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ePoster Viewing
Diagnostics: detection of ESBLs and carbapenemases

A RETROSPECTIVE EVALUATION OF THE RAPID BIO-RAD BLACTA TEST TO DETECT 3RD GENERATION CEPHALOSPORIN RESISTANCE (3GCR) IN ENTEROBACTERIACEAE (ENT)

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Objectives: Faster susceptibility reporting enables appropriate therapy to be instituted in a more timely fashion. This study evaluated the ability of the Bio-Rad BLACTA Test to detect 3GCR in ENT. The BLACTA test is a rapid test intended to detect the presence of beta-lactamases (BL) based on a colour change reflecting hydrolysis of a chromogenic cephalosporin.

Methods: A total of 305 ENT including 35 (11.5%) 3GC-susceptible (S) and 270 (88.5%) 3GCR with diverse chromosomal and plasmidic BL [class A extended spectrum (A-ESBL), class C (C-BL), class D (D-BL), carbapenemases] were subcultured onto 5% sheep blood agar (Oxoid) and tested by the BLACTA test in a blinded fashion. ENT included 2 *C. freundii*, 8 *E. aerogenes*, 44 *E. cloacae*, 89 *E. coli*, 12 *K. oxytoca*, 129 *K. pneumoniae*, 6 *M. morganii*, 5 *P. mirabilis*, 1 *P. stuartii*, 4 *R. ornithinolytica*, 5 *S. marcescens*. A yellow to red colour change noted in 15 min was considered BLACTA positive. Colour was noted again at 30 min in order to detect isolates with delayed hydrolysis of the chromogenic cephalosporin.

Results: Of the 305 ENT tested, 225 (80.7%) were BLACTA positive (red<15 min), 12 (3.9%) were delayed positive (red >15/<30 min), 9 (3%) were indeterminate (orange <15/<30 min), and 59 (19.3%) were negative (yellow >15/>30 min). Indeterminate results were considered negative. All BLACTA positive and delayed positive ENT were 3GCR due to A-ESBL, C-BL and/or carbapenemases, some plasmid-mediated alone or others with hyper-produced chromosomal A- or derepressed chromosomal C-BL. There were no false positives. False-negatives results included 13 ENT with derepressed chromosomal C-BL with/without porin changes (9 were indeterminate and 4 were BLACTA-negative) and 20 ENT that carried plasmid-mediated C-BL (11 CMY2, 7 DHA1) or D-BL (2 OXA1) (all BLACTA-negative). Overall BLACTA sensitivity and specificity for detection of 3GCR was 87.8% (95%CI: 83.3-91.2) and 100% (95%CI: 88.2-100), respectively.

Conclusions: BLACTA accurately detects most 3CGR by 15min, and is further improved by extending the final read-time to 30 min with no associated false positives. Presumptive reporting of 3CGR based on BLACTA positive results would direct appropriate therapeutic choices in a more timely fashion compared with conventional antimicrobial susceptibility testing without overcalling resistance. Given that BLACTA misses some 3CGR due to C-BL and D-BL, presumptive reporting of 3CGS would not be advised.