Background: Ceftaroline is a new cephalosporin with broad-spectrum activity against Gram-negative bacteria, including extended-spectrum β-lactamases (ESBL). Ceftaroline is also active against Enterobacteriaceae but has limited activity against pathogens that cause acute otitis media (AOM). The aim of this study was to evaluate the clinical activity of ceftaroline against Enterobacteriaceae, including ESBL producers.

Methods: Antibacterial activity of ceftaroline was evaluated in vitro against 500 AOM strains of Enterobacteriaceae isolated from 263 USA hospitals (20 states) during 2010. In addition, 967 clinical isolates of P. mirabilis, including KPC-producing Enterobacteriaceae clinical isolates (five) and PER (one; Table 2) were tested. The results were compared with those previously published for ceftaroline fosamil, a prodrug of ceftaroline.

Results: Ceftaroline inhibited 96.7% of strains at ≤0.12 g/mL; Table 2). The highest ceftaroline MIC value observed was 4 µg/mL (one K. oxytoca strain with bima_pAmpC). Ceftaroline was also active against Enterobacteriaceae that overproduce mRNA encoding the TEM-1 β-lactamase. Ceftaroline was 100% active against clinical isolates of K. pneumoniae with bima_pAmpC.

Conclusions: Ceftaroline fosamil is the prodrug of ceftaroline, a new cephalosporin with broad-spectrum activity against Gram-negative pathogens. Ceftaroline is also active against Enterobacteriaceae, including ESBL producers. Ceftaroline was highly active against clinical isolates of P. mirabilis, including KPC-producing Enterobacteriaceae clinical isolates. In addition, both enzymes were often observed in the same strains (30 of 35). KPC-2, KPC-3, SHV-30, and CMY-2 were also prevalent enzymes detected. Two of these enzymes were associated with clinical isolates (two occurrence), PSE (one), and PER (one; Table 2). Among plasmidic AmpC enzymes (20 occurrence), CMY-2 was the most prevalent enzyme (13/20; 65.0%) followed by FOX-5 (5/20; 25.0%). All CMY-2 pAmpC-encodin genes were resistant to meropenem (MIC value of ≥2 g/mL; Table 1). The highest ceftaroline-avibactam MIC value observed was 4 µg/mL (one K. oxytoca strain with bima_pAmpC).

References: