Comparative Activity of Plazomicin and Other Aminoglycosides against Enterobacteriaceae Isolates from Various Infection Sources from Hospitalized Patients in the United States

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Background: Plazomicin is a next-generation aminoglycoside that was approved in June 2018 by the United States Food and Drug Administration for complicated urinary tract infections (UTIs), including primary pyelonephritis due to Enterobacteriaceae (ENT) in patients who have limited or no alternative treatment options. We evaluated the activity of plazomicin and comparator aminoglycosides against ENT isolates from US hospitals and did not vary by infection type; however, amikacin activity against CRE isolates varied by infection source.

Methods: A total of 8,510 ENT isolates collected from bloodstream infections (BSIs; 2,133), urinary tract infections (UTIs; 2,508), and other or unknown infection sites (157) in US hospitals from 2014 to 2017 were susceptibility tested using the reference broth microdilution method described in the CLSI M100 document (2018), or the US FDA website for plazomicin.

Materials and Results

- Plazomicin was active against 97.0% of the Enterobacteriaceae isolates included in this study using the current US FDA approved breakpoints. The activity of plazomicin ranged from 71.4% of the 7 isolates from BSI with intrinsic elevated doripenem MIC values to 100% of the 27 isolates with a wild-type doripenem MIC value.
- Among comparator antimicrobial agents, tigecycline, meropenem, and colistin inhibited 94.3%, 95.0%, and 85.7%, respectively, of the ENT isolates overall. Plazomicin was more active than amikacin and tobramycin against these isolates.
- The activity of plazomicin ranged from 71.4% of the 7 isolates from other infection types to 100.0% of the 45 (94%) isolates.
- Amikacin and gentamicin inhibited 92.1% and 7.0% of the isolates nonsusceptible to 2 aminoglycosides, respectively, and all isolates were tol benzylpenicillin-resistant.

References


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Figure 1 Activity of plazomicin and comparator agents tested against Enterobacteriaceae isolates

Figure 2 Activity of plazomicin and comparator agents tested against Enterobacteriaceae nonsusceptible isolates

Figure 3 Activity of plazomicin and comparator agents tested against Enterobacteriaceae nonsusceptible isolates

Introduction

- Plazomicin is a semi-synthetic aminoglycoside developed from sisomicin that demonstrates activity against Enterobacteriaceae, including multidrug-resistant isolates. Sisomicin is a cephalosporin, and some Pseudomonas aeruginosa isolates
- Plazomicin contains structural modifications that allow it to retain activity in the presence of aminoglycoside-modifying enzymes (AMEs).
- AMEs are the most common resistance mechanism to aminoglycosides agents in gram-negative and many gram-positive and confer resistance by aminoglycoside modification and subsequent inactivation

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