Laparoscopy may be an effective tool in the diagnosis of peritoneal tuberculosis

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Results

The mean age of the patients was 28.3 ± 4.7 years (median 28; range 22-37). All patients were referred to the gynecologic oncology unit with a history of abdominal swelling and pelvic-abdominal pain. The other symptoms were swelling in the legs and menstrual irregularity (in two patients); weight loss and lack of appetite (in one patient). Ascites was present in all patients, but no masses were palpable either abdominally or vaginally.

All patients had moderate iron deficiency anemia with a median hemoglobin level of 10.5 gr/dl; (range 9.7-11.1 gr/dl) The white blood cell counts, platelet counts, erythrocyte sedimentation rates, liver function test results, urea concentration, and electrolyte levels were all within normal reference ranges. Intracutaneous injection of 5 tuberculin units of purified protein derivative caused a median skin induration of 11 mm for every patient (range 10-14 mm). A plain x-ray film of the chest showed normal appearance of the lungs, pleura, and mediastinum in all of the cases. All patients underwent abdominopelvic computerized tomography (CT), and transabdominal and transvaginal ultrasound examinations. All patients showed gross ascites and irregular thickening of the peritoneum. There were ovarian masses with heterogeneous textures of about 5 cm in size in two cases. Abdominal paracentesis was performed in the diagnostic work-up of all cases. Ascitic fluid was an exudate with lymphocytosis and no malignant cells. No acid-fast bacilli were seen by direct microscopy. Standard bacteriological and mycological cultures of ascitic fluids were negative. Results of tuberculosis polymerase chain reaction analysis of the ascitic fluid were negative. Sputum and urine cultures performed for all mycobacteria species were negative. All patients had elevated serum CA 125 levels with a median of 162 U/ml, (range 75 to 500 U/ml). All patients had normal cervical smears and endometrial biopsies.

A diagnostic laparoscopy was performed in all cases. Ascites with a median of 4 liter (range 3 to 5.5 lt), mililiary peritoneal lesions, and filmy adhesions throughout the peritoneal cavity were the major intraoperative findings. These findings were considered highly suggestive of tuberculosis. In two patients with ovarian masses documented by preoperative CT and ultrasound scans, exploration of the adnexae revealed corpus hemorrhagicum. Multiple biopsies were obtained from various parts of the peritoneum and the omentum. Frozen section examinations demonstrated granulomatous inflammation with necrosis, compatible with tuberculosis in all patients. Acid-fast bacilli were detected in the postoperative histopathological specimen of one patient. The postoperative courses of the patients were uneventful.

All the patients received antituberculous therapy with isoniazid, rifampicin, ethambutol and pyrazinamide. Treatment was started with a combination of four drugs for the first 3 months, and continued thereafter with three drugs for nine months. Preoperative high serum CA-125 levels were found to be within normal limits two months after the completion of therapy.

Discussion

Although vaccination against the disease during early infancy is mandatory, tuberculosis is not a rare phenomenon in our country. Since the clinical pictures of the patients with peritoneal tuberculosis are similar to those of patients with ovarian cancer, we are used to consider peritoneal tuberculosis in the differential diagnosis of ovarian cancer. The most common signs and symptoms were abdominal swelling, abdominopelvic pain, ascites and elevated serum CA-125 level (2,13) in our cases. Other infectious agents (e.g., Actinomycetes species and other mycobacteria) may produce similar clinical pictures. Recently, a case of Streptococcus milleri infection mimicking ovarian carcinoma was reported (14). Age may also be used as a good clinical predictor in favour of peritoneal tuberculosis. The age range of our cases contributed to the findings of previous studies demonstrating that women with peritoneal tuberculosis were younger than those with ovarian carcinoma (2,15).

A strongly positive tuberculin test (Mantoux) is sometimes indicative of reactivation of tuberculosis (16). The 10 to 14 mm skin induration (+) of our cases seems to be related to prior vaccination. The results of chest X-rays and sputum cultures showed that these tests were not helpful in the diagnostic work-up, as reported by other authors (16,17).

In our cases, cultures of ascitic fluids failed to demonstrate the infection, in contrast with the cases reported by Irvin et al (15) and Piura et al (18). Guinea pig inoculation and culturing for tuberculosis have a turnaround time of about six weeks, which could be a detrimental delay in treatment in the case of the ovarian cancer patient. Combined use of guinea pig inoculation and culture also has a low sensitivity about 37% (19).

Ascitic fluid analysis for mycobacteria generally does not contribute to more than 25% of the tuberculous peritonitis diagnoses. Direct preparations of ascitic fluid were not found to be positive for acid-fast bacilli in our cases as previously demonstrated by Bilgin et al (17).

An elevated adenosine deaminase activity in fluids isolated from the serosal cavities is considered to be...
an excellent tuberculosis marker, though only a few centers use it as an exclusive measure for tuberculosis diagnosis (1). On histologic examination, epithelioid granulomatous lesions with necrosis are typically seen in cases of peritoneal tuberculosis. In one of our cases Ziehl-Nielsen stain revealed acid-fast bacilli, however this is not always the case and is not essential for diagnosis (6,20). Cytological examination of ultrasonographically guided peritoneal biopsies may be a diagnostic approach, though it was never practiced at our institution (21).

Polymerase chain reaction (PCR) for mycobacteria may be helpful for obtaining results earlier (22). However, tuberculosis PCR analyses failed to demonstrate the infection in ascitic fluid, in contrast to the cases reported by Irvin et al (15) and Piura et al (18). In our laboratory, IS6110 fingerprinting was performed using the standard reference protocol (23). It was an unexpected finding to see that all the PCR tests for tuberculosis on ascitic fluid were negative even when one patient had acid-fast bacilli on histopathological examination. We could not find a reasonable explanation for this unusual finding.

Although ovarian carcinoma remains to be the first diagnostic choice in patients with elevated serum CA-125 levels, an elevation of CA-125 is not a guarantee of ovarian carcinoma, even in those women presenting with organic abdominal pathologies. Several reports have showed raised serum CA-125 levels, pelvic masses, ascites, or pleural effusions in cases of tuberculous peritonitis (6). In most reported cases, the CA-125 levels have been <500 U/mL, and in a study of 11 patients the mean level was 316.6 U/mL (6). In our cases the median level, and the range of serum CA 125 (162 U/ml and 75 to 500 U/ml, respectively) were consistent with the previous reports. Simsek et al noted that the association between elevated serum CA-125 levels, and peritoneal tuberculosis was not an incidental finding (24). Monitoring serum CA-125 levels is helpful to evaluate the effectiveness of medical treatment in patients with peritoneal tuberculosis. Serum CA-125 levels can be expected to normalize in two months as in our cases, and other relevant reports.

Sonographic features of tuberculous peritonitis may illustrate adnexal masses, adhesions and septated or particulate ascites. Omental and peritoneal thickening can also be seen (25). However, ultrasonography has conflicting results in previously reported cases, revealing ascites and complex pelvic masses (12,17). We detected adnexal pathology only in two cases and the sonographic features were not helpful in diagnosis.

In computerized tomographic examination, the presence of a smooth peritoneum with minimal thickening and pronounced enhancement suggests peritoneal tuberculosis, whereas nodular implants and irregular peritoneal thickening suggest peritoneal carcinomatosis (26). In a retrospective study, Ha et al showed that patients with tuberculosis were more likely to have mesenteric changes, macro-nodules (>5 mm in diameter), splenomegaly, and splenic calcification visible on CT imaging. Patients with carcinomatosis were more likely to show a more irregularly infiltrated omentum and to have the loss of the thin omental line covering the infiltrated omentum (27). They calculated the sensitivities of CT scan in the prediction of tuberculosis and carcinomatosis as 69% and 91%, respectively. However, CT imaging does not appear to be any more specific than ultrasonography for diagnosis of this condition, as consistently shown in our cases and in other reports (18,28).

The most fruitful algorithm for the diagnosis of possible peritoneal tuberculosis remains to be established. In the case of a young patient with generalized ascites and no suspicious mass, an abdominal paracentesis may be the first step in the diagnostic algorithm. If direct cytologic examination, culture or PCR analysis of ascitic fluid are inconclusive, diagnostic laparoscopy should be performed to obtain multiple tissue samples. Paracentesis and laparoscopy are not only simple, effective and minimally invasive diagnostic tools but also can be therapeutic tools whenever uncertain conditions of massive ascites are noted. In one series of 200 patients with undiagnosed ascites, laparoscopy proved to be a safe method of providing a diagnosis (29). In another series of 135 patients with tuberculous peritonitis, 97% of cases were diagnosed on the basis of biopsy specimens taken during laparoscopy (24). Since the gross appearance of peritoneal tuberculosis may resemble that of a disseminated ovarian carcinoma, a frozen-section analysis should always be considered during the laparoscopy. If no carcinoma is detected, and histopathological examination is consistent with diagnosis of tuberculosis, unnecessary extensive surgery is avoided and a multi-drug anti-tuberculosis regimen should be started. In patients with a suspicious adnexal mass, performing paracentesis or laparoscopy may lead to recurrences in the needle tracts, and laparoscopic port sites in case of ovarian malignancy (30). In ovarian cancer patients with abdominal wall metastases, prognosis is reportedly worse (31). Therefore laparotomy seems to be reasonable in cases with adnexal masses. On the other hand Volpi et al emphasized the importance of laparoscopy for the differential diagnosis of tuberculosis in a
References
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