Susceptibility profiles of Enterobacteriaceae to temocillin, piperacillin/tazobactam and taftrandem and characterisation of carbapenemase resistance mechanisms.

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Method

Introduction

The prevalence of antibiotic resistance in Gram-negative pathogens has rapidly become an increasing concern in healthcare environments worldwide. In particular, the effectiveness of carbapenems, often the last line of defence against ESBL and AmpC-producing isolates, is compromised by the development and rise of carbapenemases.

High-level resistance to carbapenems is now a significant global problem, with the risk of the dissemination of carbapenemases.

In this study, we aimed to verify the correlation between minimum inhibitory concentration (MIC) testing and susceptibility disc testing using temocillin and piperacillin/tazobactam, either individually or in combination.

Discussion

As expected, all CPE tested other than those producing OXA-48 (n=39), formed no zone of inhibition against FARID. This provided a conventional two-disc method for the detection of CPE among isolates used in this study.

Results

Table 1. Distribution of zone diameters (ZD) (mm), according to BSAC susceptibility disc testing for the detection of CARBAPENEMASE PRODUCERS. Please cite as Vaughan E.S. and Hobson J.A. (2013) Susceptibility profiles of Enterobacteriaceae to temocillin, piperacillin/tazobactam and taftrandem and characterisation of carbapenemase resistance mechanisms.

Table 2. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) calculated according to the approaching cut-off values for the determination of CARBAPENEMASE PRODUCERS.

Table 3. Distribution of resistance mechanisms produced by isolates used in the study.

Table 4. Distribution of zone diameters (ZD) (mm) generated from ESBL, AmpC, ESB and AmpC co-producing and CPE, and isolates derived from UTI for the detection of resistance mechanism (wild type), for temocillin (30 µg) discs. UTI = Urinary tract infection breakpoint (R = ≤ 11 mm, S = ≥ 12 mm) and Systemic infection breakpoint (R = ≤ 19 mm, S = ≥ 20 mm) (breakpoints according to BSAC, 2013).

Table 5. Distribution of zone diameters (ZD) (mm) with no relevant resistance mechanism (wild type), for temocillin (30 µg) discs. (R = ≤ 11 mm, S = ≥ 12 mm) and Systemic infection breakpoint (R = ≤ 19 mm, S = ≥ 20 mm) (breakpoints according to BSAC, 2013).

Conclusion

These results support previous studies and confirm that high-level resistance to temocillin and taftrandem provide very sensitive and specific phenotypic surrogate markers of carbapenemase producers.

References


