Saturday – AAR-691

Time Comparison of Nine Phenotypic IVD Methods for Detection of Antibiotic Susceptibility in Clinical Blood Cultures: Reducing the Wait for Diagnosis

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BACKGROUND

For patients with bloodstream infections, decreasing the time to obtaining antimicrobial susceptibility testing (AST) results enables patients to be put on effective and optimal therapy sooner, which has the potential to improve patient outcomes.

The Accelerate PhenoTest™ BC kit used with the Accelerate Pheno™ system (AXDX) uses fluorescence *in situ* hybridization to produce identification results in approximately 2 hours and morphokinetic cellular analysis (MCA) to produce AST results in approximately 7 hours directly from positive blood cultures (PBC). Other phenotypic IVD methods require a culturing step prior to antimicrobial susceptibility testing, which results in a longer time to result.

In this study, the AST time to result (TTR) from positive blood culture for AXDX was compared to other laboratory phenotypic AST methods for fresh clinical PBC specimens run in multiple clinical laboratories across the globe over a 22 month period.

METHODS

2,415 fresh PBC patient specimens from 106 clinical labs in the U.S. (n=72), EU (n=29), Middle East (n=5) that reported AST TTR for both AXDX and one or more alternate AST methods (all market authorized for *in vitro* diagnostic use) from Feb 2017-Dec 2018 were included. Specimens that were not run by AXDX within 8 hours of positivity, or which had data entry errors were excluded from the analysis.

AST TTR was calculated and compared between AXDX and other laboratory methods for 20,551 tested organism-antimicrobial combinations. Times presented are mean ± standard deviation (SD) in hours (h).

The organism distribution for the tested specimens was also calculated.

RESULTS

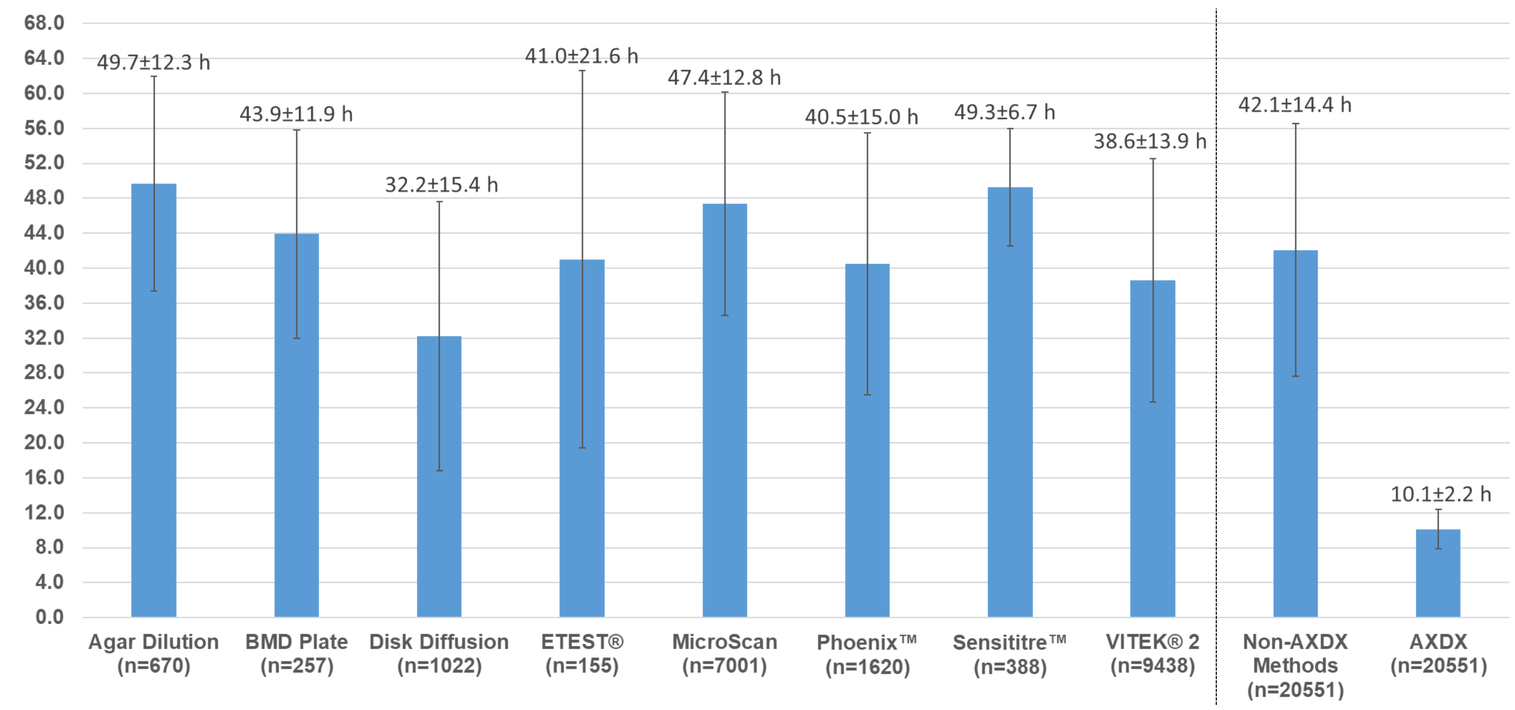

Figure 1: Mean AST TTR by method (hours, error bars ± 1 SD). Mean AST TTR of all non-AXDX methods compared to AXDX at right.

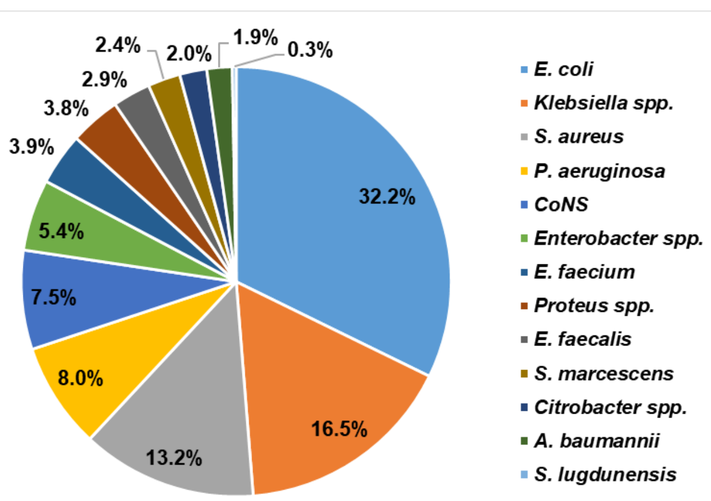

Figure 2: Organism distribution for PBC specimens

Of the 2,415 specimens included in the analysis, 37 were polymicrobial specimens containing 2 (n=33) or 3 (n=4) organisms, for a total of 2,456 organisms, with the majority being *E. coli* (32.2%), *Klebsiella* spp. (16.5%) or *S. aureus* (13.2%) (Figure 2).

The average AST TTR was 10.1±2.2 h for AXDX and 42.1±14.4 h for all other methods combined. The most common non-AXDX methods were the VITEK® 2 system (46%, TTR=38.6±13.9 h) and the MicroScan WalkAway system (31%, TTR=47.4±12.8 h). Individual non-AXDX method AST TTR ranged from 49.7±12.3 h (agar dilution) on the high end to 32.2±15.4 h (disk diffusion) on the low end. The average overall time saved for AST result by AXDX compared to other methods was 31.9±14.5 h.

CONCLUSIONS

This study demonstrated notable decreases in AST TTR between the Accelerate Pheno™ system and all other methods. Additionally, the Accelerate Pheno™ system shows less variability in time to result compared to other methods. The combination of a reliably faster and more consistent time to AST results has the potential to improve outcomes for patients with bloodstream infections.