448 IU/mL (range 32–1725), often mimicking ovarian malignancy.[10] Imaging features such as minimal ascites or adnexal mass cannot reliably distinguish PTB from peritoneal carcinomatosis—CT discrimination models show high accuracy but require validation in endemic settings.[11]

Peritoneal fluid analysis including ADA supported diagnosis in most cases, but AFB smear and culture remained negative, consistent with low sensitivity in paucibacillary disease.[12] Laparoscopy with biopsy had 100% diagnostic yield in our series, similar to literature reporting >97% diagnostic confirmation rates by laparoscopy in pelvic TB cases.[13]

The standard six to nine months HRZE regimen is WHO-recommended for drug-susceptible extrapulmonary TB, including peritoneal forms, with excellent efficacy and manageable toxicity when dosed as per weight-guided schedules (INH 4–6 mg/kg, RIF 10 mg/kg, PZA 25 mg/kg, EMB 15 mg/kg) and pyridoxine supplementation.[14] All four women had full recovery without surgical intervention, underscoring the importance of early medical diagnosis.

The excellent treatment response in all patients underscores the importance of timely diagnosis and initiation of anti-tuberculosis therapy. Laparoscopy, when employed early in the diagnostic process, can prevent misdiagnosis and unnecessary radical surgeries.

Conclusion

Peritoneal tuberculosis, although rare in Gynaecological practice, should be considered in women with unexplained ascites, elevated CA-125, or infertility, particularly in tuberculosis-endemic settings. Laparoscopy with histopathological confirmation remains essential for accurate diagnosis. Early identification and initiation of medical therapy significantly improve patient outcomes and prevent overtreatment with radical surgical interventions.

Limitations

Small sample size due to the rarity of the condition and the study design

Retrospective nature limits control over data completeness

Short-term follow-up; long-term fertility or recurrence outcomes were not assessed

Recommendations

Maintain a high index of suspicion for PTB in endemic areas, especially in women with ascites or subfertility

Avoid unnecessary radical surgery in patients where TB remains a differential diagnosis

Consider early diagnostic laparoscopy when initial investigations are inconclusive

Further prospective, multi-center studies are needed to better assess long-term outcomes and fertility impact.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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