Clinical Outcomes with Implementation of Accelerate Pheno™ Blood Culture Detection System for Gram Negative Bacteremia

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Background

- Delayed treatment for bacteremia increases patient morbidity, mortality, and healthcare costs.[1,2]
- Accelerate Pheno™ (AXDX) is a novel diagnostic technology for rapid identification (ID) and susceptibility (AST) testing of organisms causing bacteremia.[3]

Objectives

- Examine the impact of AXDX on clinical outcomes: length of stay (LOS), readmission rates, *Clostridioides difficile* infection (CDI) rates

Methods

- Retrospective study at an academic medical center with 213 adult hospitalized with gram negative bacteremia
- Pre- AXDX group with 109 patients in 2019 and post-AXDX group with 104 patients in 2021
- Standard reporting with laboratory call within 2 hours of positive cultures to on-call clinician and daily pharmacy evaluation for de-escalation

Results

- Both cohorts had similar demographics, clinical factors, causative organism & infectious etiology, however post- AXDX cohort had statistically more patients with mild liver disease, altered mental status (AMS) and higher Charlson Co-morbidity Index (CCI)

Table 1 Patient Outcomes

Patient Outcomes	Pre- AXDX; n=109	Post- AXDX; n=104	p-value
30- day mortality	23 (21.10%)	18 (17.48%)	0.62132
In hospital mortality	16 (14.68%)	15 (14.42%)	1
Relapse of organism	3 (3.03%)	4 (3.85%)	1
C difficile infection	9 (8.33%)	3 (2.88%)	0.1559
Length of stay	21 days	15 days	0.12237
Re-admissions related to bacteremia	24%	16%	0.1118
Mean time to de-escalation/ escalation to appropriate therapy	74 ± 45 hours	44 ± 30 hours	<0.01
Time to susceptibility after culture collection	71.9 ± 29.6 hours	23.7 ± 9.6 hours	< 0.01

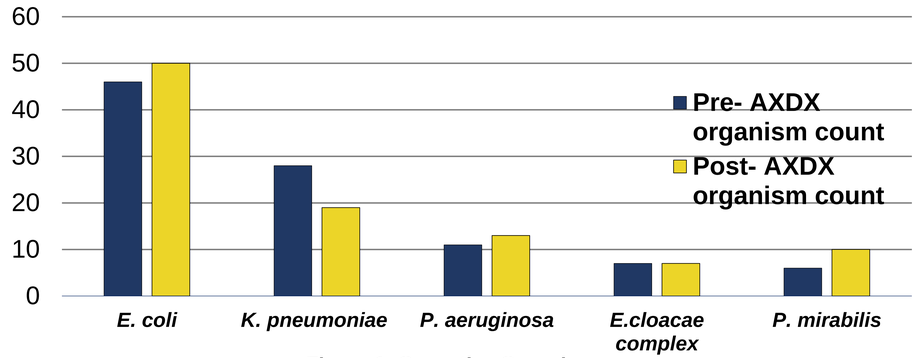

Figure 1: Causative Organisms

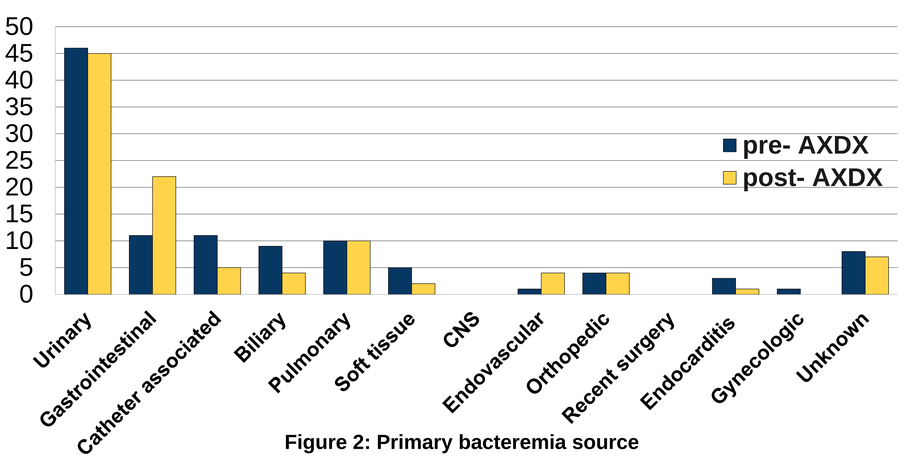

Figure 2: Primary bacteremia source

Table 2: Comparison of ID and AST with time to de-escalation of antibiotics based on top causative organisms

Pre- AXDX organisms	Pre- AXDX organism count	Pre- AXDX mean ID/AST time (hrs)	Pre- AXDX mean time to antibiotic de-escalation (hrs)	Post- AXDX organisms	Post- AXDX organism count	Post- AXDX mean ID/AST time (hrs)	Post- AXDX mean time to antibiotic de-escalation (hrs)
E. coli	46	69.5	66.9	E. coli	50	21.2	38.6
K. pneumoniae	28	73.3	79.1	K. pneumoniae	19	19.8	19.8
P. aeruginosa	11	72	96.1	P. aeruginosa	13	41.6	28.1
E.cloacae complex	7	88.8	79.7	E. cloacae complex	7	62	32.2
P. mirabilis	6	65.7	64.9	S. marcescens	10	41	21.2

Discussion

- Differences in liver disease, AMS, and CCI could be due to factors related to COVID-19 pandemic
- Clinical improvements were not statistically significant with AXDX, but there were improvements in de-escalation of antimicrobial therapy
- Patients may benefit more with AXDX use; however, this determination will require future prospective studies with larger sample sizes

Conclusion

- Our results further support prior studies evaluating AXDX and confirms faster ID and AST compared to conventional methods
- Study limitations include retrospective approach, suboptimal cohort matching and lack of power to detect a statistical difference in analyzed measures
- Future areas to explore are ways to further reduce time to de-escalation.

References

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