Case Report

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Microbiology Section

Mycobacterium fortuitum Peritonitis in a Patient on Continuous Ambulatory Peritoneal Dialysis (CAPD): A Case Report

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ABSTRACT

Mycobacterium fortuitum, an environmental organism, is capable of producing a variety of clinical infections such as cutaneous infections, abscesses and nosocomial infections. Rarely, it has been a documented as a cause of peritonitis in patients receiving continuous ambulatory peritoneal dialysis (CAPD). Continuous Ambulatory Peritoneal dialysis (CAPD) is one of the treatment options which are used for patients with end-stage renal disease (ESRD). Although peritonitis rates have declined in parallel with advances in peritoneal dialysis (PD) technology, peritonitis remains a leading complication of CAPD and it is the major cause for transfer to other methods of dialysis. We are reporting a case of M. fortuitum peritonitis in a patient who was undergoing CAPD, which was successfully treated. This case emphasizes the importance of mycobacterial cultures in patients with CAPD-associated peritonitis, whose routine cultures may yield no organisms.

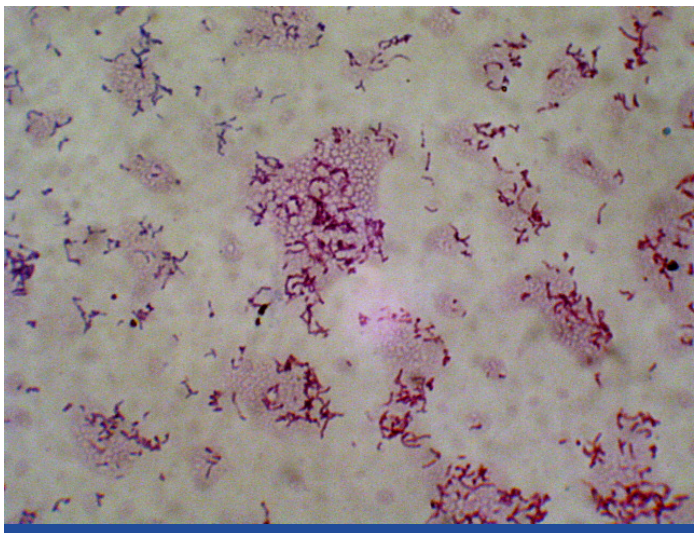
Keywords: Acid fast bacilli, Dialysate culture, End-stage renal disease, *Mycobacterium fortuitum*, Peritonitis

CASE REPORT

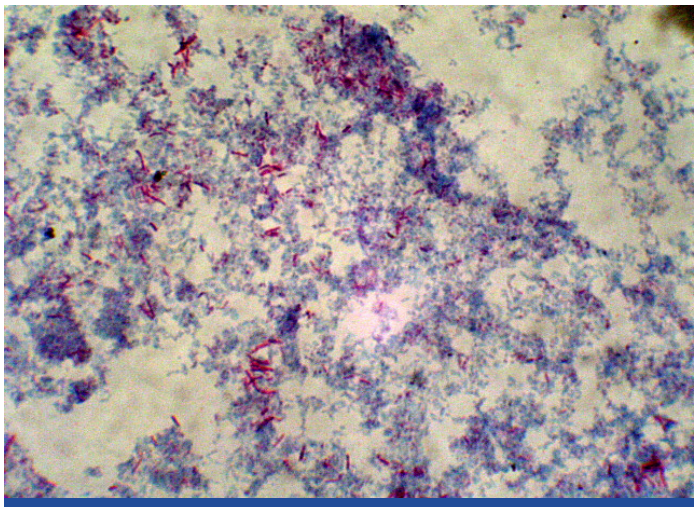
A 9-year-old girl child with end stage renal disease was admitted for continuous ambulatory peritoneal dialysis (CAPD) at a tertiary care centre in Pune in 2011. She was diagnosed with chronic glomerulonephritis in 2009, for which she was treated with steroids. Patient did not respond and later, was labelled to have end stage renal disease (ESRD). Continuous ambulatory peritoneal dialysis was started. Post-operative period was uneventful and catheter was working well. Patient was discharged. Fifteen days later, patient complained of reduced output, following which she was taken for urgent haemodialysis. After 2 days, a laproscopic surgery was performed to find out the cause of reduced output and catheter was found to be stuck in omentum, from where it was released. Post-operative period was uneventful and output was also good. A week later, again the output reduced markedly and again, an urgent haemodialysis was performed. Later, the patient was taken for laproscopic omentectomy and release of catheter obstruction. Following surgery, after 2 days, the patient complained of loss of appetite, diffuse abdominal pain and a turbid dialysate and so, she was put on intraperitoneal ciprofloxacin. The dialysate bag was sent for cell count, culture and sensitivity.

On examination, patient was found to be lethargic and she appeared ill. She was thin and underweight for her age. Temperature was 99ºF, pulse rate was 72 per min. Examination of head and neck was normal, except for a pale conjunctiva. Respiratory and cardiovascular systems were normal. The abdomen was rigid and diffusely tender, but the catheter exit site showed no signs of infection or leakage. Liver and spleen were not palpable. Complete blood count revealed: haemoglobin: 9gm/dl, TLC: 6000 cells/mm^3, DLC showed increased lymphocytes (58%).

The dialysate was received in the laboratory for microbiological investigations. On gross examination, sample was found to be turbid. Cell count was found to be 340 cells/mm^3, with predominant cells being lymphocytes. Gram staining revealed lymphocytes and no microorganisms. Culture was done on blood agar (BA) and Mac Conkey's agar (MA) and sample was also inoculated in Brain Heart Infusion (BHI) broth. Two days later, BHI broth showed turbidity, but there was no growth on BA and MA. Hence, both the plates were kept for incubation.BA and MA showed growth after four days of incubation at 37°C. Gram staining from colonies showed gram variable pleomorphic bacilli, many of which were long and filamentous [Table/Fig-1]. Ziehl Neelsen staining was performed, which revealed "acid fast bacilli" [Table/Fig-2]. Colonies were cultured on Lowenstein-Jenson (LJ) medium, which showed growth on fourth day. These colonies were identified as those of



[Table/Fig-1]: Gram stain picture showing Gram variable pleomorphic bacilli (Binocular, Light Microscope: 1000x)



[Table/Fig-2]: Ziehl Neelson stain picture showing acid fast bacilli (Binocular, Light Microscope: 1000x)

Sr no.	Tests	Result
1	Growth on LJ medium	Present (4 days)
2	Growth on MacConkey agar	Present (4 days)
3	Pigment	Negative
4	Urease Test	Positive
5	Nitrate Reduction	Positive
6	Catalase at 68°C	Positive

[Table/Fig-3]: Results for identification tests performed

M.fortuitum. The results of identification tests have been given in [Table/Fig-3]. Subsequent antibiotic susceptibility testing done by using broth microdilution as per CLSI guidelines [1] demonstrated sensitivity to ciprofloxacin, clarithromycin and amikacin, intermediate resistance to cefoxitin, and resistance to doxycycline, imipenem and trimethoprim/sulfamethoxazole.

Meanwhile, the patient improved symptomatically, but dialysate was still turbid. Hence, a repeat sample was sent for cell count, culture and sensitivity. Again, the cell count was found to be high (740 cells/mm^3), with predominant cell type being lymphocytes and culture showed the growth of *M.fortuitum* again. All this time, the patient was on intraperitoneal ciprofloxacin and was continued on the same, considering sensitivity of organism and her symptomatic improvement. Culture sensitivity and cell counts were repeated weekly for next three consecutive weeks, which showed no growth, with cell counts falling down to 500, 150,50 cells/mm^3 respectively. Total duration of ciprofloxacin treatment till this time was 6 weeks. Considering her improvement, patient was discharged with oral ciprofloxacin and clarithromycin for two weeks. Patient was followed up for 6 weeks afterwards and she was doing well.

DISCUSSION

The most common infectious complication of peritoneal dialysis (PD) is bacterial peritonitis [2]. Although mycobacterial infections are uncommon, they occur ten times more frequently in patients with ESRD than in patients with normal renal function, because of impaired cellular immunity [3]. Non-tuberculous (atypical) mycobacteria, including rapidly growing species, have sporadically been identified as aetiologic agents in continuous ambulatory peritoneal dialysis (CAPD) peritonitis [4-9].

Mycobacterium fortuitum is the commonest of the group IV (Runyon's classification) rapidly growing, non-tuberculous mycobacteria and it is readily isolated from a number of natural sources such as soil, dust and water [10]. This organism displays low-inherent pathogenicity, but when it is inoculated into a sterile body site, such as through accidental trauma or surgery or through the CAPD catheter into the peritoneum, it may cause a serious infection. It has been identified as a cause of sporadic post-surgical infections, as well as of outbreaks of nosocomial disease that involve dialysis [4-9] and specific types of surgery [11]. In this case, the patient had undergone surgical procedures twice, that could probably have resulted in infection with *M. fortuitum*. Ciprofloxacin, levofloxacin, moxifloxacin, trimethoprim sulfamethoxazole, linezolid, doxycycline, clarithromycin, azithromycin; imipenem, tigecycline, linezolid, amikacin, cefoxitin are the drugs which are effective against this organism. Treatment usually ranges from 6 to12 weeks, for preventing a relapse of infection [12].

There are a number of difficulties in the diagnosis of infection with *M. fortuitum*. The problem in the recovery of this organism is that it grows slower than common bacterial pathogens. Hence, it goes undetected when culture media are discarded after 2 days, as is the common practice in routine cultures of CAPD fluid. In addition, colonies of *M. fortuitum* resemble diphtheroids on blood agar and they may be mistaken for them on Gram staining, unless acid-fast staining is done. Longer observation of routine peritoneal fluid cultures, early use of mycobacterial culture media and increased familiarization with the Gram stained appearance of non-tuberculous mycobacteria, are necessary for proper diagnosis [2]. In our case, suspicion of colonies on blood agar and Gram stained appearance led us to acid fast staining and the resulting "acid fast bacilli" gave an important clue for identifying the causative organism.

Though recently, few studies have reported non tuberculous mycobacteria as a cause of peritonitis, in all of them, removal of catheter was the last resort, whereas in our case, timely detection and treatment of Mycobacterium fortuitum peritonitis did not require removal of CAPD catheter [8,9].

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