Evaluation of the new strip Etest KPC MP/MPB for K. pneumoniae carbapenemases detection in comparison with Liofilchem strips (MRP/MBO and ETP/EBO) on a large collection of genotypically characterized Enterobacteriaceae.

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INTRODUCTION

The spread of multidrug-resistant (MDR) gram-negative pathogens is one of the major hazards for patients requiring long-term hospitalization or in intensive care units (ICU). MDR phenotype includes resistance to carbapenem drugs. A resistance to carbapenems in Gram negative bacteria can be mediated by three main mechanisms, namely: production of extended-spectrum beta-lactamase (ESBL/IMP) associated with loss of porins, production of metallo-beta-lactamase (MBL) and production of K. pneumoniae carbapenemases (KPC). In order to propose an easy-to-use routine laboratory test, a new Etest® strip was developed. This new test is based on the reduction of meropenem (MP) inhibitory concentration (IC) in the presence of phenylboronic acid (PBA). The aim of this study was to compare Etest® KPC MP/MPB with two Liofilchem strips MRP/MBO and ETP/EBO already available on the market for their ability to detect the KPC-producing-Enterobacteriaceae.

METHODS

Reading

For Etest® strip : When bacterial growth is clearly visible, read the MP and MPB IC values where the respective inhibition ellipses intersect the strip. Ignore haze and mutant colonies in the ellipse.

Interpretation

After incubation, the inhibitory concentration (IC) is read on each side of the strips. The IC ratio of MP/MPB or ETP/EBO or MRP/MBO must be calculated and rounded to the nearest whole number. An IC ratio $\geq 8$ or $\geq 3$ log₂ dilutions indicates KPC production. Deformation of the ellipse on the MP, ETP or MRP side (or ellipse only on the MPB side for Etest® KPC) is also considered non-determinable (ND) and when ICs are < the lowest values on both sides, results are considered negative. NB : For Etest®, double-sided strips cannot be used to generate MIC values, and instead, generate an IC ratio that is used to interpret results.

RESULTS

<table>
<thead>
<tr>
<th>Etest® KPC MP/MPB</th>
<th>Liofilchem® MIC Test Strip (MRP/MBO)</th>
<th>Liofilchem® MIC Test Strip (ETP/EBO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity (%)</td>
<td>95.8</td>
<td>92.0</td>
</tr>
<tr>
<td>Specificity (%)</td>
<td>100.0</td>
<td>56.4</td>
</tr>
</tbody>
</table>

Table 2. Sensitivity and Specificity (ND excluded) for each strip

CONCLUSIONS

The new Etest® KPC MP/MPB is fast and easy-to-use method. Its high specificity and sensitivity make it the test of choice for the initial characterization of KPC in comparison with the other strips available on the market. This kind of tests are required to implement efficient infection control measures to limit the spread of these MDR pathogens.