Background: Meropenem-vaborbactam (MV) is a carbapenem inhibitor that has activity against Ambler class A (including KPC) and C β-lactamase (BL) inhibitor that has activity against Ambler class A (including KPC) and C β-lactamase (BL). The highest meropenem-vaborbactam MIC result for MV was ≤0.015/0.03 µg/mL, and the collection included 61 CRE isolates displaying meropenem MIC values ranging from 1 to >32 µg/mL.

The activity of meropenem-vaborbactam against CRE isolates that are usually associated to multiresistant phenotypes highlights the importance of this compound in the armamentarium against infections caused by resistant organisms.

Materials and Methods

- A total of 4,942 ENT isolates collected from 30 US hospitals during 2016 were tested against meropenem-vaborbactam and meropenem. ENT isolates were limited to 1 per patient episode and were collected from 30 hospitals located in the US that were included in the study. These agents are hydrolyzed by carbapenemases, which include KPC β-lactamase-producing Enterobacteriaceae. Antimicrob. Agents Chemother. 2016;60:4860–71.
- Quality control (QC) was performed according to CLSI guidelines (M100-S27). Enterobacteriaceae carrying KPC-4 were included in this collection. MIC results were interpreted using EUCAST interpretative criteria for CRE (MIC ≤0.015/0.03 µg/mL) and amikacin (MIC ≤0.25/1 µg/mL).

Table 1. Distributions of the main organisms and organism groups when susceptibility against meropenem-vaborbactam and meropenem is tested against meropenem-vaborbactam and meropenem.

<table>
<thead>
<tr>
<th>Organism/organism group</th>
<th>CRE isolates (N=61)</th>
<th>CRE isolates (N=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MER (56)</td>
<td>56 (91.8%)</td>
<td>56 (91.8%)</td>
</tr>
<tr>
<td>MER NS (5)</td>
<td>5 (8.2%)</td>
<td>5 (8.2%)</td>
</tr>
<tr>
<td>CAR (5)</td>
<td>5 (8.2%)</td>
<td>5 (8.2%)</td>
</tr>
</tbody>
</table>

Table 1. Activity of meropenem-vaborbactam and meropenem against the main organisms and organism groups

- While induced by a variety of mechanisms, the expression of KPC-4 has been shown to be associated with a low rate of resistance to meropenem-vaborbactam and meropenem against CRE isolates that are usually associated to multiresistant phenotypes.

Results

- Meropenem-vaborbactam (MIC ≤0.015/0.03 µg/mL) was active against 91.8% of the CRE isolates tested, identifying the activity of meropenem alone (MIC ≤0.03/0.06 µg/mL) as inferior.
- Among 61 CRE isolates, 56 (91.8% of the CRE) carried genes encoding MER (bla KPC-3, -4). Inhibitory activity was achieved against CRE isolates belonging to 8 bacterial species/species complex, and amongst the meropenem-resistant CRE isolates, 50/90 µg/mL of CAR and the highest meropenem-vaborbactam MIC were ≤0.015/0.03 µg/mL (Table 1).
- CRE isolates were submitted to whole genome sequencing on a MiSeq platform (Illumina, USA). The highest meropenem-vaborbactam MIC result for MV was ≤0.015/0.03 µg/mL, and the collection included 61 CRE isolates displaying meropenem MIC values ranging from 1 to >32 µg/mL.

Conclusions

- Meropenem-vaborbactam displayed activity against Enterobacteriaceae isolates collected from hospitals during 2016.
- The highest meropenem-vaborbactam MIC result for MV was ≤0.015/0.03 µg/mL, and the collection included 61 CRE isolates displaying meropenem MIC values ranging from 1 to >32 µg/mL.

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References

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