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The impact of a rapid molecular identification test on positive blood cultures from critically ill with bacteremia: A pre-post intervention study.

Verroken A., Despas N., Rodriguez-Villalobos H., Laterre P.-F.

STUDY DESCRIPTION

The objective of this pre-post study in adult ICU patients was to evaluate how the BIOFIRE® FILMARRAY® Blood Culture Identification (BCID) Panel impacts the therapeutic management of critically ill patients. An 8-month pre-intervention period (P0) using standard methods of pathogen identification from positive blood cultures (Gram stain, MALDI-TOF and AST) was compared to a 10-month intervention period (P1) that used the BIOFIRE® FILMARRAY® BCID Panel 24h/7d, with results immediately communicated by telephone to the treating physician. Outcome measures included time to optimal antimicrobial treatment (OAT), time to pathogen identification and performance of the BIOFIRE® FILMARRAY® BCID Panel for the detection of pathogens and antimicrobial resistance genes.

SUMMARY OF RESULTS AND DISCUSSION

For the performance analysis, 139 positive blood cultures containing 149 microorganisms were included. The BIOFIRE® FILMARRAY® BCID Panel correctly identified 127/149 (85.2%) organisms. Seventeen of the missed pathogens were off-panel and 5 were on-panel, resulting in a sensitivity for on-panel organisms of 96.2% (127/132). The *mecA* gene was correctly detected in 2/14 *S. aureus* and 25/30 *Staphylococcus* strains, and in full concordance with routine AST, no *vanA/B* or bla_{KPC}-strains were detected.

The median time to organism identification was significantly shorter in P1 (1.6 h) compared to P0 (14.7 h; $p<0.05$). Likewise, the median time to administration of the optimal antimicrobial treatment (OAT) was reduced significantly in P1 (4.7h) compared to P0 (14.7h; $p<0.05$). The BIOFIRE® FILMARRAY® BCID Panel result allowed for treatment modifications in 35/110 (31.8%) patients, which included therapy initiations (n=21), de-escalations (7), and spectrum broadening (7). Due to the around-the-clock access to the BIOFIRE® FILMARRAY® BCID Panel, 80% of the tests that enabled a treatment switch occurred outside the lab opening hours.

"...BCID testing allowed a significant reduction in time to identification and administration of optimal antimicrobial treatment. We hereby consider it as a beneficial add-on identification tool for the diagnosis of BSI in critically ill."

KEY FINDINGS

- The BIOFIRE® FILMARRAY® BCID Panel demonstrated excellent sensitivity and specificity for the detection of both pathogenic organisms and resistance genes.
- Roughly 50% of positive blood cultures occurred after hours, which accounted for 80% of therapy changes based on the BIOFIRE® FILMARRAY® BCID Panel result.
- The BIOFIRE® FILMARRAY® BCID Panel reduced the time to organism identification by about 13 hours, and the time to optimal antimicrobial treatment by about 10 hours, and the results of the Panel triggered a treatment modification in nearly 32% of the patients.