A Case Series of Peritoneal Tuberculosis Mimicking Ovarian Cancer

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Learning objectives

To **review the imaging findings** in suspected ovarian cancer that has already proven as peritoneal tuberculosis (TB)

To perform a proper **differential diagnosis in suspected ovarian cancer** especially in country with high incidence of TB infection for optimal therapeutic approach
Background

Tuberculosis (TB) is a global health problem, approximately 95% of TB cases occur in the developing countries in Africa and Asia. According to the World Health Organization (WHO) in 2013, 9 million individuals were infected with TB and 1.5 million died; 20% of all dead cases were extra-pulmonary TB [1]. Abdominal TB which may involve the gastrointestinal tract, peritoneum, lymph nodes or solid viscera constitutes up to 12% of extrapulmonary TB and 1-3% of the total [2]. The exact incidence of pelvic TB is not accurately known because of asymptomatic nature, bizarre symptoms and lack of reliable confirmatory investigations [3].

Peritoneal TB is considered a rare extrapulmonary form, but at the same time this location is five or six times more frequent than the location in any other organs of the alimentary system. Peritoneal TB is initiated by the infiltration from affected mesenteric or intestinal lymphatic nodes. There is also the possibility of its spreading via the blood stream from the primary site in lungs [4].

Weakness, loss of appetite, fever, abdominal pain and enlarged abdominal circumference are the usual clinical symptoms with addition of symptoms such as menstrual disturbances or infertility [4,5]. Chest radiographs may be normal in patients with peritoneal TB, approximately 40% of the time [2]. Physical examination may reveal pathological lesions in abdominal cavity and ascites, while laboratory test shows increased serum concentration of antigen CA-125 [4].

Serum CA-125 level is found to be elevated in up to 82% of women with late stage epithelial ovarian cancer. Increased concentration of antigen CA-125 may also be found in cases of pelvic inflammation, endometriosis, uterine fibroid, hepatitis and peritonitis, therefore has a limited diagnostic value and must be interpreted with caution in any pelvic-peritoneal pathology [4,5].

Ovarian malignancy accounts for 4-6% of all cancers in women and 23-27% of all gynecologic cancers [6]. It is the most common cause of death among women with gynecologic cancer and the seventh leading cause of cancer death in all women [7]. Ovarian carcinoma is typically assumed in a female patient with ascites, adnexal masses and elevated CA-125 levels [6].

Both peritoneal TB and ovarian cancer have non specific and overlapping signs and symptoms, thus peritoneal TB often presurgically unrecognized and misdiagnosed in the female population as an ovarian cancer [1,2,4,11]. When patient presents with abdominal pain, ascites and pelvic mass, discrimination between other abdominal pathologies and metastatic ovarian cancer is extremely difficult [8].

Sonography and CT may share similar features and lead to diagnosis of ovarian cancer [4,6,7,12]. Nodular peritoneal thickening, omental involvement, ascites, adnexal masses
with both solid and cystic components are more suggestive of peritoneal metastatic carcinoma or a locally advanced ovarian cancer rather than peritonitis TB [5].

Unfortunately, more than two thirds of patients were diagnosed incidentally after laparotomy, where unnecessary radical surgery was performed. As extensive debulking is often necessary for ovarian carcinoma, this diagnosis usually leads to radical surgery including the removal of the uterus and ovaries [6].

Histopathological examination is the standard for diagnosis. The most precise and definitive diagnosis is performed through peritoneal biopsy obtained from surgery, in which tuberculoid granulomatous lesions can be observed [8]. Being a paucibacillary disease, demonstration of *M. tuberculosis* is not possible in all cases; a high index of suspicion is required [3].
Findings and procedure details

We reviewed five cases of women aged 22-47 years old who admitted to our hospital, Dr. Soetomo General Hospital in Surabaya, Indonesia who were suspected preoperatively as having an ovarian malignancy but whose pathological results after surgery revealed peritonitis TB between January 2016 until May 2017.

Demographic characteristics including age, gravidity, parity, symptoms, medical history, laboratory investigations including CA-125, radiological imaging including chest x-ray, ultrasonography, MSCT using 16-slice scanner, surgical findings and histopathological results of the patients were recorded (table 1). Suspicion of ovarian malignancy was based on clinical evaluation, US and CT appearance, ascites and elevated CA-125 levels.

<table>
<thead>
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<td>Left abdominal pain, Abdominal enlargement</td>
<td>Lower right abdominal pain, Abdominal enlargement</td>
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Table 1: The demographic and clinical characteristics of the cases

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya

Case 1. A 22-year-old, unmarried, nulligravid woman presented with abdominal pain and abdominal distention. She had normal WBC count and CA-125 level of 317.1 U/ml. Previous medical history was unremarkable also previous lung TB was denied. Ultrasonography revealed solid mass with septated cystic component, with size bigger than the probe, within right pelvic cavity, suggesting right malignant ovarian mass and left pleural effusion. Abdominal CT scan indicated enhancing lesion in pelvic cavity, with
size approximately 11.4 x 6.7 x 5.7 cm, peritoneal seeding, fluid collection, matted bowel and mesenteric thickening (Figure 1). Chest x-ray revealed fibrosis in right upper lobe. Primary ovarian malignancy was suspected then diagnostic laparotomy was performed. During laparotomy the peritoneal entry was difficult, also there were thick adhesions and miliary seedings (disseminated multiple nodules) (Figure 2). Histology revealed caseating granulomas with epithelioid and Langhan's type giant cells conclusive for peritoneal TB. Antituberculosis regimen then was given for 9 months.

Fig. 1: Contrast enhanced abdominal CT of 22-year old woman with abdominal pain and abdominal distention, turned out to be peritoneal TB, showed enhancing lesion in pelvic cavity, with size approximately 11.4 x 6.7 x 5.7 cm, peritoneal seeding, fluid collection, matted bowel and mesenteric thickening

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya
Fig. 2: Intraoperative findings of the aforementioned patient. Miliary seedings on peritoneum and serosal surface of bowel with dense adhesions

References: Department of Obstetrics and Gynecology, Dr. Soetomo General Hospital, Surabaya

Case 2. A 47-year-old, unmarried, nulligravid woman presented with suspicion of residual post-operative ovarian cancer on evaluation. She had previous gynecological history of left malignant ovarian mass that had been operated with histopathology result from left salpingo-oophorectomy was high grade serous papillary carcinoma. This patient also got adjuvant chemotherapy. CT-Scan evaluation four months post operative was suggestive of residual mass with laboratory results of normal WBC and elevated CA-125 level (672.5 U/mL). CT scan revealed heterogenous enhancing solid mass in right pelvic cavity with size approximately 6.49 x 7.55 x 5.49 cm which obliterating upper portion of uterus and push bladder to the left side, suggesting residual mass, fat stranding and regional lymphnode enlargement (Figure 3). Chest x-ray finding was unremarkable. Exploratory laparotomy revealed multiple subserosal myoma approximately 3-5 cm in size which seen on CT as enhancing solid mass in right pelvic cavity. Right ovary and right fallopian tube seemed mildly enlarged with miliary seedings on the serosal surface and there were dense adhesions of posterior site of uterus to rectum (figure 4). Total abdominal hysterectomy with right salphyno-oophorectomy, adhesiolisis, omentectomy and pelvic lymph node dissection were performed. Histopathology result came out as multiple intramural and subserosal uterine leiomyoma, adenomyosis, endocervical polyp, and granulomatic inflammation in right ovary. No metastatic process were visible in lymphnode, omentum and rectum.
**Fig. 3:** Contrast enhanced abdominal CT of 47-year-old woman with history of post-operative left malignant ovarian mass turned out to be peritoneal TB showed heterogenous enhancing solid mass in right pelvic cavity with size approximately 6.49 x 7.55 x 5.49 cm suggesting residual mass which after exploratory laparotomy revealed intramural and subserosal myoma. CT Scan also showed there were fat stranding and regional lymphnode enlargement

**References:** Department of Radiology, Dr. Soetomo General Hospital, Surabaya
Fig. 4: Exploratory laparotomy result of the aforementioned patient revealed multiple intramural and subserosal myoma, approximately 3-5 cm, slightly enlarged right ovary and right fallopian tube, with miliary seedings on the serosal surface, also dense adhesions of posterior site of uterus to rectum.

References: Department of Obstetrics and Gynecology, Dr. Soetomo General Hospital, Surabaya

Case 3. A 29-year-old, married, multiparous woman presented with left abdominal pain since 3 weeks before and enlarged abdominal circumference. Abdominal CT showed matted bowel loops with fat stranding, mesenteric thickening, omental cake, peritoneal seeding and loculated fluid collection. There was solid lesion (31 HU) with partially indistinct border in right and left adnexa, approximately 1.8 x 3.5 x 3.6 cm and 3.31 x 1.6 x 3.2 cm in size with heterogenous contrast enhancement (74 HU). There was also extraluminal loculated fluid collection in pelvic and abdominal cavity (Figure 5 & 6). CT-Scan examination suggesting bilateral malignant ovarian mass with intraperitoneal carcinomatosis. Chest x-ray was unremarkable with no previous history of pulmonary TB. White blood cell count was normal but CA-125 level was elevated (609.3 U/mL). Primary ovarian malignancy with intraperitoneal carcinomatosis was suspected. Laparotomy then performed, 1500 mL of serous ascites fluid collected, miliary seedings on peritoneum and serosal surface of liver, bowel, uterus were observed. Uterus, right and left ovary were normal. Histology of omental and peritoneal tissue revealed caseating granulomas with epithelioid and Langhan’s type giant cells which conclusive as peritoneal TB.
Fig. 5: Contrast enhanced abdominal CT of 29-year-old woman with left abdominal pain and abdominal enlargement, turned out to be peritoneal TB, showed, A & B) Matted bowel loops with mesenteric thickening, peritoneal seeding and fluid collection (Hounsfield unit greater than fluid density); C) enhancing mass (31HU) with partially indistinct border in right and left adnexa, approximately 1.8 x 3.5 x 3.6 cm and 3.31 x 1.6 x 3.2 cm in size, with heterogenous contrast enhancement (74 HU) and loculated fluid collection

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya
Fig. 6: Contrast enhanced pelvic CT of 29-year-old woman with left abdominal pain and abdominal enlargement that turned out to be peritoneal TB revealed free fluid collection with mesenteric thickening

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya

Case 4. A 38-year-old, married, multiparous woman presented with right lower abdominal pain since two months prior to admission and enlarged abdominal circumference that she noticed since one month ago. Ultrasonography showed cystic lesion with solid component, approximately 20.8 x 9.7 cm, with irregular margin. Abdominal CT then ordered and revealed no discrete mass with mesenteric thickening, fluid collection, peritoneal seeding suggestive of malignancy (peritoneal carcinomatosis) (Figure 7 & 8). Chest x-ray was unremarkable with no previous pulmonary TB history. Laboratory results indicated normal WBC count and high CA-125 level (386.7 U/mL) which within 3 weeks follow up decreased to 239.1 U/mL. Ascites fluid cytology revealed no malignant cells. Peritoneal TB then suspected as differential diagnosis. Exploratory laparotomy was carried out and revealed multiple milliary advance nodules with size approximately 0.2 - 0.5 cm in all over peritoneal wall, intestines, pelvic without any ovarian or pelvic mass. Biopsy from peritoneal tissue revealed granulomatic inflammation consistent with TB.
Fig. 7: Abdominal CT of 38-year-old woman with lower right abdominal pain and abdominal enlargement turned out to be peritoneal TB, revealed no discrete mass with mesenteric thickening, fluid collection, peritoneal seeding suggestive of malignancy (peritoneal carcinomatosis)

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya
**Fig. 8:** Abdominal CT of 38-year-old woman with lower right abdominal pain and abdominal enlargement, turned out to be peritoneal TB, revealed no discrete mass with mesenteric thickening, fluid collection, peritoneal seeding suggestive of malignancy (peritoneal carcinomatosis)

**References:** Department of Radiology, Dr. Soetomo General Hospital, Surabaya

**Case 5.** A 37-year-old, married, multiparous woman presented with left abdominal pain and abdominal distention with onset 3 weeks prior to admission. Abdominal CT showed mesenteric thickening, fat stranding with matted bowel and multiple paraortic lymphadenopathy, minimal fluid collection and right pleural effusion suggesting malignant pelvic mass with suspicion of lung metastasis (Figure 9). Chest CT then ordered to evaluate lung metastasis which indicated consolidation with air bronchogram in superior segment of left superior lobe, single nodule in apicoposterior segment of left superior lobe, lymphadenopathy, bilateral pleural effusion which consistent with metastatic process and differential diagnosed as TB process (Figure 10). This patient had previous history of pulmonary TB. Laboratory result CA-125 level was 421.2 U/mL. Exploratory laparotomy was done and scattered miliary nodules all over the peritoneal, omental, small and large bowel, liver, and diaphragm surface were found, there was also mild ascites, while uterus, right ovary and right fallopian tube were normal, but left ovary and left fallopian tube were slightly enlarged (Figure 11). There was no ovarian mass. Adhesiolysis was done for matted bowel loops in rectosigmoid region.

Peritoneal, ovary, mesentery and omental biopsies were taken and histopathological examination revealed focal necrotizing granulomatous inflammation, Langhan's type giant cells and no malignant cells, conclusive as peritoneal TB.
**Fig. 9:** Contrast enhanced abdominal CT of 37-year-old woman with left abdominal pain and abdominal distention, turned out to be peritoneal TB, showed mesenteric thickening, fat stranding with matted bowel and multiple paraaortic lymphadenopathy, minimal fluid collection and right pleural effusion suggesting malignant process turned out to be peritoneal TB

**References:** Department of Radiology, Dr. Soetomo General Hospital, Surabaya
**Fig. 10:** Contrast enhanced chest CT of 37-year-old woman with initial diagnosis as pelvic malignant mass with previous history of pulmonary TB showed consolidation with air bronchogram in superior segment of left superior lobe, lymphadenopathy, bilateral pleural effusion with conclusion metastatic process differential diagnose with tuberculosis process

**References:** Department of Radiology, Dr. Soetomo General Hospital, Surabaya
Fig. 11: Laparotomy findings of the aforementioned patient revealed scattered miliary nodules all over the peritoneal, omentum, small and large bowel, liver, and diaphragm surface

References: Department of Obstetrics and Gynecology, Dr. Soetomo General Hospital, Surabaya

DISCUSSION

This report included 5 cases of peritoneal TB within 16 months observation period from January 2016 until May 2017. The average age of the patients was 34.6 (± 12.6) years (range 22 - 47 years). Abdominal pain and distention were encountered in all patients (n = 5, 100%) (Table1). Only one patient had a history of lung TB. Serum CA 125 was elevated in all patients (n = 5, 100%) and the average CA-125 level was 481.36 (± 152.03) U/mL (range 317.1 - 672.5 U/mL). In one patient CA-125 level was 386.7 U/mL then decreased to 239.1 U/mL three weeks after.

Two patients (40%) had abnormal chest X-ray, one of whom had history of pulmonary TB, then evaluated with chest CT with specific findings for tuberculosis and differential diagnosed as metastatic process by the radiologist.

Abdominal CT scan revealed ascites in 4 patients (80%), pelvic mass in 2 (40%) of the patients, peritoneal thickening and omental involvement in 2 patients (40%), peritoneal seedings found in 2 patients (40%), mesenteric thickening in 4 patients (80%), and matted bowel in 3 patient (60%). Lymph node enlargement was evident in 3 patients (60%) (Tabel 2). In abdominal CT, four patients had specific findings for the differential diagnosis of ovarian cancer and only one case with no discrete mass, in which ascites and peritoneal seeding were the only findings (suggesting intraperitoneal carcinomatosis). One patient
had history of left ovarian cancer which had been resected a year before with elevated CA-125 level, made CT-scan finding considered as residual ovarian mass.

Leder RA, et al made peritoneal TB divided further into three types: wet, fibrotic, and dry although there are considerable overlap in their CT appearances [13, 14]. Wet type peritonitis is the most common type of peritonitis (90% of cases) and features large amounts of free or loculated ascites, which, at CT, is usually slightly hyperattenuating (20-45 HU) relative to water due to its high protein and cellular content. Fibrotic type peritonitis accounts for 60% of cases of peritonitis and is characterized by large omental and mesenteric cake like masses with matting of bowel loops. At CT, it manifests as mottled low-attenuation masses with nodular soft-tissue thickening. Dry type peritonitis is seen in 10% of cases and is characterized by mesenteric thickening, fibrous adhesions, and caseous nodules. Its imaging manifestations are highly suggestive of, but not specific for, tuberculosis [13]. Among these five patients, two (40%) gave CT scan impression as wet type peritoneal TB, two (40%) as fibrotic type peritoneal TB and one (20%) as dry type peritoneal TB (Tabel 2).

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Table 2: Detailed Characteristics In Computed Tomography Finding of 5 Patients with Tuberculous Peritonitis

References: Department of Radiology, Dr. Soetomo General Hospital, Surabaya

Biopsy by exploratory laparotomy was preferred as a first-line approach. As widespread miliary nodules (n = 5, 100%) and adhesions (n = 3, 60%) which were suspicious for peritoneal TB were observed during exploration. Histopathological examination were obtained in 5 (100%) cases, and revealed chronic granulomatosus inflammation with caseous necrosis and Langhan’s type giant cells in all cases.
Only one patient had initially diagnosed as peritoneal TB while the rest diagnosed after laparotomy, the implication was an unnecessary radical surgery performed in one case.
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Conclusion

Peritoneal TB is difficult to distinguish from peritoneal carcinomatosis or advanced ovarian carcinoma from imaging, laboratory and clinical findings. Peritoneal TB should always be considered in the differential diagnosis of patients with evidences suggesting advanced ovarian cancer especially in country with high incidence of TB infection.
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References


