Enhanced Detection of Bloodstream Pathogens from Positive Blood Culture Specimens with an Improved Multiplex PCR Molecular Diagnostic System

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Background

Timely bloodstream infection (BSI) pathogen identification requires robust sample purification and testing methods that can accommodate the wide variety of blood cultures used for growing positive blood culture (PRC) specimens. Sensitivity of molecular methods is not only dependent on the presence of pathogens present in BPCs, especially in the polymicrobial setting, which may be difficult to identify with standard methods. Multiple tissue types of BD and BioMérieux blood culture media commonly used in hospital laboratories were used to evaluate the performance of a prototype BioFire FilmArray® Blood Culture Identification 2 (BCID 2) Panel with PRCs.

Methods

Fungi (1) and bacteria (13) were isolated concomitantly in blood samples, inoculated into a variety of different types of blood culture bottles, and incubated on the recommended instrument. Time to detection (TTD) was recorded for individual tubes, and results for all tubes were evaluated (including negative controls) to determine the TTD. Using positive culture results, all samples were evaluated to determine the TTD.

Conclusions

The data compiled here provides valuable insight regarding TTDs, TPC, and Rolfminkse Blood Culture Identification 2 (BCID 2) Panel results. This study demonstrates that a prototype BioFire BCID 2 Panel, as well as the BioFire BCID 2 Panel, robustly and accurately identify 100% BSI pathogens over a wide variety of common blood culture media and systems. The data collected during this study is a valuable resource for clinical laboratories and healthcare providers as it provides important information on the efficacy of the BioFire BCID 2 Panel in detecting bloodstream pathogens from positive blood cultures.

Polymicrobial Results

Polyomicrobial PRCs (11) showed equivalent performance from 0 to 24 hours after being cultured when the blood culture media bottles were identified as positive. For the organisms and associated antibiotic resistance markers (ARM) expected to be present in the polymicrobial PRCs, BioFire BCID 2 Panel positivity was 102/104, while BioFire BCID 2 Panel positivity was 102/104. Based on analysis of TTD, it was found that slow growing organisms likely had reduced TTD when seeded with fast growing organisms but were still identified by both BioFire BCID 2 Panels at a rate of 90%.

The BioFire BCID 2 Panel has not yet been evaluated by the FDA or other regulatory agencies for in vitro diagnostic use.