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METHODS

Objective: To (1) compare the diagnostic accuracy of the Accelerate PhenoTest™ BC kit (AXDX) to conventional method (CM) and (2) assess the potential use of AXDX for antimicrobial stewardship (AS).

Methods: Adults with Staphylococcus aureus or Enterococcus spp. bloodstream infections (BSI) from 07/2014 to 01/2016 at a tertiary care medical center were included. Isolates were obtained from blood cultures and tested on AXDX using software v1.0. Identification (ID) and antimicrobial susceptibility testing (AST) of AXDX were compared to those of CM (VITEK2® 2 system) and conventional methods were testing for essential agreement (EA) and categorical agreement (CA) between the methods: vancomycin, linezolid (S. aureus only), and ampicillin (Enterococcus spp. only). Potential impact of AXDX on AS was assessed via a retrospective audit of infectious diseases clinicians.

RESULTS

A total of 231 patients (S. aureus [n=112] and Enterococcus spp. [n=119]) were assessed for possible interventions. A total of 105 and 95 isolates were available for ID and AST testing, respectively. AXDX and AST were concordant for 98% and 95%, respectively. For S. aureus, both CA and EA was 97.3%. For Enterococcus spp., CA was 97.8% and EA was 98.5%. A total of 365 AS pharmacologic interventions were possible with AXDX, of which 88% were concordant with patients’ actual clinical course. Using AXDX, targeted/active therapy could be initiated 43 hours sooner (IQR, 32-66 hours) and unnecessary therapy was stopped 37 hours earlier (IQR, 20-60 hours).

Conclusions: Diagnostic accuracy of AXDX was comparable to that of CM. AXDX is potentially useful for AS in patients with gram-positive BSI.

BACKGROUND

- Staphylococcus aureus and Enterococcus spp. (species) commonly cause healthcare-associated bloodstream infections (BSI).
- Patients with gram-positive BSI:
  - Delay in initiation of appropriate therapy → increased mortality
  - Unnecessary therapy → collateral damage, unwanted adverse drug reactions, additional cost

- Rapid diagnostic tests (RTDs) address delays in antibiotic therapy, collateral damage, and adverse drug reactions, additional cost

- The Accelerate PhenoTest™ BC kit (AXDX) is a RTD that targets 16 bacterial and fungal species and provides species-level ID and phenotypic antimicrobial susceptibilities within 1.5 and 7 hours of blood culture positivity, respectively

- Potential use of AXDX for antimicrobial stewardship (AS) in patients with bloodstream infections (BSI): could be stopped 37 hours earlier (IQR, 32-66 hours).

- A total of 231 patients (S. aureus [n=112] and Enterococcus spp. [n=119]) were assessed for possible interventions using AXDX.

- The potential use of AXDX for antimicrobial stewardship could be initiated a median of 43 hours earlier (IQR, 32-66 hours).

- Unnecessary antibiotic therapy was stopped a median of 37 hours earlier (IQR, 20-60 hours).

- Potential interventions with AXDX were assessed for possible interventions using AXDX.

- A total of 365 AS pharmacologic interventions were possible with AXDX, of which 88% were concordant with patients’ actual clinical course.

- Using AXDX, targeted/active therapy could be initiated 43 hours sooner (IQR, 32-66 hours) and unnecessary therapy was stopped 37 hours earlier (IQR, 20-60 hours).

- AXDX could be initiated a median of 43 hours earlier (IQR, 32-66 hours).