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Poster Session IV
Molecular detection of bacterial resistance

EVALUATION OF A COMMERCIAL REAL-TIME PCR TO DETECT CARBAPENEM-RESISTANT ENTEROBACTERIACEAE IN RECTAL SWABS

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OBJECTIVES – The spread of carbapenemase-producing Enterobacteriaceae (CPE) is matter of concern worldwide. This resistance has become more common in *Klebsiella pneumoniae* (KP), which can harbour multiple resistance mechanisms. The treatment options for infections caused by these microrganisms are limited. Major efforts in managing the spread of CPE are necessary. Rapid detection of colonized patients allows the possibility to cohort them. The performance of a new real-time PCR (Xpert Carba-R Assay, Cepheid, USA), able to detect KPC, IMP, VIM, NDM, OXA-48 like genes from rectal swabs, was evaluated.

METHODS – In a 4-month period, 185 paired rectal swabs belonging to 90 different patients were evaluated. Swab #1 was analyzed using the molecular method; the other one was placed in 10 ml McConkey broth with a 10 mcg meropenem disk; the day after, a drop was subcultured onto Brilliance agar (Oxoid, ThermoFisher, USA). Strains grown in culture were identified and carbapenemase production was confirmed using synergy tests and in-house PCR. To evaluate the test performance in stress conditions, ten rectal swabs prepared with different CPE (random amounts for some targets) and non-CPE microrganisms were analyzed.

RESULTS – 170 out of the 185 samples were both Xpert- and culture-negative. Thirteen samples belonging to eleven different patients were Xpert-positive (overall positivity 7.0%). One sample was positive for OXA48-like gene, 5 for VIM, and 7 for KPC genes. Agreement with culture results was seen in 11 of 13 samples. All isolates were KP. The cultures of the OXA48-like and one VIM Xpert-positive samples were repeatedly negative. In both cases, the molecular target was amplified near to the end of the thermal cycle range. For the 11 strains grown in culture, confirmation tests (synergy and PCR) agreed with the Xpert results. Two samples gave positive cultures but were Xpert-negative. The first one was a carbapenem-resistant *Acinetobacter baumannii*; the latter a KP strain that gave negative synergy tests; both were negative by in-house PCR. All microrganisms placed in the prepared rectal swabs (two IMP+, two OXA-48 like, one NDM and five negative samples) were correctly detected by Xpert.

CONCLUSION – The Xpert Carba-R Assay demonstrated exquisite specificity and sensitivity. The test was extremely easy and rapid, requiring only one hour to be completed (including sample preparation, run, data analysis). This short turn-around-time can be crucial for the proper decision to cohort or not patients at the admission time. The results were in agreement with the cultures, except for two samples, in which OXA-48 like and VIM genes were detected by Xpert at the end of the thermal cycles. We postulate that in both cases a low amount of these targets, combined with a low-level MIC for meropenem (likely for these CPE) could explain the culture negativity.