

## CASE REPORT

# *Enterobacter Gergoviae* Peritonitis In A Patient On Chronic Ambulatory Peritoneal Dialysis - First Reported Case

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## ABSTRACT

*Enterobacter gergoviae* is a gram negative rod-shaped opportunistic organism reported to cause urinary and respiratory tract infections, but peritonitis caused by this organism is unknown. We report a case of 50-year-old patient on peritoneal dialysis (PD) presented with *Enterobacter gergoviae* peritonitis with septic shock. Despite Intraperitoneal (IP) cloxacillin 250mg qid and IP ceftazidime 1gram q24h and subsequent escalation with IP amikacin 2mg/kg q24h and IP vancomycin 15mg/kg q24h within the next 48 hours, his peritonitis remained refractory and required catheter removal. Although *Enterobacter gergoviae* is naturally sensitive to aminoglycosides, carbapenems and quinolones, it reacts differently to the beta lactam antibiotics. Their resistance to third-generation cephalosporins is fast emerging and treatment with third-generation cephalosporins may cause AmpC-overproducing mutants. The majority of Enterobacteriaceae, including Extended-spectrum beta-lactamases producers, remain susceptible to carbapenems. Our report provides an unfavourable course of *E. gergoviae* peritonitis likely due to acquired secondary drug resistance during the therapy period.

**Keywords :** *Enterobacter gergoviae*, Peritonitis, Peritoneal dialysis

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## INTRODUCTION

Peritonitis remains a major complication of peritoneal dialysis (PD) patients; accounting up to 18% of infection-related mortality in PD patients. They usually present with turbid effluent, abdominal signs, cell count of white blood cells more than 100/mL with at least 50% polymorphonuclear neutrophilic cells and a positive culture. *Enterobacter gergoviae*, an opportunistic organism has been reported to cause urinary and respiratory tract infection (1), but peritonitis caused by this organism is yet to be reported in the literature. We present the first case of *Enterobacter gergoviae* peritonitis in patient receiving peritoneal dialysis.

## CASE REPORT

We report a case of 50 year-old man patient with a past medical history of vascular access exhaustion and had been converted to PD for the past 2 years without any problem. On this occasion, he travelled from another state to visit his relative who resided near our hospital.

After two days, he presented to Serdang Hospital with symptoms of fever, abdominal pain, diarrhea and turbid PD fluid. Upon presentation he was febrile and in septic shock requiring single inotropic support. Intraperitoneal (IP) cloxacillin 250mg qid and IP ceftazidime 1 gram q24h was given upon admission as per our department guidelines. His initial PD fluid cell count revealed 5425 cells/mm<sup>3</sup>(majority polymorphs), peripheral WBC 18 x 10<sup>9</sup>/L and his C-reactive protein was 280 mg/L. IP amikacin 2mg/kg q24h was added within the next 24 hours as his PD fluid was still turbid with cell count showing slight improvement at 2400 cells/mm<sup>3</sup>. Despite that he responded poorly even with the addition of the second line antibiotic within the next 24 hours. On the fourth day of admission his PD fluid was still turbid with cell counts remained high at 1060 cells/mm<sup>3</sup>. IP vancomycin 15mg/kg q24h was then added on. Despite this, he was still requiring inotropes and his PD fluid was still not clearing up even after 5 days of intensified antibiotics. The peritoneal dialysis catheter was removed in view of the refractory peritonitis. Within 24 hours of catheter removal, patient's clinical condition improved tremendously, we were able to wean off the inotropes and his abdominal symptoms resolved fully. Cultures of the PD fluid subsequently came back as *Enterobacter gergoviae*; sensitive to augmentin, ampicillin, amikacin, ceftazidime, cefoperazone, ciprofloxacin, cefotaxime, cefuroxime and gentamicin. His peripheral blood cultures yielded no growth.

He admitted that his relative's home where he did his PD exchanges were not as ideal as his home set up condition. There was no dedicated corner for him to perform the exchanges and the washing basin facility is relatively far from the place he did the exchanges.

After the PD catheter was removed, the patient responded well to the same antibiotics and returned to good health within the next 48 hours. We continued the antibiotics for 2 weeks in the hospital and discharge him with an oral course of ciprofloxacin for 1 week, making the total duration of treatment 3 weeks. Upon review in clinic 2 weeks later, he was in good health and is now receiving hemodialysis via a cuffed catheter.

## DISCUSSION

*Enterobacter gergoviae* (*E. gergoviae*) belongs to the family Enterobacteriaceae. It is a gram negative rod-shaped organism which was first described by Richard et al in 1976, isolated from urinary samples taken during a urinary infection outbreak in Clermont-Ferrand University Hospital near Gergoviae Highland in France (2). It is an opportunistic pathogen of the urinary tract and has been associated with antibiotic-resistant outbreaks in hospitals. Apart from urinary tract, this microbe is also frequently isolated from the respiratory tract and from blood. In a case of nosocomial outbreak in a neonatal intensive care unit, the strain was isolated from the dextrose saline used for the dilution of parenteral antibiotics and from the hands of a healthcare worker on duty (3). Enterobacter species can also be isolated from natural environments, such as sewage, soil, and foods. It has also been reportedly isolated from cosmetic products. Very little is known regarding this organism and its clinical significance is not yet known. To the best of our knowledge, there has been no peritonitis cases reported to be caused by this organism.

Antibiotic susceptibility of the Enterobacter species have been the subject of interest as many sought to provide more data on the newer taxa of the enterobacter species. The natural resistance of all species to rifampicin, lincosamide, glycopeptides and fusidic acid is well known and is largely attributed to the outer membrane of these bacteria (4). The enterobacter group is naturally sensitive to tetracycline, aminoglycosides, carbapenems and quinolones. They however react differently to beta lactam antibiotics. *E. gergoviae* has intermediate sensitivity to amoxicillin and amoxicillin/clavulanic acid, naturally sensitive or intermediate to most cephalosporins except ceftazidime in which they are naturally resistant to (5). Resistance of Enterobacter spp to third-generation cephalosporins is fast emerging and this is mostly associated with overproduction of AmpC beta-lactamases, and treatment with third-generation cephalosporins may select for AmpC-overproducing mutants. Some Enterobacter strains are now ESBL and

AmpC producers, conferring resistance to both third- and fourth-generation cephalosporins. Quinolone resistance in Enterobacteriaceae is usually the result of chromosomal mutations leading to alterations in target enzymes or drug accumulation. The vast majority of Enterobacteriaceae, including ESBL producers, remain susceptible to carbapenems, and these agents are considered preferred empiric therapy for serious Enterobacteriaceae infections. Carbapenem resistance, although rare, appears to be increasing.

Despite detecting the organism early (within day 3 of admission) and treating with the appropriate antibiotics with adequate therapeutic dose, his peritonitis remained refractory which led to catheter removal. *E. gergoviae* has likely acquired secondary drug resistance during the therapy period. Peritoneal dialysis catheter removal is needed in cases of refractory peritonitis as the catheter itself can serve as the nidus of infection. Removal of catheter will also protect the peritoneum for future reinitiation of PD.

## CONCLUSIONS

As there was no previous reported *E. gergoviae* PD peritonitis, our report provides an unfavourable natural course of *E. gergoviae* peritonitis despite prescribing the appropriate antibiotics. Although an opportunistic infection, *Enterobacter* species are either very resistant to many agents or can acquire resistance during antimicrobial therapy as likely what had happened in our case, the choice of appropriate antimicrobial agents is complicated. Hence carbapenems should come as a strong consideration when there is failure for *E. gergoviae* peritonitis to respond adequately with our usual repertoire of antibiotics. Consultation with experts in infectious diseases and microbiology will be beneficial in such case. The case also highlighted the importance of constant reminding our PD patient regarding the importance of hand hygiene and cleanliness of the surrounding environment where PD exchanges are being carried out.

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