Peritoneal Tuberculosis in Dialysis: Fatal if Missed

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Introduction

The incidence of tuberculosis (TB) has been increasing worldwide.[1] Many risk factors are associated with TB, such as human immunodeficiency virus (HIV) infection, organ transplant, renal insufficiency, malignancy, and low socio-economic status.[2] Patients with end-stage renal disease (ESRD) are at increased risk of developing TB due to defective cell-mediated immunity.[3] The incidence of TB in dialysis patients is 5 to 15 times higher than the general population, increasing the morbidity and mortality in those patients.[4]

Case Report

A 60-year-old Hispanic female patient with a past medical history significant for ESRD on continuous ambulatory peritoneal dialysis (CAPD), hypertension, diabetes, and anemia presented with non-resolving abdominal pain of eight weeks duration. Pain was continuous, epigastric, and severe. She had multiple admissions for peritonitis within the prior two months without a microbiologic diagnosis. The patient had no known exposures to tuberculosis and no recent travel. She had emigrated from Mexico to the United States around 20 years prior. On physical exam, she was afebrile and tachycardic with diffuse abdominal tenderness; otherwise she had no major findings.

On admission, her complete blood count showed leukocytosis and anemia. Liver function tests were within normal limits. HIV and hepatitis panel were negative. She received broad spectrum empiric antibiotics while repeated bacterial and fungal cultures of the peritoneal fluid were negative.

Computed tomography (CT) of the abdomen and pelvis showed increased densities diffusely throughout the omental fat in the mid abdomen consistent with inflammation (Figure 1). Peritoneal fluid was cloudy in appearance and showed 735 white blood cells, 1% bands, 87% neutrophils, 1% lymphocytes, and 11% monocytes.

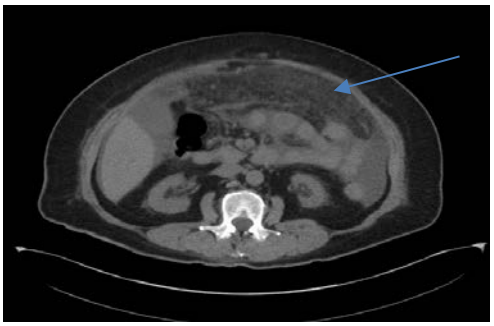

Figure 1. CT of the abdomen and pelvis showed increased density diffusely throughout the omental fat in the mid abdomen which is consistent with inflammatory changes (arrow).

Her peritoneal dialysis catheter was surgically removed and sent for cultures. A right internal jugular catheter was placed and she was switched to hemodialysis. Bacterial and fungal cultures remained negative. The acid fast bacilli (AFB) smear

was negative. AFB culture ultimately grew *Mycobacterium tuberculosis* (MTB) after four weeks of incubation on both the peritoneal catheter tip and peritoneal tissue.

She was started on isoniazid, ethambutol, pyrazinamide, rifampin and vitamin B6. Her chest-x-ray and sputum AFB cultures were negative. At two months, once susceptibilities were available, she was transitioned to isoniazid and rifampin to complete four more months. Her abdominal symptoms gradually resolved.

Discussion

Peritoneal tuberculosis is rare but remains a very important complication in CAPD patients. In 70 percent of cases, patients have symptoms for more than three months before the diagnosis is established which are usually indistinguishable from bacterial peritonitis.[5] The most common symptoms are abdominal pain (92%), cloudy peritoneal fluid (90%), and fever (78%).[6] There is a predominance of polymorphonuclear cells in the peritoneal fluid in 65% of cases, which can be misleading.

Different tests can be used to diagnose TB peritonitis in CAPD patients. AFB smear has limited sensitivity and specificity (all mycobacteria are acid fast). Culture of peritoneal tissue needs time to yield a diagnosis and has sensitivity between 38-98%.[2] Adenosine deaminase (ADA) levels have high sensitivity (100%) and specificity (97%).[7] The Quantiferon assay has a sensitivity of 93% and a specificity of 100%.[8] The polymerase chain reaction (PCR) is important for early diagnosis but has a sensitivity of 60-88 percent and specificity of 81-100 percent.[9]

The most common cause of peritonitis in dialysis patients is bacterial infection, and it should always be high in the differential diagnosis. Based upon 1108 episodes of peritonitis among 1015 CAPD patients, single gram-positive organisms, single gram-negative organisms, multiple organisms, fungi, and MTB caused 45, 15, 1, 2, and 0.1 percent of peritonitis episodes, respectively.[10] Since MTB peritonitis is very rare in CAPD, it is always important to think about it in patients with repetitive episodes of peritonitis with negative bacterial cultures and failure of antibiotic therapy. The average mortality rate is 15-30% with most significant factor being treatment delay.[6] Suspicion of TB peritonitis should be higher in patients that emigrated from countries with high prevalence of TB. Six months of anti-tuberculous therapy is effective and improves outcome.

Conclusions

A high index of suspicion is crucial to make the diagnosis of TB peritonitis in CAPD patients with recurrent peritonitis and negative bacterial or fungal cultures. Clinical findings in peritoneal TB are indistinguishable from those of bacterial peritonitis.[6] The gold-standard for diagnosis is growth of MTB from ascitic fluid or peritoneal biopsy specimen.[2] TB peritonitis could be fatal but is potentially curable if diagnosed in a timely manner.

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