Atypical zoonotic peritoneal dialysis–related peritonitis

Varote Shotelersuk MD, Tulaton Sodsri MD, Esther Burns, Sadie Sudduth, Sydnie Sudduth, Jacob Nichols MD

Abstract

Zoonotic organisms are an uncommon but increasingly recognized cause of peritoneal dialysis (PD)-related peritonitis, particularly among patients with close exposure to animals. We report the case of a young male end-stage renal disease on PD and newly diagnosed liver cirrhosis who developed refractory PD-related peritonitis caused by the rare zoonotic pathogens Pasteurella dagmatis *and* Neisseria zoodegmatis *following contamination of the peritoneal dialysis equipment by cat saliva. Despite treatment with intraperitoneal and oral antimicrobial therapy, as well as a PD catheter removal, the patient's symptoms persisted and relapsed, ultimately resolving only after a prolonged course of cefepime combined with oral metronidazole. This case highlights the challenges associated with managing PD-related peritonitis caused by rare zoonotic organisms, as well as the potential impact of host factors such as cirrhosis on treatment response. It also emphasizes the importance of avoiding animal exposure in patients undergoing peritoneal dialysis.*

Keywords: Peritonitis, zoonotic infection, cirrhosis

Introduction

Peritoneal dialysis–related peritonitis remains one of the most common and serious complications of peritoneal dialysis (PD), contributing to approximately 6–10% of mortality among patients with end-stage renal disease receiving PD.[1] Most episodes of PD-related peritonitis episodes are caused by common skin flora such as coagulase-negative staphylococci and *Staphylococcus aureus.* Although uncommon, zoonotic pathogens are increasingly recognized as causes of PD-related peritonitis, particularly among the patients with close animal exposure.[1] *Pasteurella dagmatis* and *Neisseria zoodegmatis* are exceptionally rare in this setting and have been reported only once and twice, respectively, in the literature.[2–4]

We report a case of refractory polymicrobial PD-related peritonitis caused by *Pasteurella dagmatis* and *Neisseria zoodegmatis* in a young man with end-stage renal disease and newly diagnosed liver cirrhosis, following direct contamination of his PD equipment by cat saliva.

Corresponding author: **Varote Shotlersuk**
Contact Information: Varote.Shotelersuk@ttuhsc.edu
DOI: 10.12746/swjm.v14i60.1678

Case Summary

A man in his early 20s with end-stage renal disease secondary to IgA nephropathy undergoing PD presented with a one-day history of severe diffuse abdominal pain, nausea, vomiting, and fever. His medical history was significant for a newly diagnosed Child–Pugh class B cryptogenic liver cirrhosis. One week prior to symptom onset, he had adopted a cat that contaminated his PD equipment by licking the equipment during exchanges.

On physical examination, the patient was mildly tachycardic and febrile with diffuse abdominal tenderness; however, the catheter exit site appeared clear without erythema or drainage. The PD effluent was cloudy. Laboratory studies demonstrated a normal peripheral white blood cell (WBC) count with neutrophil predominance. Computed tomography (CT)

of the abdomen revealed ascites without peritoneal enhancement. Analysis of the PD fluid demonstrated a WBC count of 12,910 cells/μL (93% neutrophils), consistent with bacterial peritonitis.

Empiric intraperitoneal cefepime 1 g every 24 hours and vancomycin 1 g q 96 hours were initiated. Peritoneal fluid cultures subsequently grew *Pasteurella dagmatis* and *Neisseria zoodegmatis,* without evidence of anaerobic and fungal growth. Despite partial laboratory improvement, the patient continued to experience persistent abdominal pain, prompting PD catheter removal on hospital day 7 and transition to hemodialysis. Sensitivity testing for both organisms was not performed due to unspecified technical issues. He was discharged on day 10 of hospitalization and continued oral ciprofloxacin 500 mg every 12 hours, metronidazole 500 mg every 12 hours, and nystatin 500,000 Units four times daily for a total antibiotic duration of three weeks, as recommended by the infectious disease team. The decision to use ciprofloxacin was based on available literature. In addition, metronidazole and nystatin were administered for anaerobic coverage and fungal prophylaxis, respectively.

The patient's symptoms partially improved but recurred toward the end of the antibiotic regimen, requiring readmission. Repeat imaging studies and cultures were negative. However, recurrent neutrophil-predominant ascites with a WBC count of 1803 with neutrophils 68% was identified five days after completion of the three-week antibiotic course. The patient ultimately received ceftriaxone 2 g IV daily for three days, followed by post-hemodialysis intravenous cefepime 2, 2, and 3 g on Monday, Wednesday, and Friday, respectively, in combination with oral metronidazole 500 mg every 12 hours for total antibiotic duration of three weeks, resulting in complete symptom resolution.

Discussion

Pasteurella dagmatis in PD-related peritonitis

Pasteurella infections most commonly present as skin and soft tissue infections following dog or cat bites.[5] *Pasteurella* species colonize the upper respiratory tract of approximately 90% of cats and 66% of dogs.[5] *Pasteurella dagmatis* is a Gram-negative, facultative aerobic coccobacillus that is nonmotile and non–spore-forming.[2] Among PD-related infections, *Pasteurella multocida* is the most frequently reported species.[5]

Similar to previously reported cases, our patient had a normal peripheral WBC and a negative Gram stain despite clear evidence of peritonitis.[2] In the only previously reported case of *P. dagmatis* PD-related peritonitis, treatment with intraperitoneal piperacillin and cephalothin resulted in rapid clinical improvement without the need for PD catheter removal.[2] In contrast, our patient required catheter removal due to an inadequate clinical response despite broad-spectrum antimicrobial therapy.

In published accounts of *Pasteurella*-associated PD peritonitis, only 11% of patients required catheter removal,[2–5] suggesting that our patient experienced a more complicated disease course.

Impact of liver cirrhosis on disease severity

Underlying liver cirrhosis likely contributes to treatment failure. A previous report described fatal spontaneous bacterial peritonitis caused by *P. dagmatis* in a patient with cirrhosis who rapidly progressed to septic shock despite appropriate antimicrobial therapy and demonstrated in vitro susceptibility.[6] Cirrhosis is a known independent risk factor for increased mortality in *Pasteurella* infections and may impair host immune responses[7,8]

In our case, cirrhosis may have contributed to persistent infection, an inadequate response to standard therapy, and the need for catheter removal and prolonged antimicrobial treatment.[7,8] These findings suggest that patients with *P. dagmatis* PD-related peritonitis and significant comorbidities may require longer-duration therapy or intravenous treatment rather than standard oral therapy alone.

Neisseria zoodegmatis in PD-related peritonitis

Neisseria zoodegmatis is a Gram-negative coccobacillus and commensal organism in the oral cavities of cats and dogs.[9] Human infections associated

with *Neisseria zoodegmatis* are rare. Reported isolates have demonstrated susceptibility to amoxicillin-clavulanate, ceftriaxone, fluoroquinolones, and tetracyclines, although resistance to azithromycin has been reported in some cases.[4,9]

Previously reported cases of PD-related peritonitis demonstrated clinical resolution with intraperitoneal ceftriaxone or meropenem-based regimens, often without the need for catheter removal.[3,4] In contrast, our patient experienced recurrent infection despite catheter removal and prolonged oral therapy.

Conclusion

In summary, we report a difficult to treat case of PD-related peritonitis caused by *Pasteurella dagmatis* and *Neisseria zoodegmatis,* associated with contamination of PD equipment by cat saliva. This case emphasizes the importance of strict avoidance of animal exposure to PD equipment and careful consideration of antimicrobial selection and treatment duration in patients with polymicrobial infection and significant comorbid conditions, particularly liver cirrhosis.

Article citation: Shotelersuk V, Sodsri T, Burns E, Sudduth S, Sudduth S, Nichols J. Atypical zoonotic peritoneal dialysis–related peritonitis. 2026;14(60):50–52
From: Department of Internal Medicine, Texas Tech University Health Sciences Center, Lubbock, TX
Conflicts of interest: none

References

1. Szeto CC, Li PK. Peritoneal Dialysis-Associated Peritonitis. Clin J Am Soc Nephrol. 2019;14(7):1100–5.
2. Wallet F, Toure F, Devalckenaere A, et al. Molecular identification of *Pasteurella dagmatis* peritonitis in a patient undergoing peritoneal dialysis. J Clin Microbiol. 2000;38(12): 4681–2.
3. Sarwal A, Ramkumar N, Abraham J. *Neisseria zoodegmatis*: an interesting cause of peritoneal dialysis related peritonitis: TH-PO351. Journal of the American Society of Nephrology. 2023;34(11S):189–90.
4. Pak WLW, Chan KL, Chan Z, et al. Pet-related *Neisseria zoodegmatis* peritonitis in a patient on automated peritoneal dialysis. Nephrology. 2023;28(5):299.
5. Poliquin PG, Lagace-Wiens P, Verrelli M, et al. *Pasteurella* species peritoneal dialysis-associated peritonitis: household pets as a risk factor. Can J Infect Dis Med Microbiol. 2015;26(1):52–5.
6. Ashley BD, Noone M, Dwarakanath AD, et al. Fatal *Pasteurella dagmatis* peritonitis and septicaemia in a patient with cirrhosis: a case report and review of the literature. J Clin Pathol. 2004;57(2):210–2.
7. Chatelier E, Mahieu R, Hamel JF, et al. *Pasteurella bacteraemia*: impact of comorbidities on outcome, based on a case series and literature review. Int J Infect Dis. 2020;92: 89–96.
8. Scalco RS, Snoeck M, Quinlivan R, et al. Exertional rhabdomyolysis: physiological response or manifestation of an underlying myopathy? BMJ Open Sport Exerc Med. 2016;2(1): e000151.
9. Merlino J, Gray T, Beresford R, et al. Wound infection caused by *Neisseria zoodegmatis*, a zoonotic pathogen: a case report. Access Microbiol. 2021;3(3):000196.