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Case Report

Uncommon Pathogen, Common Complication: *Rhizobium radiobacter*-Induced Peritonitis in Peritoneal Dialysis

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Abstract

Rhizobium radiobacter is an uncommon opportunistic pathogen commonly found in soil. To date, only a few cases have reported R. radiobacter as a cause of PD-related peritonitis. Our patient developed R. radiobacter peritonitis after gardening, presenting with cloudy dialysate without pain or febrility. The infection was successfully treated with cefepime. However, it relapsed one month later, ultimately leading to catheter removal.
Physicians must remain vigilant for this rare pathogen despite the much more common causes of peritonitis. Education of patients about the connection between Rhizobium radiobacter, soil exposure, and non-sterile conditions is crucial for prevention of relapses and avoiding the need for catheter removal.

Key words: acute peritonitis, Rhizobium radiobacter, catheter removal, soil

Introduction

Peritonitis is a serious non-mechanical complication of peritoneal dialysis (PD) [1]. Gram-positive organisms have been recognized as the leading cause of PD-related peritonitis [2]. To date, only few cases reported *Rhizobium radiobacter* as a cause of PD-related peritonitis. It is an aerobic Gram-negative rod present in the soil, known mainly for causing opportunistic infections [3].
Herein we present a case of *Rhisobium radiobacter*-induced acute peritonitis, leading to the removal of the peritoneal dialysis catheter.

Case Report

A 58-year-old female patient with end-stage renal disease (ESRD) was under hemodialysis treatment for three years. The primary underlying cause of ESRD was autosomal dominant polycystic kidney disease. She underwent two kidney transplantations, both times followed by allograft failure due to an acute rejection. After the second allograft failure, the patient resumed hemodialysis. However, due to the lack of vascular access caused by thrombotic and stenotic changes, a forced PD was introduced. A year after initiating PD, she developed her first episode of acute peritonitis caused by *Staphylococcus epidermidis* and the treatment was carried out according to the antibiogram.
Only a month later, the patient was re-hospitalized for suspected acute peritonitis. She came to the emergency room after noticing cloudiness of the dialysis fluid. Additionally, a decrease in ultrafiltration and an increase in leukocyte count in the dialysis fluid ($5.2*10^9$/L) were noted. The patient remained afebrile throughout, denied any pain, and vitals were stable. Microbiological analysis had shown the presence of *Rhizobium radiobacter*. An intraperitoneal cefepime therapy was initiated and continued for a total of 6 weeks. Follow-up microbiological findings remained sterile for 6 days after finishing cefepime therapy. Unfortunately, two months after the second relapse- a third one occurred. The clinical presentation was identical- afebrile, no pain, stable vitals as well as cloudy dialysis fluid. Once again, *Rhizobium radiobacter* was isolated. The catheter removal was indicated along with intravenous cefepime (1g/ day) for 14 days in total.

Discussion

Rhizobium radiobacter is an uncommon opportunistic pathogen [4,5]. A 6- year study found only 13 patients with Rhizobium radiobacter infections, 10 of which had an underlying haematological malignancy or solid-organ cancer [4]. Besides PD- related peritonitis, other reported infections include pulmonary infections, liver dysfunction, spondylodiscitis, cerebral abscesses, and *R. radiobacter* endocarditis.
R. radiobacter is commonly found in soil. Zhang HP et al. reported that 5 out of 6 patients had been closely exposed to soil prior to the infection [5]. Similarly, our

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patient reported some gardening activities. There were 15 cases of *Radiobacter* induced peritonitis reported since the first case in 1990 [6]. Out of the 6 publicly available case reports, 4 patients had abdominal pain, fever, and cloudy dialysis fluid, while 2 patients were afebrile [3,6-10]. In contrast, our patient exhibited no symptoms other than cloudy dialysis fluid. In 4 cases patients were treated with intraperitoneal cephalosporins (cefazolin, ceftazidime, cefepime). Other reported regimens included intraperitoneal vancomycin with oral ciprofloxacin [9], or combinations of meropenem, ciprofloxacin, and amoxicillin/clavulanic acid [7]. Catheters were removed in 2 cases, one of these patients had a relapse [8] while the other had Moraxella C. superinfection and no signs of improvement despite the antibiotic treatments [7].

Conclusion

It is essential for physicians to remain vigilant for this rare pathogen, despite the much more common causes of peritonitis. Educating patients about the connection between *Rhizobium radiobacter*, soil exposure, and non-sterile conditions is crucial for prevention of relapses, thus avoiding the need for catheter removal.

Conflict of interest statement. None declared.

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