Peritonitis in a continuous ambulatory peritoneal dialysis patient by two different species of enterococci: A rare finding

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ABSTRACT

Peritonitis in a continuous ambulatory peritoneal dialysis patient by two different species of enterococci is a rare condition. We report a case of peritonitis from which vancomycin sensitive *Enterococcus faecalis* and vancomycin resistant *Enterococcus faecium* were isolated. It also emphasizes the effectiveness of linezolid for the treatment of vancomycin resistant enterococcal infection.

Key words: *Enterococcus*, linezolid, peritonitis, vancomycin

Introduction

Peritonitis is the most troublesome complication in patients on continuous ambulatory peritoneal dialysis (CAPD).[1,2] Gram-positive organisms, especially *Staphylococcus aureus* and *Staphylococcus epidermidis*, are the most frequent causative pathogens.[1,2] However, the prevalence of certain organisms varies considerably among different dialysis centers. Enterococcal peritonitis accounts for 2-4% of peritoneal dialysis (PD)-associated peritonitis.[3,4]

Vancomycin resistance is reported increasingly in enterococci.[5] The prevalence of vancomycin resistant enterococci (VRE) in hospitalized patients is reported to be 0.4-14%.[6] Treatment options for PD associated peritonitis caused by VRE are limited. There are few agents with *in vitro* activity against pathogens that have developed resistance to vancomycin. Newer drugs such as quinupristin, dalfopristin and linezolid show *in vitro* and *in vivo* activity against enterococci including VRE.[7]

We report (i) a case of peritonitis, in a CAPD patient, caused by two different species of enterococci with a different antimicrobial susceptibility pattern, especially for vancomycin and (ii) the effectiveness of linezolid for the treatment of vancomycin resistant enterococcal peritonitis.

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Case Report

A 63-year-old male was hospitalized in BP Koirala Institute of Health Sciences, Dharan, Nepal with the complaint of bilateral swelling of lower limbs for 7 days, clouding of CAPD fluid for 5 days and fever for 2 days. The patient, having history of stage 2 hypertension for 20 years and type 2 diabetes mellitus with nephropathy (with end stage renal disease) for 15 years, was on CAPD. In addition, he also had history of one episode of peritonitis and recurrent urinary tract infections in the past.

Gram staining of the CAPD fluid showed plenty of polymorphs with Gram-positive cocci (GPC) in pairs and short chains. The organism in culture was presumptively identified as *Enterococcus* sp ecies based on the colony morphology, absence of hemolysis, Gram reaction, catalase negativity and bile esculin positivity. The isolate was further characterized with a set of biochemical tests using standard microbiological methods[8,9] and identified as *Enterococcus faecalis*. On

performing antimicrobial susceptibility by Kirby-Bauer disc diffusion method in compliance with Clinical and Laboratory Standards Institute guidelines,[10] the isolate exhibited sensitivity to ampicillin, azithromycin, linezolid, ofloxacin and vancomycin while it remained resistant to amikacin and ceftriaxone. The minimum inhibitory concentration (MIC),[11] performed by agar dilution method, of the isolate for vancomycin was 0.5 μg/ml. The MIC value confirmed its sensitivity to vancomycin. The patient was administered intraperitoneal vancomycin and was discharged after 5 days of admission.

After a week of discharge, the patient was readmitted with no resolution of symptoms. CAPD fluid was sent again for microbiological analysis. GPC with few pus cells were observed in direct microscopy and isolate obtained this time was identified as *Enterococcus faecium.* The isolate remained resistant to amikacin, ampicillin, azithromycin, ceftriaxone, ofloxacin and vancomycin while it was sensitive to linezolid. Vancomycin resistance was further confirmed by determination of MIC. The isolate had MIC of 32 μg/ml. Following catheter removal, patient's condition improved with the intravenous administration of linezolid and he was discharged from the hospital.

Discussion

The above case has some interesting points. First, in the previous two situations where the cultures were performed, two different species of enterococci were recovered, one species at a time, from the same patient. The pattern of antibiogram also differed in the two species. *E. faecalis*, recovered initially, was vancomycin sensitive while *E. faecium*, isolated in the second time, was resistant to vancomycin. Second, the *E. faecium* isolate was not only resistant to vancomycin but also to other important group of antibiotics.

The appearance of two different species of enterococci at two different times may be explained by a fact that the patient must already have harbored two different species of enterococci but only *E. faecalis* having the predominant role in infection for the first time. After administration of the drug, since *E. faecalis* was sensitive to vancomycin, *E. faecium* being resistant to vancomycin predominantly replaced *E. faecalis* under selective pressure and was recovered in the culture.

Vancomycin-resistant strains of enterococci are generally resistant not only to vancomycin but also to other antibiotics and can cause severe infections in compromised hosts.[12] The *E. faecium* isolate in the above case was not only resistant to vancomycin, but also to amikacin, ampicillin, azithromycin, ceftriaxone and ofloxacin. The widespread and often inappropriate use of broad spectrum antibiotics in the hospital is recognized as an important contributing factor to the spread of resistance.[13] The patient had frequent exposure to antibiotics such as aminoglycoside, cephalosporin and glycopeptide in the past. It must have an important impact on development of resistance in *E. faecium*.

Moreover, it has been documented that enterococci have shown to produce biofilm in the peritoneal catheters.[14] Dissemination of these strains from catheter into the peritoneum may induce recurrent peritonitis in PD patients and are refractory to routine antibiotic treatments. In such situation, catheter removal becomes necessary.[14,15]

As observed in *in vitro* sensitivity of *E. faecium* isolate to linezolid, patient responded well with its intravenous administration. This fact highlights that newer drugs such as linezolid remain a good option for treatment of vancomycin resistant enterococcal peritonitis.

Conclusion

Enterococci are emerging as an important cause of peritonitis in CAPD patient. The aforementioned case report emphasizes the importance of accurate identification or speciation of enterococci as the antimicrobial susceptibility pattern may differ among its various species. Newer drugs such as linezolid remain a good treatment option for vancomycin resistant enterococcal peritonitis. However, prudent use of antimicrobials and strict adherence to the infection control practices are crucial not only in the effective management of enterococcal infection but also for the prevention of development and spread of resistance.

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