**A Case Report of Expanded-Spectrum
Beta-Lactamase-Producing *Klebsiella
pneumoniae* Peritonitis in a Patient
on Continuous Ambulatory
Peritoneal Dialysis**

KEY WORDS: Expanded-spectrum beta-lactamase peritonitis; ESBL; *Klebsiella pneumoniae* peritonitis; *Klebsiella* peritonitis; peritonitis; peritonitis case report; *Klebsiella pneumoniae*.

Editor:

Given the very few reported cases of expanded-spectrum beta-lactamase (ESBL)-producing *Klebsiella pneumoniae* peritonitis, a standardized protocol for its treatment in the continuous ambulatory peritoneal dialysis population does not exist. Even though the International Society for Peritoneal Dialysis recommends use of intraperitoneal (IP) cephalosporins (ceftazidime or cefepime) or aminoglycosides to cover gram-negative bacteria, ESBL enzymes hydrolyze broad-spectrum oxyimino-cephalosporins, making those antibiotics ineffective (1,2).

Here, we are presenting a case of ESBL *K. pneumoniae* peritonitis that was successfully treated with intravenous (IV) ertapenem 1 g daily for 3 weeks, as evidenced by normalization of the intra-abdominal white blood cell (WBC) count, sterilization of the peritoneal effluent, and resolution of symptoms.

A 59-year-old man on continuous ambulatory peritoneal dialysis for 6 years because of end-stage renal disease resulting from hypertension and type 2 diabetes was admitted for left below-knee amputation because of peripheral vascular disease. On hospital day 22, he developed diffuse abdominal pain and nausea. The PD effluent was cloudy, with WBCs 4000/ μ L (93% neutrophils, 6% lymphocytes).

The patient was started on empiric IP vancomycin and ceftazidime. However, after 2 days of antibiotics, the patient continued to complain of diffuse abdominal pain, nausea, and vomiting. Repeat testing of the effluent showed WBCs 20 125/ μ L (88% neutrophils, 3% lymphocytes). Gram stain showed numerous gram-negative bacteria. The following day, the effluent culture was positive for ESBL *K. pneumoniae*; the antibiotic was changed to ertapenem 1 g IV daily. Complete resolution of the abdominal pain and nausea occurred 2 days after initiation of ertapenem. Retest of the PD effluent 9 days later resulted in WBCs 117/ μ L (55% neutrophils, 2% lymphocytes). Gram stain was negative, and culture

showed no growth. The peritonitis resolved completely after a 3-week course of IV ertapenem.

Compared with non-ESBL-producing spontaneous bacterial peritonitis, ESBL-producing *K. pneumoniae* and *Escherichia coli* infections have been associated with adverse clinical outcomes and a significantly higher mortality (2,3). Yip *et al.* reported that ESBL peritonitis patients were more likely to experience treatment failure and to die of sepsis (3). Risk factors associated with infection by ESBL-producing organisms include admission to the intensive care unit, presence of an indwelling urinary catheter, central venous catheterization, an invasive procedure within the previous 3 days, use of antibiotics within 30 days, and use of gastric acid inhibitors (3,4). Our patient had multiple risk factors similar to those reported by Yip *et al.*

Carbapenems are the most reliable antimicrobial agents against ESBL isolates because of their resistance to the hydrolytic activity of ESBL enzymes. We chose the IV route instead of the IP route because ertapenem cannot be mixed with glucose. A previously published case of ESBL *K. pneumoniae* peritonitis in a patient in Taiwan reported successful treatment with IP flomoxef (5). Flomoxef is not available in the United States.

With the increasing prevalence of ESBL infections, higher incidences of ESBL peritonitis are likely to be encountered in PD patients. Although current recommendations from the International Society for Peritoneal Dialysis have not yet addressed the issue, clinicians should be aware of these emerging and difficult-to-treat bacteria in PD patients with peritonitis. Further studies are needed to identify effective IP antibiotics for ESBL peritonitis.

DISCLOSURES

The authors have no relationships with pharmaceutical companies or any financial conflicts of interest to declare.

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