Case Report

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High SUV_{max} Value of Ovarian Tubercular Mass: Conflict in Diagnosis

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ABSTRACT

Abdomino-peritoneal tuberculosis is a commonly encountered infectious disease especially in endemic areas. Abdomino-peritoneal tuberculosis should be kept in mind in assessing patients with elevated blood CA125 levels, abdominal ascites and adnexal mass since these signs may indicate both advanced ovarian cancer and ovarian tuberculosis as a known dilemma. In the literature, standardized uptake values (SUV) of malignant ovarian tumors and inflammatory/infectious conditions of ovaries on Positron emission tomography/computed tomography (PET/CT) scan have been demonstrated so far.

In this case report, we present a 13-year-old female patient who was living in an endemic area for tuberculosis and complaining of abdominal distention and blunt abdominal and back pain, and whose F-18 Fluorodeoxyglucose (FDG)-PET scan revealed adnexal mass with avid FDG uptake with the SUV_{max} value of 16.6 which was highly suggestive for ovarian cancer.

Keywords: Abdomino-peritoneal tuberculosis, ovarian tuberculosis, standardized uptake value

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium Tuberculosis*. TB occurs all part of the world (1). Approximately 8 million new cases and more than 2 million deaths arise due to TB each year (2). The lifetime risk of developing active TB in people who have active TB is about 5-15%. This rate increases in immunocompromised patients such as those infected with human immunodeficiency virus, malnutrition status, diabetes, tobacco usage, and diseases that repress the immune system. Even TB affects mainly lungs and mediastinal lymph nodes, it may involve all systems in the body causing wide variety of symptoms. The peritoneal or abdominopelvic tuberculosis is a form of abdominal tuberculosis that involves the liver, spleen, female genital tract, omentum and visceral and parietal peritoneum. Peritoneal TB is the sixth most common site for extrapulmonary TB which accounts 1-2% of all forms of tuberculosis (3,4). Abdomino-peritoneal tuberculosis should be kept in mind in assessing patients with elevated blood CA125 levels, abdominal ascites and adnexal mass since these signs may indicate both advanced ovarian cancer and ovarian tuberculosis. To keep abdomino-peritoneal TB in mind is essential for proper diagnosis and accurate and rapid treatment.

Ultrasound is the first choice and mainly used as the imaging modality for the characterization of tuboovarian tubercular mass. It is widely available and there is no exposure to radiation. Computerized tomography (CT) may be helpful but generally gives nonspecific information. Magnetic resonance imaging (MRI) characterizes tubo-ovarian masses better than CT and ultrasound do. 2-deoxy-2-(18) fluoro-D-glucose- positron emission tomography (F-18 FDG-PET) combined with CT detects

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malignant lesions and inflammatory masses and differentiates active and inactive disease process by demonstrating increased FDG uptake (3).

We presented a case of abdomino-peritoneal tuberculosis referred from the periphery as ovarian carcinoma. As shown in our case, preoperative definitive diagnosis is still a problem in ovarian cancer and ovarian TB. We also wanted to emphasize that the maximum standardized uptake values (SUV_{max}) on (F-18 FDG-PET) may also be misleading in differential diagnosis.

CASE PRESENTATION

A 13-year-old female patient was referred to our hospital from the periphery as ovarian carcinoma. She was complaining of abdominal distention, lower abdominal pain and low back pain for over two months. Physical examination revealed only lower abdominal tenderness by palpation. She had no sexual history. Her past medical history was unremarkable. In blood analysis, white blood cell count was 13.000 (1/mm^3), hematocrit level was 34.3, B-human chorionic gonadotropin was below 0.5 mU/mL, carcinoembrionic antigen (CEA) level was 0.23 (ng/mL) and preoperative CA125 was 500.6 (U/mL). The sedimentation rate was increased (89 mm/hr). Ultrasound was performed as the initial diagnostic modality and bilateral adnexal masses of 5x4 centimeter on the right and 4x4 centimeter on the left, with cystic and solid components, were noted. On performed MRI, bilateral mass like lesions with soft tissue and hemorrhagic cystic components were noted with sizes of 47x32x41 and 39x43x33 mm, respectively. High attenuation was observed in both of the lesions after intravenous contrast administration. The MRI findings were reported as suggestive for ovarian carcinoma and further evaluation with F-18 FDG-PET was recommended. On F-18 FDG-PET imaging combined with CT, bilateral adnexal mass lesions with cystic and solid components were noted (Figure 1). Solid parts of the masses had intense hypermetabolism with 16.6 SUV_{max} value, which is also very suggestive for malignity rather than infectious processes. There were also multiple lymph nodes in abdominal cavity with increased FDG uptake which were evaluated as metastasis (Figure 2), a nodular lesion in the superior lobe posterior segment of the right lung that showed increased FDG uptake with the 1.3 SUV_{max} value (Figure 3) and multiple soft tissue lesions with increased FDG uptake spread in the abdominal cavity in which the highest size was up to 2.5 centimeter in diameter and 13.5 SUV_{max} value, which were evaluated as peritoneal implants. Also increased FDG uptake was observed in the left quadratus lumborum muscle and evaluated also as tumor implant. Metastatic ovarian carcinoma was considered by blood tests and imaging. Transabdominal ultrasound guided biopsy of the adnexal masses was planned to attain histopathological diagnosis and to start possible chemotherapy rapidly. Biopsy was performed under ultrasound with 20 Gauge biopsy needle from the right ovary and intra-abdominal free fluid was aspirated for characterization concomitantly. Pathology report revealed necrosis and inflammatory cell proliferation. Ehrlich Ziehl Neelsen staining of the samples was unremarkable. On performed abdominal free fluid analysis, there was increased glucose (79 mg/dL), microprotein (8.850 mg/dL), leucocyte (11.200/mm^3) and erythrocyte (33.600/mm^3) levels. Unfortunately, no bacterial reproduction could be observed. After these steps for final diagnosis, laparoscopic biopsy was planned. During the operation, wedge biopsy from the right ovary was performed and aspirated abdominal fluid was collected for culture. The biopsy specimen revealed chronic granulomatous inflammatory infiltration with caseification necrosis. *M. Tuberculosis* bacteria reproduction was obtained in culture specimen. Four drug fixed dose combination of anti-TB regimen was initiated to patient. Written informed consent from the patient's relative was taken for this case presentation.

DISCUSSION

Abdomino-peritoneal tuberculosis generally presents with nonspecific symptoms like dull abdominal pain, menstrual cycle

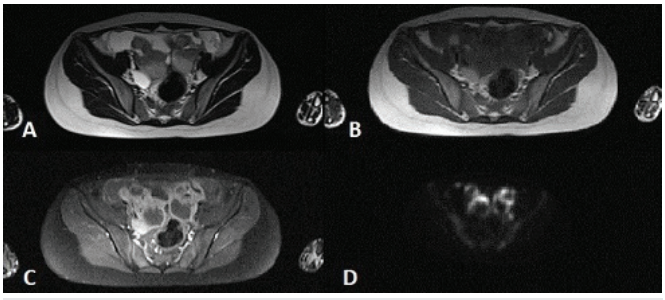

Figure 1. Bilateral ovarian mass lesions with cystic and soft tissue components. Peripheric enhancement after intravenous contrast injection and avid fluorodeoxyglucose (FDG) uptake in adnexal masses are seen. A) Axial pre-contrast T2-weighted (T2-W) sequence. B) Axial pre-contrast T1-W sequence. C) Axial post-contrast T1-W sequence. D) Fluoro-18 FDG-positron emission tomography imaging

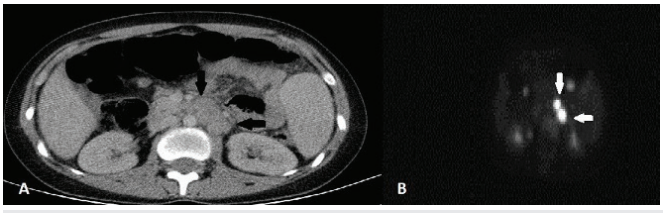

Figure 2. Paraaortic enlarged lymph nodes are seen (arrows). A) Axial computed tomography imaging. B) Axial fluoro-18 fluorodeoxyglucose-positron emission tomography imaging

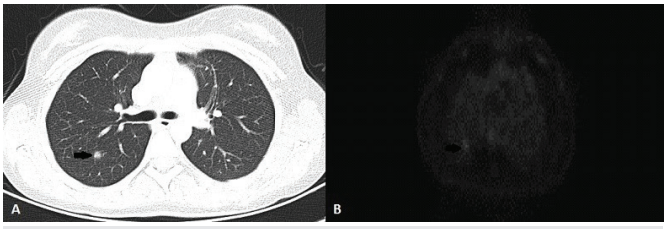

Figure 3. Solid nodule with peripheric ground-glass opacities in the lower lobe superior segment of the right lung is seen. A) Axial CT imaging B) Axial fluoro-18 fluorodeoxyglucose-positron emission tomography imaging

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abnormalities, and infertility problems (3-5). Abdominopelvic mass and ascites may be present and accompanied by an increase in serum Ca125 level. These findings may mimic ovarian cancer. Preoperative diagnosis of ovarian cancer and abdomino-peritoneal tuberculosis can be a challenging issue at times. Definitive diagnosis is made by tissue biopsy. To attain the tissue sample, diagnostic laparotomy/laparoscopy or ultrasound guided biopsy can be performed (4). There is no pathognomonic marker in the differentiation of abdominopelvic tuberculosis and advanced ovarian cancer, as a known dilemma. In our case, patient history and physical examination were unremarkable and all symptoms were non-specific. In blood analysis, preoperative CEA-125 was elevated (500.6 (U/mL), which may accompany ovarian cancer and also many benign conditions like peritoneal TB and malign conditions other than ovarian cancer. Ultrasound and MRI showed bilateral ovarian mass, abdominal ascites, mass like peritoneal thickening and multiple enlarged lymph nodes. These imaging features could be observed in both advanced ovarian carcinoma and peritoneal tuberculosis as well. The F-18 FDG-PET imaging revealed bilateral adnexal masses with cystic and solid components and intense hypermetabolism with 16.6 SUV_{max} value which was very suggestive for malignancy rather than infectious processes. There was also a nodular lesion in the superior lobe posterior segment of the right lung, multiple lymph nodes in abdominal cavity, multiple soft tissue lesions spread in abdominal cavity, and a mass like lesion evaluated as an implant in the left quadratus lumborum muscle, and all showed increased FDG uptake.

To our knowledge, there is no study which points out the maximum standardized uptake value (SUV_{max}) of ovarian masses secondary to tuberculosis. Chen et al. (6) performed a retrospective analysis of F-18 FDG-PET of 103 patients with peritoneal thickening. They showed that there was no significant difference of SUV_{max} values between benign and malignant peritoneal thickening with P value of 0.12. On the other hand, SUV_{max} value of malignant peritoneal thickening was higher than non-tuberculous etiologies of benign peritoneal thickening (p=0.02). They also showed that peritoneal thickening secondary to tuberculosis had SUV_{max} values similar to malignant peritoneal thickening within a range of 1.7 to 8.6 (6). In another study, Sharma et al. (7) obtained F-18 FDG-PET of 17 patients with tubercular tubo-ovarian masses to assess the role of F-18 FDG-PET scan in preoperative diagnosis. They classified tubo-ovarian masses according to masses that uptake glucose or not. The ratio of unilateral tubo-ovarian mass with glucose uptake was 35.3% and the ratio of bilateral tubo-ovarian masses with glucose uptake was 23.5%. They did not mention about the SUV_{max} values quantitatively in this study.

CONCLUSION

Abdominopelvic tuberculosis needs to be considered in young women diagnosed as ovarian cancer, who come from low socioeconomic backgrounds and live in endemic areas of tuberculosis. Even though the role F-18 FDG-PET scan cannot be denied in confirming malignant and benign inflammatory or infectious lesions, it has limited performance in distinguishing abdomino-peritoneal tuberculosis from advanced ovarian cancer or peritoneal carcinomatosis. Ultrasound-guided fine needle biopsy, as a relatively new method, and laparoscopic biopsy are still needed for final histopathologic diagnosis of abdomino-peritoneal tuberculosis.

Informed Consent: Written consent from the patient's relative was taken for this case presentation.

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