Case Report

An unusual case of *Acanthamoeba* peritonitis in a malnourished patient on continuous ambulatory peritoneal dialysis (CAPD)

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Abstract
An unusual case of peritonitis in a 61-year-old patient is reported where culture for bacteria and fungi were negative. *Acanthamoeba* was isolated and the patient was treated with Ceftazidine, Cefazolin, Levofloxacin, Fluconazole and Rifampicin with regular haemodialytic support. The patient was completely cured of the infection and continuous ambulatory peritoneal dialysis (CAPD) fluid became clear after 2 weeks of treatment. Diagnosis and treatment of *Acanthamoeba* infections are difficult due to the rarity of the infections, lack of familiarity of most clinicians with disease syndromes, and limitations of therapeutics options. Even an experienced microbiologist can easily mistake the amoebae in ascitic fluid for peritoneal macrophages or lymphocytes.
Key Words: Continuous Ambulatory Peritoneal Dialysis (CAPD), *Acanthamoeba*, Peritonitis.

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Introduction

The process of continuous ambulatory peritoneal dialysis (CAPD) has provided a useful, relatively inexpensive, and safe alternative procedure for patients with end stage renal disease. Infectious peritonitis, however, has limited the acceptance of this technique [1-3]. Peritonitis results from decreased phagocytic efficiency with depressed phagocytosis and bactericidal capacity of peritoneal macrophages. Free-living amoebae of the genus *Acanthamoeba* are the causative agents of many infections in immunocompromised patients and may be life threatening. Extraneural infective foci in the skin, paranasal area, or lungs are possible points of access for amoebae [4]. The most important finding in our patient was made by direct demonstration of the amoebae in the ascitic fluid and also by culture.

Case Report

A 61-year-old male suffering from non–insulin dependent diabetes mellitus for the past nine years presented with generalized weakness and swelling. For the first six years the patient received oral hypoglycemic agents and subsequently was given insulin for controlling hyperglycemia. He was diagnosed with hypertension three years ago. Anasarca and stage V diabetes chronic kidney disease (diabetes nephropathy) were diagnosed two years ago. In February 2006, the patient was started on chronic ambulatory peritoneal dialysis and was doing well on 4 exchanges per day. Four months later, the patient was hospitalized with a history of low-grade intermittent fever, mild abdominal pain, cloudy effluent dialysate, nausea and vomiting for one month, and altered sensorium for five days. The patient had stopped peritoneal dialysis 10 days before hospitalization.

On examination the patient was irritable with aggressive behavior, and not oriented in time, place and person. The patient was febrile (102^{o}F), with pallor and pitting edema in both lower limbs. His pulse rate was 110 per minute and blood pressure was 150/90 mm Hg in the right upper arm supine position.

The patient's chest and cardiac examination was unremarkable. His abdominal examination revealed distended abdomen with generalized tenderness, mild guarding and normal bowel sounds. The exit site and tunnel of the peritoneal

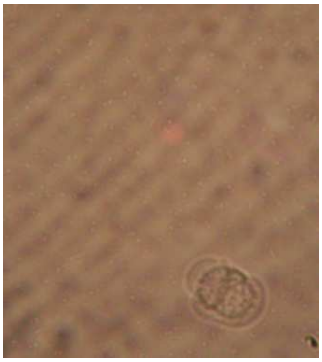
dialysis catheter were healthy without any drainage. The patient's investigations revealed hemoglobin of 4.8 gm/dl, total leukocyte count of 17,000 cells/mm3 with the differential count showing 64% neutrophils, 33% lymphocytes, 2% eosinophils and 1% monocytes. His peripheral blood film revealed normocytic, normochromic anaemia with no hemoparasites. His random blood glucose levels were 146 mg/dl and kidney function tests revealed urea of 214 mg/dl, S. creatinine of 13 mg/dl with normal electrolytes (Na+ = 140 meq/L, K+ = 4.5 meq/L). His liver function tests revealed bilirubin of 0.9 mg/dl, SGOT of 26 units, SGPT of 34, Serum protein of 4.6 gm/dl and albumin of 1.3 gm/dl.

Both blood and urine cultures were found to be sterile. Peritoneal dialysis effluent showed 165 cells/cmm with 81% lymphocytes and showed negative results on Gram's stain and Ziehl Neelsen stain.

Empirically, Ceftazidime 1 gm and Cefazolin 1 gm intraperitoneally 3 times a day and intravenous Levofloxacin 500mg daily were started immediately. Peritoneal dialysis was stopped due to poor outflow and the patient was given thrice weekly hemodialysis. The patient's mental status improved and he regained consciousness but continued with fever and abdominal symptoms over the next 10 to 15 days. His dialysis effluent wet mount examination showed the presence of free-living amoebae. The motile forms presented the characteristic morphological features of spherical shape, having abundant cytoplasm and nuclei with prominent nucleoli consistent with the morphology of *Acanthamoeba* species (Figure 1). A specimen inoculated on non-nutrient agar (NNA) covered with a dense lawn of the *Escherichia coli* yielded *Acanthamoeba* species.

The patient was continued on thrice weekly hemodialysis, Ceftazidine and Levofloxacin and in addition was treated with Rifampicin 600 mg daily and Fluconazole 150 mg daily. After 2 weeks of treatment, the patient's fever settled, abdominal signs and symptoms disappeared, and his appetite improved. Repeat peritoneal fluid examination was found negative for *Acanthamoeba sp*. and peritoneal dialysis was restarted with clear effluent dialysate.

Figure 1. *Acanthamoeba* species found in the patient's peritoneal fluid.



Discussion

Peritonitis remains the major concern in patients on CAPD; however, with improved technology the incidence of peritonitis has decreased to less than one episode in 24 months. Patients usually present with abdominal pain, nausea and vomiting, fever, chills and constipation or diarrhoea. Cloudy peritoneal fluid is seen in almost all patients with peritonitis, as well as abdominal tenderness, increased body temperature, and increased blood leucocytes [5,6].

Fungal peritonitis occurs in 1% to 10% of cases, whereas in 5% to 20% of cases no organism can be isolated. We are reporting a case of a patient suffering diabetic nephropathy on CAPD due to *Acanthamoeba* species. This parasite is an opportunistic free-living amoeba capable of infecting persons with depressed immune systems. *Acanthamoeba* species are causative agents of granulomatous amoebic encephalitis and amoebic keratitis, and have been associated with cutaneous lesions and sinusitis [2]. Immunocompromised individuals, including AIDS patients, are particularly susceptible to infections with the parasite. The life cycle of the amoeba includes an active feeding trophozoite stage and dominant cyst stage with no flagellate stage. Trophozoites are infective forms and are believed to gain entry via the lower respiratory tract and ulcerated or broken skin.

If properly treated, typical cases of peritonitis have a mortality rate of about <10% in otherwise healthy patients; this figure rises to about 40% in elderly patients. If untreated, generalized peritonitis is almost always fatal.

In our case, *Acanthamoeba* was isolated from peritoneal dialysis effluent in a patient with diabetic nephropathy on CAPD. The parasite was identified

by light microscopy based on its characteristic appearances. It has not been previously reported as a cause of peritonitis in patients on CAPD. Another interesting feature of our case was the successful treatment of peritonitis using Rifamipicin 600 mg and Fluconazole 150 mg daily along with empiric antibiotics.

In conclusion, *Acanthamoeba* is a rare cause of peritonitis on CAPD. This case is even more unusual in view of successful treatment with Fluconazole and Rifampicin. It should be considered in culture negative peritonitis. Delayed diagnosis of *Acanthamoeba* peritonitis often results in death. Clinical awareness of this entity may lead to early diagnosis and proper treatment.

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Conflict of interest: No conflict of interest is declared.