Antimicrobial Activity of Ceftazidime-Avibactam and Comparator Agents Tested against Gram-Negative Organisms Isolated from Complicated Urinary Tract Infections: Results from the International Network for Optimal Resistance Monitoring (INFORM) Program

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INTRODUCTION

Urinary tract infections (UTIs) are among the most frequent healthcare-associated infections and represent a major burden of gram-negative bacterial infections. Common sources of UTIs include catheters or instrumentation. Many UTIs are caused by multi-drug resistant strains owing to limited therapeutic options.

Carbapenem resistance is approved by the United States Food and Drug Administration for the treatment of infections caused by Acinetobacter baumannii, Enterobacteriaceae, and Pseudomonas aeruginosa. These infections are not easily treated due to the limited therapeutic options available. We evaluated the antimicrobial susceptibility of GNB isolated from patients with UTIs in US medical centers.

MATERIALS AND METHODS

Unique patient isolates were consecutively collected from patients with UTIs in 83 medical centers from 2016 to 2017, and the GNB (with or without carbapenem resistance) were susceptibility tested against carbapenem-resistant and comparator agents through the INFORM Network for Optimal Resistance Monitoring (INFORM) program. All gram-negative bacterial isolates were subjected to in-house quality control criteria as the reported probable cause of infection were included in the program. Carba-penem-resistant Enterobacteriaceae (CRE) isolates were defined as expressing imipenem, meropenem, or gentamicin MIC values at ≥8, ≥8, or ≥16, respectively. The GNB susceptibility data was compared to the Clinical and Laboratory Standards Institute (CLSI) guidelines (2018). All statistical analyses were performed using appropriate commercially available software (JMI Laboratories) to screen β-lactamase genes and susceptibility testing. FASTQ files were assembled using SPAdes Assembler and subjected to a proprietary software (JMI Laboratories) to identify β-lactamase genes.

RESULTS

The most common organism were Enterobacteriaceae (14.3%)-Acinetobacter baumannii (10.4%), Enterobacteriaceae (5.0%)-Enterobacter cloacae (4.0%), and Enterobacteriaceae (2.5%)-Pseudomonas aeruginosa (2.3%).

Ceftazidime-avibactam was the most active against Enterobacteriaceae isolates, including all CRE (100%): Enterobacter cloacae (100%), Enterobacteriaceae species complex (100%), and Enterobacteriaceae species complex (100%), with >99.9% of isolates producing an MIC of ≤0.12 mg/L (Table 1). Enterobacteriaceae species complex (100%) was the only Enterobacteriaceae species to produce >99.9% of isolates with an MIC of ≤0.12 mg/L (Table 1). Enterobacteriaceae species complex (100%) was the only Enterobacteriaceae species to produce >99.9% of isolates with an MIC of ≤0.12 mg/L (Table 1). Enterobacteriaceae species complex (100%) was the only Enterobacteriaceae species to produce >99.9% of isolates with an MIC of ≤0.12 mg/L (Table 1). Enterobacteriaceae species complex (100%) was the only Enterobacteriaceae species to produce >99.9% of isolates with an MIC of ≤0.12 mg/L (Table 1).

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CONCLUSIONS

Carbapenem-resistant Enterobacteriaceae (CRE) isolates were defined as expressing imipenem, meropenem, or gentamicin MIC values at ≥8, ≥8, or ≥16, respectively. The GNB susceptibility data was compared to the Clinical and Laboratory Standards Institute (CLSI) guidelines (2018). All statistical analyses were performed using appropriate commercially available software (JMI Laboratories) to screen β-lactamase genes and susceptibility testing. FASTQ files were assembled using SPAdes Assembler and subjected to a proprietary software (JMI Laboratories) to identify β-lactamase genes.

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