



Case report

Peritoneal tuberculosis mimicking advanced ovarian cancer case report: Laparoscopy as diagnostic modality

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ABSTRACT

Introduction and importance: Peritoneal Tuberculosis is one of extrapulmonary tuberculosis that occurs in 1-2% of patients, its incidence is higher in developing countries. It is very difficult to diagnosed and can mimic advanced ovarian cases. Making an accurate diagnosis is vital, laparoscopy is a great modality for this purpose.

Case presentation: A 36 years-old woman got referred with abdominal distention and weight loss from an internist and digestive surgeon. The abdominal computed tomography said thickening of the stomach wall with ascites. Ultrasound concluded the uterus, ovary, and endometrium within normal. The CA 125 levels elevated to 1200 U/mL and the complete blood count was normal. We were making diagnosis of peritoneal tuberculosis, peritoneal carcinomatosis, and advanced ovarian cancer. We did the diagnostic laparoscopic and taking a biopsy sample, ascites with peritoneal carcinomatosis and omental cake were found, the peritoneal cavity was covered by miliary nodules. Histopathology results concluded peritoneal tuberculosis without malignancy signs. The patient was treated with tuberculosis drugs. The follow-up evaluations show significant clinical improvement.

Clinical discussion: When facing patients with massive ascites and elevated CA 125 without any ovary enlargement, a gynecologist should think that it may be a peritoneal TB case with peritoneal carcinomatosis and advance ovarian cancer possibility as differential diagnosis especially in developing countries. An exact diagnosis can be made using laparoscopy and histopathology examination.

Conclusion: Laparoscopy is the best modality to differentiate between peritoneal tuberculosis, peritoneal carcinomatosis, and advance ovarian cancer. The benefits are direct visualization and could take a biopsy for histology examination.

1. Introduction

Peritoneal Tuberculosis (TB) is one of extrapulmonary tuberculosis, which predominantly involves the omentum, intestinal tract, liver, spleen, or female genital tract in addition to the parietal and visceral peritoneum [1]. It occurs in 1-2% of patients with pulmonary TB due to reactivation latent tuberculous foci in the peritoneum and hematogenous spread from a primary disease in the lung. This extrapulmonary TB is very difficult to diagnose due to its non-specific signs and symptoms, which sometimes leads to gynecological oncology diagnoses like advanced ovarian carcinoma [2,3]. These non-specific symptoms of the disease like abdominal or pelvis symptoms with masses, ascites, and elevated CA 125 levels can mimic the advanced ovarian cancer cases, and sometimes we can be confused with each other [4]. However, we

should think that TB cases have a very high incidence in developing countries. The World Health Organization (WHO) estimated 9.4 million cases of TB globally in 2009, with most of the cases coming from developing countries [5].

Treatment and outcome of peritoneal TB and advanced ovarian cancer are very different, peritoneal TB could be treated medically with an anti-tuberculosis drug, and it's curable. In contrast, advanced ovarian cancer must be treated by debulking surgery followed by cytotoxic medications and poor outcomes [6]. Careful examination and diagnosis are needed to differentiate this kind of case to avoid inappropriate treatment.

Indonesia is one of the developing countries, the high incidence of TB should be an awareness for the physician, obstetric gynecologist, and oncology gynecologist to suspect peritoneal TB as a diagnosis for

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abdominal masses or differential diagnosis for ovarian cancer suspect cases. We present our experience using laparoscopy as a diagnostic modality to accurately diagnose peritoneal TB which mimics advanced ovarian cancer.

2. Case description

A 36-years-old Asian woman presented with an eight-week history of abdominal distention, decreased appetite with nausea, no fever or vomiting appeared, and no irregular menstrual cycle symptom was found. She had lost 4 kg over three months. Due to the worsening symptoms, she went to an internist for a medical check-up. She got treated with anti-nausea drugs by the internist for a month, but there is no significant improvement, and the abdominal got bigger.

Then she searches for another opinion, so she went to a digestive surgeon. The doctor did the computed tomography scan. The abdominal CT-Scan said thickening of the stomach wall with widely loculated ascites in all parts of the abdominal quadrant and multiple lymphadenopathies on the mid essential quadrant. The chest CT-Scan said the "tree in bud" sign with solid nodule and pleural effusion duplex in the left lung. The first ultrasound results said ascites, pleural effusion, and left ovarian tumor suspect. From the results, the doctor then referred the patient to us. On physical examination, we found abdominal distention without tenderness. Our abdominal ultrasonography concluded uterus, ovary, and endometrium were normal, with no fluid appearance on Douglas cavity. Laboratory data showed blood hemoglobin 13.0 g/dL and CA 125 levels elevated to 1200 U/mL (normal range <35 U/mL). The liver and kidney function tests were normal. We made a hypothesis that massive ascites with elevated CA 125 may be caused by peritoneal tuberculosis, peritoneal carcinomatosis, or advanced ovarian cancer. The gold standard for diagnosis of these cases should be based on histopathology examination, so we suggested the patient undergo diagnostic laparoscopic to confirm the diagnosis and the patient agreed (Fig. 1).

In the laparoscopic view, we found 4 L of ascites with peritoneal carcinomatosis and omental cake, the uterus remains normal, both ovarium and tube also normal, but all peritoneal cavity covered by millitary nodule. We took a sample biopsy from the nodular lesion on the anterior abdominal wall peritoneal surface and omentum. The sample got referred to the pathologic-anatomy department for a histopathology examination. The results said there are groups of multinucleated Datia

Langhans cells and concluded that it was peritoneal tuberculosis without malignancy sign (Fig. 2).

From the examination results, we multidisciplinary with the internist treated the patient using tuberculosis drugs for the disease, and doing the one-month rectal sonography follow-up to evaluate the peritoneum and omentum. The first-month follow-up showed that the ascites fluid reduced to 100–200 cc in the Douglas cavity, and the third-month rectal sonography follow-up result said that no ascites were found anymore, and the nausea symptom disappeared. The patient is still doing the one-month follow-up to evaluate the medication clinically, imaging, and laboratory work-up.

Timeline

Date	Information
June 2019	Abdominal distention, decreased appetite, weight loss.
September 2019	Treated by the internist.
November 1st 2019	Her stomach got bigger, she consulted this complaint to the digestive surgeon. The abdominal CT-Scan showed thickening of the stomach wall with widely loculated ascites in all parts of the abdominal quadrant with multiple lymphadenopathies. Chest CT showed a "tree in bud sign" with solid nodule and pleural effusion. The first ultrasound said ascites, pleural effusion, and left ovarian tumor suspect.
November 12th 2019	Referred to gynecology-oncologist. Abdominal ultrasound concluded uterus, ovary, and endometrium were normal. No fluid in the Douglas cavity. Laboratory showed CA 125 levels elevated to 1200 U/mL.
November 15th 2019	Diagnostic laparoscopy found 4 l of ascites with peritoneal carcinomatosis and omental cake. Uterus, both ovaries, and tube were normal. All peritoneal cavity was covered by miliary nodules. A biopsy sample was taken.
November 23rd 2019	Histopathology results from the biopsy concluded it was peritoneal tuberculosis without malignancy signs. Patient treated with tuberculosis drugs.
December 2019	Ultrasound examination found ascites fluid reduced to 100–200 cc in the Douglas cavity.
March 2020	The rectal sonography follow-up result said that no ascites were found anymore, and the nausea symptom disappeared.

3. Discussion

When gynecologists facing patients with massive ascites and elevated CA 125 without any ovary enlargement, which may be indicated for malignancy, the gynecologist should think that it may be a peritoneal TB case with peritoneal carcinomatosis and advance ovarian cancer possibility as differential diagnosis. The concept of ascites formation was due to blockage of peritoneal circulation in these cases may be causes of the nodule. The massive volume of ascites suggests that the blocking process is comprehensive.

Peritoneal TB is one extrapulmonary which is rare and difficult to diagnose, accounting for 1% - 2% of all tuberculosis cases [2]. Tuberculosis is a major health problem in a developing country, WHO reported an estimated 9.4 million cases of TB globally in 2009, and most of the cases were from developing countries [5]. The mechanism of peritoneal TB may be the hematogenous spread of *Mycobacterium tuberculosis* to the abdominal cavity from a pulmonary infection. Usually, the primary focus in the lungs heal completely, and no clinical or radiological sign is detected [3,7]. Diagnosing peritoneal TB may be challenging for physicians and obstetric-gynecologist because of non-specific clinical and laboratory findings. Patients may present similar signs and symptoms to ovarian cancer or peritoneal carcinomatoses, and sometimes they can be confusing (Fig. 3).

One study about peritoneal TB said that abdominal pain and distention were two signs and symptoms which mostly appear from physical examination with the percentage of 70% and 65%, from the laboratory, we got 80% of subjects present elevated CA-125 levels more than 35 IU/mL with 75% was more than 100 IU/mL, and the average

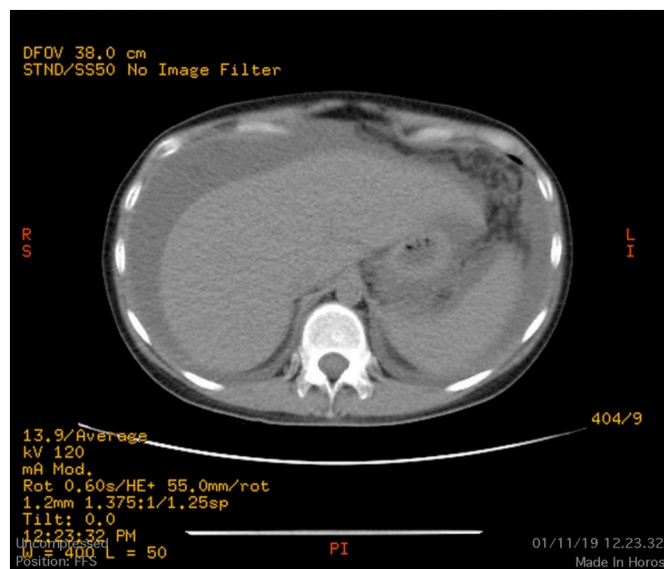


Fig. 1. Abdominal CT-scan showed thickening of stomach wall with widely loculated ascites.

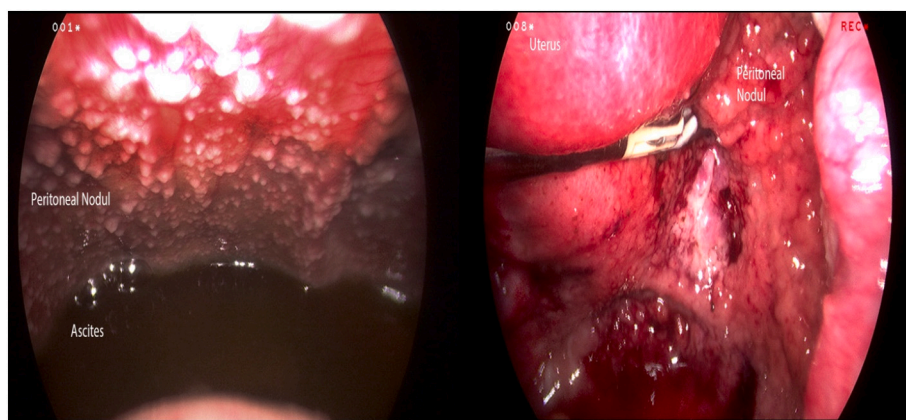


Fig. 2. Laparoscopic view showed ascites with peritoneal nodules.

	Ovarian Tumor	Peritoneal Staging	Omental	Histopathology	CA 125
Peritoneal Carcinomatosis	None	Always	Could be	Mesothelial Cell	Elevated
Peritoneal Tuberculosis	Rare (Cystic)	Always	Could be	Datia Langhans	Elevated
Advanced Ovarian Cancer	Always (Cystic-Solid Part)	Could Be	Could be	Adenocarcinoma	Elevated

Fig. 3. Differential diagnosis table.

level was 289 ± 186.2 IU/mL, the imaging examination using chest x-ray said only 25% subjects had abnormality appearance [4].

On the other hand, a recent study also supports the most significant and symptoms we found in the patient were abdominal pain and distention with 81.3% of cases. In this study, the imaging examination using ultrasound, CT-Scan, and Magnetic Resonance Imaging (MRI) concluded that ascites were the most findings with all patients (100%) present with ascites. The omental and peritoneal thickening was the second most findings in the imaging examination [6]. From these two studies, we can conclude signs and symptoms may appear in cases that we must be aware of peritoneal TB. In addition, we must be more aware of this sign in developing countries where the incidence of tuberculosis is still high. In our cases, we found that the patient fulfills most of the signs and symptoms and epidemiology included. That's why we highly suspected peritoneal TB as diagnosed with peritoneal carcinomatoses and advanced ovarian cancer as the differential diagnosis. To confirm the diagnosis, we also did the diagnostic laparoscopy to take samples for a histopathology examination. We know that laparoscopic tissue biopsy is a safe and accurate method of diagnosis with sensitivity above 80%, especially with ascites present [8,9].

Another examination that we can use to detect tuberculosis is Interferon-gamma release assays (IGRA) and tuberculin skin test (TST). IGRA is in vitro blood tests of cell-mediated immune response which measure T cell release of interferon-gamma (IFN- γ) [10]. IGRA are preferred over TST in conditions where patients received BCG, and TST is preferred over IGRA for testing children less than five years old according to Centers for Disease Control (CDC) 2010 guidelines [11]. One study shows that IGRA had a sensitivity of 91,18% and a specificity of 83,33% with an accuracy of 90% for detecting TB, whereas TST had a sensitivity of 76,47%, specificity 66,67%, and accuracy of 75% [12]. Some previous studies also support these results concluding IGRAs have been shown to have superior sensitivity and specificity than TST [13,14]. IGRA were explicitly designed to replace TST in diagnosing

latent tuberculous infection and were not intended for active tuberculosis, which is a microbiological diagnosis [14].

Gynecologists could also use fine needle aspiration cytology (FNAC) or fine-needle aspiration biopsy (FNAB) on the involved area for diagnostic matters. Image-directed FNAC is considered a safe, reliable, and accurate method for ovarian mass diagnosis, but it has been limited because of malignancy spreading risk [7,15]. Tissue biopsy is the most sensitive and specific diagnostic procedure for abdominopelvic TB and may be obtained by laparotomy or laparoscopy. However, sometimes abdominal TB can be diagnosed instantly when small tubercles (milia) are observed on the peritoneum [16]. Microscopically, peritoneal TB defines by numerous, large, confluent granulomas composed of epithelioid cells, with a peripheral zone of lymphocytes, and Langhan's giant cell with central caseous necrosis like we found in our cases [17].

4. Conclusion

Clinicians must consider this important differential diagnosis of tuberculosis, particularly in high TB incidence areas and developing countries. It is necessary to accurately diagnose lower abdominal abnormality like this case because of the difference in peritoneal TB and ovarian cancer therapy. The peritoneal TB can be treated by tuberculosis drugs only, whereas ovarian cancer must be treated by operative procedure and, in some cases, with chemotherapy. By making an accurate diagnosis, major unnecessary surgery can be avoided using minimally invasive methods pre-operatively.

Laparoscopy is the best modality to differentiate between peritoneal tuberculosis, peritoneal carcinomatosis, and advanced ovarian cancer. The benefits of laparoscopy are direct visualization and could take a biopsy for histology examination. We should not rush into laparotomy for this kind of case, laparotomy would be an inappropriate procedure.

5. Patient's perspective

From June until September 2019, I started to feel that my stomach got bigger, I felt nauseous and my weight get loss. My stomach got bigger every week and I decided to check myself to the internist. I got some medicines for a month, but no significant improvement. I decided to go to a digestive surgeon to consult my grievance because the nauseous get worsen and my stomach still getting bigger. The surgeon did some imaging examinations like ultrasound and CT-Scan. The results concluded that my stomach wall thickened, there is a mass on my ovary, and also some problems in my lungs. I was worried that it could be a malignant ovary mass even though I never had any history of malignancy in my family. I got referred to the gynecologist for more advanced evaluation. I was then going through further evaluation to confirm the diagnosis with ultrasound, and I got suggested to do the diagnostic laparoscopy to confirm the diagnosis. After that, I was observed in the ward and scheduled for a diagnostic laparoscopy with biopsy sampling. The surgery went well, and the histological examination showed that I got abdominal tuberculosis. I was then observed for two days post-operative, I got discharged and tuberculosis drugs were prescribed. After one month, I felt the nauseous was significantly decreasing. In my last follow-up, the doctor said that there is no mass or fluid anymore in my stomach.

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Ethical approval

This study was reviewed and approved by the Institutional Review Board and Ethical Committee Dr. Cipto Mangunkusumo, a national reference, and teaching hospital. Patient medical records were maintained under applicable medical ethical standards.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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None declared.

Guarantor

Sigit Purbadi.

CRedit authorship contribution statement

Sigit Purbadi: conceptualization, methodology, resources, supervision. Sigit Purbadi, Gilbert Elia Sotarduga: writing-original draft preparation, investigation, visualization, writing-review and editing. Sigit Purbadi, Junita Indarti, Hariyono Winarto, Andi Darma Putra, Kartiwa Hadi Nuryanto, Tofan Widya Utami: supervision, data curation, editing.

Declaration of competing interest

The authors declare that we have no financial or personal relationship that may have inappropriately influenced us in writing this article.

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