Introduction

- Rapid detection of carbapenemase in Enterobacteriaceae (EB) is essential for early appropriate therapeutic management and infection control purposes.¹

- The Carbapenemase Test has recently been proposed as an easy and rapid to perform imipenem hydrolysis-based test with high accuracy (sensitivity and specificity) for the detection of carbapenemase-producing Enterobacteriaceae (CPE).

- However, the Carbapenemase Test in its current format is an in-house technique requiring purchase of several reagents and home-made preparation of the test solutions (including the addition of imipenem).

- We evaluated here the performance of two imipenem hydrolysis-based rapid tests, the Carba NP test and the commercially available ROSCO Rapid Carb Screen kit for the detection of CPE.

Objectives

- Validation of carbapenemase and extended spectrum beta-lactamase multiplex endpoint PCR assays according to ISO 15189.

- Validation of carbapenemase enzyme distribution for all Enterobacteriaceae isolates tested.

- Interpreted results and the performance of detection of CPE by CPE test and by RCS test for all Enterobacteriaceae isolates tested.

- Conclusions

- CNC and RCS are rapid and highly sensitive screening tests for the detection of carbapenemase in EB, although a few OXA-48 producers may go undetected by any of these tests. CNC performed better than RCS owing to its superior specificity and to the large number of uninterpretable results observed with RCS.

- Both CNC and RCS as CPE screening test should be used with caution in areas with high prevalence of OXA-48 producers and should be evaluated in other epidemiological settings. Exclusion of suspected CPE isolates from further testing to confirm and identify carbapenemase (i.e. by molecular testing) should only be based on concordant results between CNC/RCS tests and phenotypic antimicrobial resistance patterns.

References


4. Table 2. Species and carbapenemase enzyme distribution of all Enterobacteriaceae isolates tested (n=235)

5. Table 3. Reading scores of CNC test vial at 30, 60 and 120 minutes of incubation and carbapenemase enzyme distribution for all Enterobacteriaceae isolates tested (n=235)

6. Table 4. Reading scores of RCS test disk at 30, 60 and 120 minutes of incubation and carbapenemase enzyme distribution for all Enterobacteriaceae isolates tested (n=235)

7. Table 5. Interpreted results and the performance of detection of CPE by CNC test and by RCS test for all Enterobacteriaceae isolates tested (n=235)

8. Table 6. Interpreted results and the performance of detection of CPE by CNC test and by RCS test for the concordant isolates referred to the NRC (n=138)

9. Table 7. Reading scores, interpreted results and the performance of detection of CPE by RCS test for Enterobacteriaceae isolates tested with both the test disk and the negative control disk

Funding and acknowledgements

- The study was supported in part by the research grant of Fondation Monique Godinne. The national reference center is partially supported by the Belgian Ministry of Social Affairs through a fund within the Health Insurance System.

- We are thankful to Josée Broux-Caleo, Rosco Diagnostics for providing the ROSCO Rapid Carb Screen kits.

- The study was supported in part by the research grant of Fondation Monique Godinne. The national reference center is partially supported by the Belgian Ministry of Social Affairs through a fund within the Health Insurance System.