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CASE REPORT

**Peritonitis in a Peritoneal Dialysis Patient
Due to *Rhizobium Radiobacter*
and *Moraxella Osleonsis*:
Case Report and
Literature Review**

Editor:

Peritonitis is a common complication in peritoneal dialysis (PD) patients. It has been associated with significant morbidity, catheter loss, transfer to hemodialysis, and occasionally death. In 50 – 61% of PD patients, peritonitis is caused by gram-positive bacteria, in 15 – 20% by gram-negatives, and in about 4% by a mixture of micro-organisms (1,2).

We report a case of a PD patient with peritonitis caused by both *Rhizobium radiobacter* (RR) and *Moraxella osloensis* (MO). These microorganisms are uncommon causes of peritonitis and appropriate therapy is uncertain because of limited literature.

A 47-year-old Caucasian man with end-stage renal failure secondary to membranous nephropathy started on continuous ambulatory PD (CAPD). After 17 months, he developed bacterial peritonitis due to a *Streptococcus gordonii* with good response to therapy. Our patient lives alone with his dog. The patient claimed to have taken all the necessary hygienic precautions in his daily CAPD exchanges.

After 36 months he was admitted with abdominal pain, fever, cloudy peritoneal fluid, and increased leukocyte count ($2.1 \times 10^9/L$) in the peritoneal fluid, diagnosed as bacterial peritonitis. There were no signs of exit-site infection. After cultures were taken, treatment was started with cefazolin intraperitoneally (250 mg, 4 times daily). The next day, preliminary culture results indicated gram-negative bacteria so treatment was switched to ceftazidime i.p. (500 mg, once daily). The fever subsided; however, the peritoneal fluid remained cloudy. Two days after admission, cultures showed RR, resistant to cefazolin, ceftazidime, and ceftriaxone, and sensitive to meropenem, ciprofloxacin, and amoxicillin/clavulanic acid. Subsequently, antibiotic therapy (AB-therapy) was switched to ciprofloxacin intraperitoneally (400 mg, once daily). The fourth day, another intraperitoneal culture was taken because the peritoneal fluid remained cloudy even though the patient had no fever. The seventh day, the microbiological diagnosis of the second culture was completed and showed a MO (confirmed using MALDI-TOF technique) with *in vitro* sensitivity to all antibiotics. However, AB-therapy was switched to meropenem because of uncertainty of *in vivo* sensitivity of MO. Despite the change in antibiotics, the patient continued to have abdominal pain and the peritoneal fluid remained cloudy with high leukocyte counts. After 12 days, it was decided to remove the Tenckhoff-catheter and initiate intermittent hemodialysis.

DISCUSSION

Rhizobium radiobacter (formerly known as *Agrobacterium tumefaciens*) is an aerobic gram-negative pathogen found in soil and plants globally. There are some reports of the RR as an opportunistic pathogen in humans (3). Peritonitis in patients with peritoneal dialysis due to RR was first described in 1990 (4). Since then, there have been only a few case reports on peritonitis caused by RR (5–9). The antibiotic resistance patterns of RR in the case reports differ. Levitski-Heikkila *et al.* (9) discussed 12 case reports (including Lui *et al.* [5]). From those 11 patients, 7 required catheter removal after an

RR infection, either because of resistance to therapy or recurrence. Three patients responded to antibiotic therapy and were cured. One patient died while being treated for another cause. One patient had 2 episodes of peritonitis in a short period of time. In both episodes, a total of 3 different bacteria of environmental origin (including *RR*) were found. The PD catheter was removed during the second episode of peritonitis. Cultures did not show *RR* during the second episode. We found 3 additional case reports (6–8): in 2, the PD catheter was removed after unsuccessful antibiotic treatment; in the third, the patient responded well to 3 weeks of intra-peritoneal antibiotic treatment and received a kidney transplant 6 months later.

Of the 15 patients described in the case reports, 4 were cured with antibiotic treatment alone, 10 ended up having their catheter removed after being infected with *RR* and 1 died. If we exclude the patient who died, these numbers suggest that there is only a 28.5% chance that antibiotic treatment without catheter removal will be successful. In 71.4% of the cases, the catheter has to be removed eventually.

Moraxella osloensis is an aerobic gram-negative bacteria that is saprophytic on skin and mucosa of humans and other warm-blooded animals. *Moraxella osloensis* has been identified as being one of the natural symbionts of bacteria-feeding nematodes (roundworms). *Moraxella osloensis* has been found in hospital environments (10) and is also responsible for locker-room smell or shower-curtain odor (11). *Moraxella osloensis* rarely causes infections in humans. There have been some case reports of serious systemic diseases caused by *MO*, but we found no reports of peritonitis in PD patients.

Han *et al.* (12) described 10 cases of *MO* blood or catheter infections that occurred during anticancer chemotherapy or without preexisting neutropenia. Nine of these patients had central venous catheters, 6 had catheter colonization and infection. All patients responded well to antibiotic therapy and none of the catheters had to be removed. Hadano *et al.* (13) report a central venous catheter-related infection caused by *MO* in a Japanese patient with advanced pancreatic cancer 7 days after administering chemotherapy. The infection was successfully controlled with antibiotic therapy without the need for removal of the central venous catheter. These reports suggest that PD patients with peritonitis due to *MO* will also respond well to antibiotic therapy. However, no data exist to validate extrapolation to PD-related peritonitis.

Considering the high probability of insufficient response to antibiotic treatment, early removal of the PD catheter in *RR*-related peritonitis without prompt reaction to antibiotic therapy should be considered.

The International Society for Peritoneal Dialysis (ISPD) guidelines/recommendations (14) state a similar strategy for peritonitis treated with appropriate antibiotics without resolution after 5 days (refractory peritonitis).

In the case of *MO* peritonitis, we advise attempting antibiotic treatment without catheter removal based on extrapolation of other (non-PD) *MO* catheter infections.

DISCLOSURES

The authors have no financial conflicts of interest to declare. The contents of this paper have not been published previously in whole or part.

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