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Performance of the Accelerate Pheno system in a tertiary care hospital in Germany

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Abstract third-party references: Accelerate Diagnostics

Background: The number of multidrug-resistant Gram-negative bloodstream infections (BSI) has dramatically increased the problems faced, when treating a hospitalized patient. In recent years, many attempts have been undertaken to enhance antibiotic management and reduce the turnaround time for reporting of the antimicrobial susceptibility profile (AST) of the identified organism to improve clinical outcome for patients. The Accelerate Pheno System (ACC) provides ID and AST results in 7 hours, directly from positive blood culture. We aimed to evaluate the analytical performance of ACC for Gram-negative BSI in a tertiary care hospital.

Materials/methods: The ACC was implemented at the University Hospital of Eppendorf (Germany) and compared to Standard of care (SOC; Vitek2). Categorical agreement (CA, results with the same interpretation), rates of very major errors (VME, proportion of resistant isolates by SOC, tested susceptible by ACC), major errors (ME, susceptible isolates by SOC, resistant by ACC), minor errors (mE, intermediate isolates by SOC, resistant or susceptible by ACC) and area of technical uncertainty (ATU) were analyzed.

Results: 75 blood cultures with Gram-negative isolates as a causative agent were prospectively measured with the ACC. The most commonly identified organisms were *E. coli* (36), *K. pneumoniae* (8) and *Pseudomonas aeruginosa* (5). 938 AST results were available by the ACC. Overall CA was 98.3%. mE rate was 0,64%, ME rate was 0.1%, VME rate was 0.53% and 0.42% were in the ATU. In 10 cases of mono-microbial infections the ACC could not identify the causative bacterium. Four poly-microbial blood cultures were measured, of which two were correctly identified, in one case the ACC identified one of two organisms and failure to identify any organism occurred in one case. In 7/61 (11.5%) cases, the ACC correctly identified the causative organism, but failed to create an AST record.

Conclusions: ACC can help to quickly identify a causative organism of a BSI directly from the positive blood culture and perform a rapid AST, reducing the turnaround time. ACC should be initiated within 8 hours of blood culture positivity, therefore laboratories must consider workflows and integration into a structured antimicrobial stewardship program to ensure maximal benefit for the patients.

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