

## A case of tuberculous peritonitis with elevated CA 125

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Peritoneal tuberculosis is a rare form of extrapulmonary tuberculosis<sup>1</sup>. It remains a difficult disease to diagnose because of the nonspecific clinical picture and radiological findings that can mimic malignancy. Here, we report a case of peritoneal tuberculosis with high serum levels of CA 125, which is a specific determinant for epithelial ovarian carcinomas. We also used CA 125 for monitoring the response to the anti-tuberculous treatment.

A 14-year-old girl presented with abdominal pain and distension, fever and a 3 kg weight loss over the last month. The patient was in good health until three weeks before admission, when diffuse abdominal pain developed. Over the next weeks, she had fever over 38°C, especially spiking at night. Her family history was unremarkable. On admission, her temperature was 38.1°C, blood pressure 105/75 mmHg, pulse 78 bpm, and respiration rate 21 per minute. Both hemithoraces were dull in percussion, and respiratory sounds were decreased on lower zones. The abdomen was distended with a moderate amount of ascites. She refused bimanual pelvic examination. Laboratory examination revealed the following results: hemoglobin, 9.7 g/dl; leukocyte count, 4,500/mm<sup>3</sup>; platelet count 520,000/mm<sup>3</sup>; and erythrocyte sedimentation rate 60 mm/hour. In biochemical analysis, only the lactic dehydrogenase level (995 U/L<sup>9</sup> was beyond the limits. The serum CA 125 level was increased to 918 U/ml (normal, less than 35 U/ml), and the serum CA 19-9, carcinoembryonic antigen and alpha fetoprotein values were all within the normal limits. Chest X-ray showed pleural effusion bilaterally. Paracentesis was performed and lymphocytes were predominant in microscopic examination. Glucose was 60 mg/dl, protein 4 g/dl, lactic dehydrogenase 943 U/L and pH 7.15. Direct stains for acid-fast bacilli and cultures for common bacterial organisms and mycobacteria species were also negative. Thoracentesis revealed the same results as pleural effusion. Additionally, cytological examination of pleural and ascitic fluids showed

reactive mesothelial cells and some histiocytes in the predominance of lymphocytic cells. The ascitic fluid CA 125 level was highly elevated at 1018 U/ml (normal range between 10-30 U/ml). Computed tomography (CT) of thorax, abdomen and pelvis showed minimal pleural effusion, massive ascites, diffuse irregular omental, peritoneal and adnexal thickening and small tumor-like nodular densities mimicking a neoplastic process (Fig. 1). A provisional

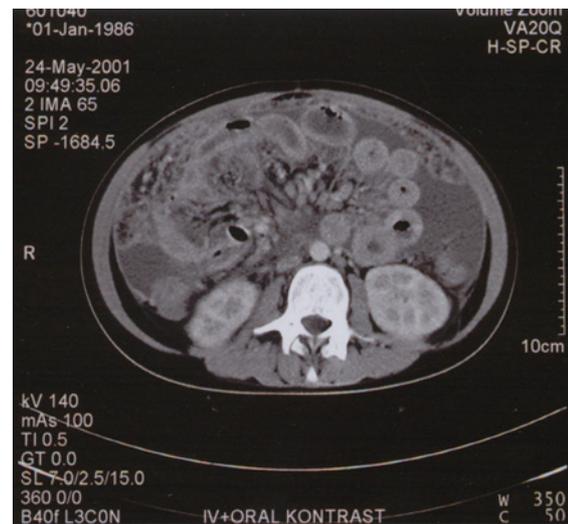


Fig. 1. Computed tomography of the abdomen. Note the thickened bowel loops, nodular thickening of the omentum, nodular dense lesions and massive ascites.

diagnosis of ovarian carcinoma based on the CT findings and elevated level of CA 125 was made and an exploratory laparotomy was performed. Laparotomy revealed multiple whitish "miliary" nodules scattered over the visceral and parietal peritoneum, ovarium, uterine tubes and numerous sites at which the bowel adhered to the stomach and liver. Two specimens from parietal peritoneum and liver were obtained. Microscopic examination of the resected specimen was reported as a tuberculoid-type caseating necrosis and chronic granulomatous reaction. Ziehl-Neelsen stain was negative for acid-fast organisms. However, mycobacterial

cultures of ascitic fluid and peritoneal biopsy yielded *Mycobacterium tuberculosis* that was sensitive to commonly used anti-tuberculous drugs. The patient was treated with steroid (1 mg/kg/day for one month), isoniazid (10 mg/kg/day for one year), ethambutol (20 mg/kg/day for four months), rifampin (10 mg/kg/day for one year) and pyrazinamide (30 mg/kg/day for two months). She responded well to anti-tuberculous medications, her initial clinical symptoms and signs disappeared and, of note, the serum CA 125 level had decreased to 340 U/ml one month later, to 76.6 U/ml two months later and to 15.5 U/ml five months later.

Primary peritoneal tuberculosis typically presents with non-specific symptoms and signs, including abdominal pain and swelling, weight loss, fever and ascites<sup>1</sup>. The diagnosis of peritoneal tuberculosis is difficult and is often made at laparotomy. It is important to differentiate peritoneal tuberculosis from malignant processes such as ovarian carcinoma, abdominal lymphoma, malignant peritoneal mesothelioma, gastrointestinal malignancies and other causes of peritoneal carcinomatosis<sup>2</sup>.

Although epithelial ovarian carcinoma is extremely rare in childhood, our patient generated reasonable concern for epithelial ovarian carcinoma, because of the combined findings of nodular peritoneal dense lesions and adnexal thickening on abdominal CTD, multiple whitish "miliary" nodules on laparotomy with elevated CA 125 level, and non-specific clinical symptoms such as abdominal pain, weight loss and ascites<sup>3</sup>. Several cases of tuberculous peritonitis with increased CA 125 levels, simulating ovarian cancer, are described in the literature in young women, but to the best of our knowledge, it has not been reported in a pediatric patient<sup>1</sup>. In these patients, ovarian carcinoma was the primary differential diagnosis that caused the exploratory laparotomy or laparoscopy with biopsy. Only a few cases of diffuse malignant peritoneal mesothelioma with elevated CA 125 have been reported in childhood in the literature<sup>4</sup>. The differential diagnosis is difficult and the majority of the cases are diagnosed with histological examination, as in our case. Gastrointestinal malignancies may cause peritoneal carcinomatosis in childhood<sup>4</sup>. The differential diagnosis is also made by histological examination. An important point is that the most common histological subtype of

gastrointestinal malignancies is adenocarcinoma; carcinoembryonic antigen and CA 19-9 are more sensitive and specific than CA 125. In our patient, carcinoembryonic antigen and CA 19-9 were within the normal limits.

In most reported cases, the CA 125 levels have been below 500 U/ml in tuberculous peritonitis<sup>1</sup>. In our patient, the CA 125 level was quite high with levels of 918 U/ml in the serum and 1018 U/ml in the ascetic fluid. It has been suggested that the high level of the CA 125 is caused by a chronically inflamed lesion of the peritoneum<sup>5</sup>. The decrease in CA 125 level after therapy supports this opinion. In a previous report, a positive correlation was found between the CA 125 level and tuberculous activity; normalization of CA 125 levels after antituberculous therapy was also demonstrated in that report<sup>6</sup>.

The most common CT feature of abdominal tuberculosis is lymphadenopathy and high density ascites fluid<sup>7</sup>. Thickening and nodularity of the peritoneal surfaces, mesentery, omentum, and bowel wall are the other findings<sup>7</sup>. However, these findings are not pathognomonic for tuberculous peritonitis, and they can occur in other diseases such as peritoneal metastatic carcinomas. In a previous article, it was reported that nodular implants and irregular peritoneal thickening suggest peritoneal carcinomatosis, whereas smooth peritoneum with minimal thickening and pronounced enhancement suggest peritoneal tuberculosis<sup>8</sup>. In our case, peritoneal, omental and adnexal thickening, with small nodular densities with elevated CA 125 were suggestive of a malignant disease.

In summary, peritoneal tuberculosis may occasionally be misdiagnosed as peritoneal carcinomatosis, as shown by our case and previous reports. Because of this, tuberculous peritonitis should be considered in the differential diagnosis of a child with fever, ascites, weight loss, and elevated CA 125. This case also illustrates that CA 125 may be used in the monitoring of other abdominal conditions where ascites and marked peritoneal inflammation are present in childhood.

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