Impact of Multiplex Polymerase Chain Reaction (PCR) Testing and Automatic Infectious Disease Consultation in Patients with Gram-Negative Bacteremia

Ann R. Cowden, PharmD; Patrick D. Ratliff, PharmD; G. Shawn King, PharmD; Dana M. Stephens, MT, CIC; Charles A. Kennedy, MD; William R. Judd, PharmD

1Department of Pharmacy; 2Department of Infection Control; 3Division of Infectious Diseases; Saint Joseph Hospital, Lexington, KY

BACKGROUND

- Strategies to improve early recognition and treatment of bacteremia are necessary to reduce mortality secondary to bacterial and fungal infections.
- The FilmArray Blood Culture ID (BCID) Panel is an FDA approved multiplex PCR system that can detect up to 24 different bacterial and fungal pathogens and 3 antibiotic-resistant genes (i.e., mecA, vanA/B, and KPC).
- Rapid PCR testing has been shown to decrease the time required for pathogen identification, resulting in more rapid delivery of effective antimicrobial therapy.1-4
- A growing body of evidence suggests that mandatory ID consultation for complicated infections results in greater adherence to evidence-based treatment guidelines, lower in-hospital mortality, and earlier discharge.5-6

OBJECTIVES

- Primary: To determine the impact of multiplex PCR testing and automatic ID consultation on in-hospital mortality in patients with gram-negative bacteremia
- Secondary: Overall and intensive care unit (ICU) length of stay (LOS), readmission within 30 days of discharge, total cost per case, and average time to speciation

METHODS

- Study Design: Retrospective, observational, cohort study
- Site Description: 433-bed tertiary care medical center
- Timeline of Interventions:
  - FilmArray® Blood Culture ID (BCID) Panel – Jan 2015
  - Automatic ID Consultation Policy – May 2015
  - Pre-Policy Cohort: January 2014 – December 2014
  - Post-Policy Cohort: June 2015 – April 2016
- General Description of Cohorts:
  - Adult inpatients with microbiological evidence of gram-negative bacteremia within 48 hours of admission

CONCLUSIONS

- A total of 111 patients were included in the study (69 patients in the pre-policy cohort and 42 patients in the post-policy cohort). Baseline characteristics were similar between groups.
- Non-significant reductions in all-cause, in-hospital mortality (11.6% vs. 7.1%, p = 0.529), overall LOS (8.5 vs. 6.9 days, p = 0.145), and ICU LOS (6.8 vs. 4.4 days, p = 0.122) were observed after policy implementation. Total cost per case was reduced by approximately $3,527, but the difference was not statistically significant.
- After implementing the FilmArray® Blood Culture ID (BCID) Panel, overall time to speciation was reduced by approximately two days (68.2 hours vs. 19.4 hours, p < 0.001).

REFERENCES