Isolation of Toxigenic Clostridium difficile from Dialysate Fluid in a Fatal Case of Chronic Ambulatory Peritoneal Dialysis—Related Peritonitis

Clostridium difficile, first identified in 1935, is now a common nosocomial pathogen and has been established as the etiologic agent of pseudomembranous colitis associated with antimicrobial therapy [1]. Extraintestinal disease caused by C. difficile has rarely been reported. Two case reports of C. difficile peritonitis have been published, including a fatal case in a neonate [2, 3]. We report a case of C. difficile peritonitis in a patient undergoing chronic ambulatory peritoneal dialysis; in this case, C. difficile may have been pathogenic.

A 41-year old man was admitted to the hospital with peritonitis. His medical history included type I diabetes mellitus with end-stage nephropathy that required chronic ambulatory peritoneal dialysis. A peritoneal dialysis catheter had been in place for ~1 year. Three weeks before admission, he presented to another hospital with severe abdominal pain, nausea, and fever. Peritonitis was diagnosed, and culture of peritoneal fluid yielded Bacteroides fragilis and Streptococcus species. A 10-day course of iv vancomycin, ceftazidime, and tobramycin was given, and the patient was discharged from the hospital with a prescription for oral metronidazole. His symptoms recurred 5 days later, and he was referred to our hospital for treatment including removal of the peritoneal dialysis catheter.

At admission, the patient was febrile (temperature to 37.7°C) and had severe abdominal pain and signs of peritonitis. Examination of chronic ambulatory peritoneal dialysis (CAPD) fluid revealed a WBC count of >100 × 10^9/L, with a 96% predominance of neutrophils. A gram stain of the CAPD fluid demonstrated yeast cells. Ten mL of fluid were inoculated into a BacT/Alert aerobic FAN (fastidious antimicrobial neutralizing) bottle (Organon Teknika, Durham, NC) and an anaerobic BacT/Alert blood culture bottle as per the method of Alfa et al. [4]. The anaerobic bottle yielded C. difficile, and Candida albicans was detected in the aerobic FAN bottle. The isolate of C. difficile produced cytoxin B. Blood cultures were sterile.

Therapy with iv amphotericin B, ceftazidime, gentamicin, and metronidazole was begun, and ip doses of ceftazidime and tobramycin were given. The patient’s abdominal pain and fever persisted, and on the third hospital day the peritoneal dialysis catheter was removed. Culture of the catheter tip yielded C. albicans; the tip was not cultured anaerobically. The patient’s abdominal symptoms decreased, but his fever persisted, and hypotension developed.

On the sixth hospital day, the patient went into unwitnessed cardiopulmonary arrest and was unresponsiveto resuscitative attempts. Autopsy revealed evidence of acute peritonitis but not of intestinal perforation or pseudomembranous colitis. No biliary tree pathology was identified. Postmortem culture of specimens from the peritoneal cavity yielded C. difficile that produced cytoxin B, Lactobacillus species, C. albicans, and Candida tropicalis. Death was attributed to acute peritonitis.

Peritonitis remains a common complication of peritoneal dialysis, ranging in incidence from 1.2 episodes per patient-year [5] to one episode every two dialysis-months [6]. To our knowledge, this is the first report of the isolation of toxigenic C. difficile from peritoneal fluid in a case of peritonitis complicating peritoneal dialysis. Predisposing factors for C. difficile as well as fungal infection in this patient included hospitalization and the use of broad-spectrum antibacterials.

In a review of 82 cases of fungal peritonitis in patients undergoing peritoneal dialysis, all patients whose peritoneal dialysis catheters were removed were cured; some patients received concomitant systemic antifungal therapy [7]. In our case, the patient died and had evidence of ongoing peritonitis at postmortem examination despite removal of the catheter and the use of appropriate antimicrobials. C. difficile toxins A and B have been shown to be lethal by both ip injection in mice [8] and iv injection in infant rhesus monkeys [9].

It has been speculated that absorption of C. difficile toxins into the systemic circulation from the gut in ill patients may contribute to increased mortality in nursing home patients [10]. Whether C. difficile or its toxin(s) contributed our patient’s death—despite therapy—is unclear, but this case report provides evidence that C. difficile can be involved in peritoneal dialysis–associated peritonitis. The detection of an anaerobic pathogen also provides support for the use of diagnostic methods that allow detection of anaerobic bacteria in CAPD fluid.

Marc C. Larroche, Michelle J. Alfa, and G. K. M. Harding
Department of Medical Microbiology, St. Boniface General Hospital, University of Manitoba, Winnipeg, Manitoba, Canada

References

Reprints or correspondence: Dr. Michelle J. Alfa, Department of Medical Microbiology, St. Boniface General Hospital, 409 Tache Avenue, Winnipeg, Manitoba, R2H 2A6 Canada.

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