

Impact of Accelerate Phenotest BC kit on time to optimal antimicrobial therapy among inpatients with extended-spectrum beta-lactamase producing *E. coli* and *Klebsiella* species bloodstream infection: a retrospective cohort study

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Objective: Accelerate Phenotest BC (Blood Culture) kit is a rapid diagnostic instrument for blood cultures that can identify organisms and their susceptibilities in about seven hours after a positive result. The purpose of this study was to determine if the use of Accelerate Phenotest BC kit in patients with extended-spectrum beta-lactamase (ESBL) producing *E. coli* and *Klebsiella* species bloodstream infections minimizes the time to optimal antibiotics and reduces adverse events compared to traditional microbiology methods. It was hypothesized that utilization of this technology would be associated with a faster time to optimal antibiotics, and subsequently, less adverse events.

Methods: Medical records of patients with documented evidence of an ESBL bloodstream infection at a 528-bed teaching hospital were retrospectively reviewed. Cases were identified throughout the period of Accelerate Phenotest BC kit's implementation (August 2020 - March 2022) and matched with historical controls (January 2013 - June 2020) based on gender, age (\pm four years), ESBL organism, and source of infection. Data assessed included: hospital length of stay, blood culture collection and result time, and antibiotic administration data. The primary outcome was the time to optimal antibiotic therapy, as defined by national and institutional guidelines.

Results: A total of 26 patients met inclusion criteria (13 patients in each group) during the study period. Time to optimal antibiotic therapy was 26.5 hours [IQR 15.95 to 55.95] in the Accelerate Phenotest BC kit group and 60 hours [IQR 32.8-75.1] in the control group ($p=0.064$).

Conclusion: Hospitalized patients with ESBL bacteremia in the Accelerate Phenotest BC kit group were put on optimal antibiotics faster than those in the conventional blood culture group. The difference shows a trend towards statistical significance, which may have been met with a larger patient population.