Peritonitis Caused by *Neisseria sicca* in a Child on Chronic Peritoneal Dialysis

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Peritoneal dialysis (PD) is the optimal mode of chronic dialysis in children with end-stage renal disease.[1] One of the important complications of PD is peritonitis. Its incidence in children receiving chronic PD is approximately 1 episode per year.[2] We present a case of peritonitis in a child on chronic PD secondary to a rarely encountered Gram-negative organism, *Neisseria sicca*.

Many species of *Neisseria*, including *N. sicca*, are common respiratory commensals in humans and are part of the normal oral flora.[3] In rare instances, *N. sicca* can be a serious pathogen causing endocarditis, meningitis, and osteomyelitis.[4,5] We report a case of *N. sicca* peritonitis in a child on chronic peritoneal dialysis and review the literature on peritonitis due to *N. sicca* infection.

Case Report

A 6-year-old African American boy was diagnosed in utero with hydronephrosis, subsequently found to be secondary to posterior urethral valves. Valve ablation was performed on the 10th day of life. Over the next few years, his renal function gradually deteriorated. Shortly after his 6th birthday, he had a Tenckhoff catheter placed and began chronic outpatient PD at home. Two months after beginning PD, the patient was admitted to the hospital for *Pseudomonas aeruginosa* urinary tract infection. Approximately 2 weeks after discharge, the mother reported that the patient accidentally cut his catheter connector while playing with scissors. The connector was replaced in the outpatient nephrology clinic under sterile conditions.

One week after this episode, he presented with acute-onset abdominal pain associated with cloudy dialysate. The next day he was admitted to the hospital with a diagnosis of peritonitis. The initial dialysate sample had a cell count of 9,596 WBC/mm^3 with 83% segmented cells and 10% lymphocytes. Gram stain showed no organisms. Cultures of blood and dialysate were obtained, and continuous intraperitoneal vancomycin and amikacin were administered empirically at concentrations of 30 and 12 mg/L, respectively. On day 3 the dialysate was reported to be growing *N. sicca*, sensitive to penicillin.

With continued antibiotic treatment with intraperitoneal cefazolin at a dose of 125 mg/L, the patient became afebrile, and the cell count gradually improved. By hospital day 11, the PD fluid cell count was 68 WBC/mm^3, and the patient was discharged on continued intraperitoneal cefazolin for outpatient follow-up. Although the patient recovered uneventfully, an elective kidney transplant from a living related donor had to be postponed several months because of this infection.

Failure to respond to initial intraperitoneal therapy with a combination of vancomycin and an aminoglycoside should alert clinicians to the possibility of an unusual organism, such as the *N. sicca* that caused infection in our patient.

Discussion

Peritonitis and other catheter-related infections are major causes of morbidity in patients on chronic PD. Those with exit-site or tunnel infections carry a two-fold risk of peritonitis as well as a three-fold risk of hospitalization and access revision.[2] Recurrent episodes of peritonitis may lead to fibrosis of the peritoneal membrane, decreased ultrafiltration capacity, and eventual termination of this modality of dialysis.[6] Gram-positive bacteria (mainly staphylococcal species), in addition to Gram-negative bacteria and fungal infections, are responsible for most episodes of peritonitis. About 5%–15% of episodes of peritonitis are culture negative and may be a result of fastidious organisms.[6]

This is the third case of *N. sicca* peritonitis reported in the literature and the second case reported in a child on chronic PD. The first case was reported in 1994 in a 5-year-old child following an episode of *Staphylococcus aureus* peritonitis.[7] The patient was treated with vancomycin without improvement. The PD fluid culture and sensitivity results led to successful treatment with ceftazidime. The second case was reported in 2001 in a 46-year-old patient whose peritonitis was causing progressive impairment of ultrafiltration.[8] He was treated successfully with levofloxacin. In our case, the infecting organism was almost certainly transferred from the patient's respiratory tract after he accidentally cut and contaminated his own catheter while at play.

N. sicca is sensitive to penicillins, cephalosporins, quinolones, and macrolides.

The organism is generally not considered susceptible to aminoglycosides, including amikacin, and is resistant to vancomycin.[9] Failure to respond to initial intraperitoneal therapy with a combination of vancomycin and an aminoglycoside should alert clinicians to the possibility of an unusual organism, such as the *N. sicca* that caused infection in our patient.

This case demonstrates the importance of the principle that physicians caring for children on chronic PD must continually reinforce the understanding of parents and patients of the vital necessity of proper PD catheter care and must stress extremely close supervision of a child on chronic PD. D&T

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