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Oral Session
PCR and other molecular tests directly on blood: what is new?
RAPID DETECTION OF GRAM-NEGATIVE BACTERIA AND RESISTANCE DETERMINANTS DIRECTLY FROM POSITIVE BLOOD CULTURES USING THE MICROARRAY-BASED SAMPLE-TO-RESULT VERIGENE BC-GN ASSAY

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Objectives: Gram-negative bacteria account for up to 40% of positive blood cultures. Multi-drug resistance attributable to different classes of extended spectrum beta-lactamases and carbapenemases are increasingly identified in these organisms. Early identification of the organism and genetic determinants associated with multidrug resistance are important to patient management decisions including selection of antibiotic therapy and implementation of infection control measures. We evaluated the microarray-based Verigene Gram-Negative Blood Culture (BC-GN) Assay (Nanosphere, Northbrook, IL, USA) for detection of bacteria and resistance determinants directly from positive blood cultures.

Methods: A total of 129 blood cultures containing gram-negative bacteria were analyzed using the BC-GN. This included 100 prospectively collected clinical specimens and 29 contrived specimens. Results were compared to routine biochemical testing as the gold standard. The BC-GN detects 8 bacterial targets including *E. coli/Shigella*, *K. pneumoniae, K. oxytoca*, *Enterobacter spp., Citrobacter spp., Proteus spp., Acinetobacter spp.,* and *P. aeruginosa*. Genes encoding the resistance determinants KPC-1/2, NDM-1, and multiple genes encoding CTX-M, VIM, IMP, and OXA type enzymes are also detected.

Results: Among 125 monomicrobial cultures, the BC-GN was 99.2% sensitive in detection of bacterial identification targets present on the assay panel. This included 100% sensitivity for cultures containing *E. coli* (n=38), *P. aeruginosa* (n=14), *Enterobacter spp.* (n=10), *Citrobacter spp*. (n=16), *K. oxytoca* (n=4), *Proteus spp.* (n=3), and *Acinetobacter spp*. (n=14). The single false negative result was from a culture containing *K. pneumoniae* that was missed by the BC-GN, resulting is a sensitivity of 93.8% (15/16) for this target. Seven prospective cultures (7.3%) contained organisms not on the BC-GN panel. A total of 11 cultures contained organisms harboring 12 genes encoding resistance markers present on the BC-GN panel. This included 5 CTX-M, 6 OXA, and 1 NDM-1 encoding genes. The correct marker was detected in 10/12 cultures for an overall sensitivity of 83.3% for detection of the 6 resistance markers. Resistance markers missed by the BC-GN included one strain each containing a CTX-M and OXA type enzyme.

Conclusions: The BC-GP assay identifies 8 gram-positive targets and 6 resistance markers directly from positive blood cultures. The BC-GN requires only 700 μl of specimen and results are available within 2.0 h of blood culture positivity.