eP321
ePoster Viewing
Diagnostics: detection of ESBLs and carbapenemases

PILOT EVALUATION OF THE BLACTA TEST FOR PREDICTING 3RD GENERATION CEPHALOSPORIN RESISTANCE (3GCR) IN ESCHERICHIA COLI, KLEBSIELLA PNEUMONIAE, KLEBSIELLA OXYTOCA AND PROTEUS MIRABILIS FROM BLOOD

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Objectives: VITEK MS (VMS; bioMérieux) testing of blood culture isolates subcultured and incubated for ~3-6h on agar (short-incubation blood culture isolates) (SIBCI) significantly improved time-to-reporting of organism identifications (ID). No similar improvement in antimicrobial susceptibility test (AST) reporting has been achieved. We conducted a pilot evaluation of the BLACTA test (BLT; Bio-Rad) for predicting 3CGR in SIBCI *E. coli* (EC)*, K. pneumoniae* (KP), *K. oxytoca* (KO), and *P. mirabilis* (PM). The BLT is a low complexity method that detects 3CGR from isolates within 15-minutes by enzymatic hydrolysis of a chromogenic cephalosporin resulting in a yellow to red colour-change.

Methods: 153 prospective semi-consecutive SIBCI were tested by BLT and interpreted as per kit instructions immediately following VMS ID as EC, KP, KO or PM. BLT results were compared 24-48h later to VITEK 2 N213 AST, Double Disk Test results, and molecular detection of b-lactamases if available. BLT-sensitivities and specificities for detecting class A extended spectrum b-lactamases (A-ESBL) and for 3GCR overall were calculated and the impact on 3GCR reporting-time was compared to conventional AST.

Results: Of 153 BLT completed, 103 (66.9%) were completed on EC, 37 (24%) on KP, 5 (3.3%) on KO, and 8 (5.2%) on PR. Of these, 22 (14.3%) were BLT-positive (red), 1 (0.7%) was indeterminate (orange), and 131 (85.1%) were negative (yellow). Of the 22 BLT-positives, 100% (95%CI: 84.2-100) were 3GCR; 11 were A-ESBL EC (7 CTX-M, 4 TEM/SHV), 7 were A-ESBL KP (4 CTX-M, 3 TEM/SHV), 2 were A-ESBL KO (2 CTX-M), while 2 KO were hyper-producers of chromosomal class A K1 (OXY) b-lactamase. The single BLT-indeterminate and 4 of the 131 (3.1%) BLT-negative isolates were 3CGR due to Class C b-lactamases; all 5 were multidrug-R EC. Sensitivities/specificities for class A-ESBL and for 3CGR overall were 100% (95%CI: 82.5-100)/98.5% (94.4-99.9) and 81.5% (95%CI: 62.8-92.3)/100% (96.4-100), respectively. Compared to the conventional AST, 3CGR was reported based on BLT-positive results 24h earlier in 83.3% of cases (P<0.0001). In addition, BLT identified an A-ESBL (TEM/SHV) KP that would have been missed on conventional AST due to a mixed culture with overgrowth of a 3CG susceptible KP.

Conclusions: In this pilot study, the BLT was found to be rapid and low-complexity method that proved to be highly accurate in its prediction of A-ESBL and 3CGR from SIBCI. Through interim reporting of BLT-positive results, patients would have had the benefit of appropriate treatment for 3CGR organisms 24h earlier than in the current conventional AST algorithm, an improvement considered extremely significant.