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Impact of real-time antimicrobial stewardship team intervention versus conventional microbiology reporting on time to appropriate antimicrobial therapy in patients with *Enterobacteriales* bacteremia

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Background

- Blood stream infections remain a major cause of mortality in the United States¹ and the world²
- Previous literature have established that rapid diagnostics with real time interventions lead to superior outcomes vs passive notification^{3,4}
- The Providence Oregon region conducts direct from blood culture (DFB) matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) identification, which results in decreased time to organism identification
- In February 2019, the antimicrobial stewardship team (AMT) established a real-time alert and clinical intervention for positive blood cultures identified by DFB MALDI-TOF

Purpose

- Assess the impact of MALDI-TOF identification, combined with real time notification and AMT intervention, has on clinical outcomes in patients with *Enterobacteriales* blood stream infections (BSI)

Objectives

- Identify and match patient pairs with *Enterobacteriales* BSI from the study time frame
- Evaluate the time to de-escalation therapy, length of hospitalization, and total length of antibiotic therapy
- Assess the effect the AMT has on clinical outcomes in the post-intervention group

Methodology

Study Design

- Retrospective, multi-center, matched, pre- and post-quasi-experimental study conducted at eight acute care hospitals in the Providence Health & Services Oregon region between August 2018 and June 2019

Inclusion criteria

- Adults (>18 yo), non-pregnant
- Enterobacteriales* BSI
- On broad spectrum therapy (IV anti-pseudomonal therapy)
- Source control achieved within 5 days of positive culture result
- Taking other enteral meds or food by day 5
- Pitt bacteremia score of <1 by day 5
- Availability of an *in vitro* active oral agent

Exclusion criteria

- Patients transferred from an outside hospital
- Polymicrobial bacteremia
- Patients who expire before blood cultures results were reported
- Patients on hospice/comfort care
- Patients who transfer to a non-Providence hospital

Primary outcome

- Time to de-escalation from broad spectrum therapy

Secondary outcome

- Hospital length of stay
- Total duration of antibiotic therapy

Results

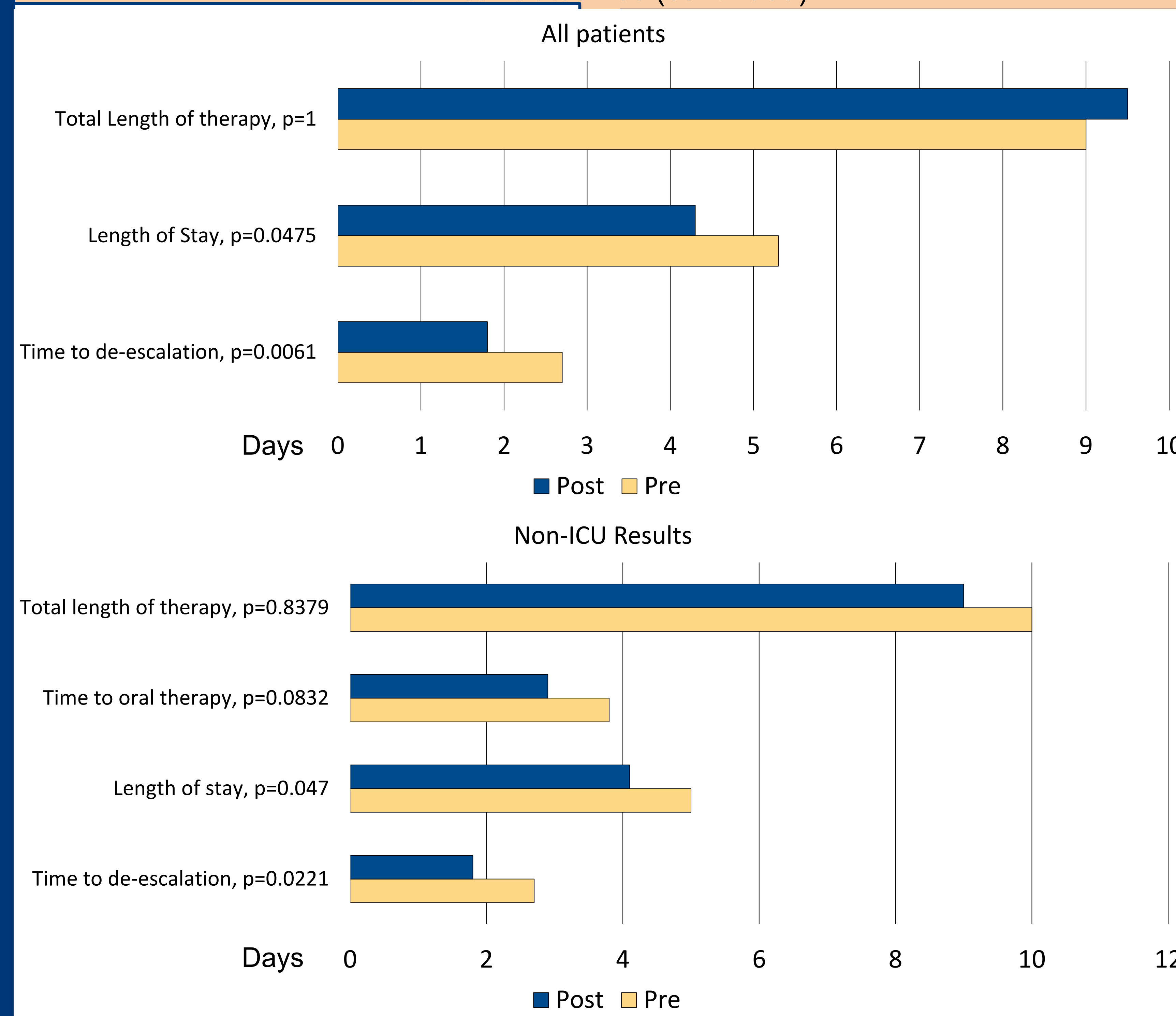
Patient Population Studied

Characteristic	Pre Group (n=30)	Post Group (n=30)	p-value
Age, No. (%)			1
20-59	8 (27)	8 (27)	
60-69	13 (43)	13 (43)	
≥70	9 (30)	9 (30)	
Sex, female, No. (%)	23 (76.7)	22 (73.3)	
Organism, No. (%)			0.0321
E. coli	23 (76.7)	15 (50)	
Non E. coli	7 (23)	15 (50)	
Pitt Bacteremia Score, No. (%)			0.1172
Score of 0	21 (70)	26 (86.7)	
Score of 1	9 (30)	4 (13.3)	
Location, No. (%)			0.7656
Non-ICU	27 (77)	22 (73)	
ICU	7 (23)	8 (27)	
Discharge Antibiotics, No. (%)			---
Levofloxacin	2 (6.7)	2 (6.7)	
Cefpodoxime	0 (0)	1 (3.33)	
Ciprofloxacin	9 (30)	8 (26.7)	
Cefuroxime	0 (0)	1 (3.33)	
Cefdinir	0 (0)	3 (10)	
Amoxicillin	1 (3.33)	1 (3.33)	
Trimethoprim-sulfamethoxazole	2 (6.7)	4 (13.3)	
Cephalexin	7 (23.3)	5 (16.7)	
Amoxicillin-clavulanate	4 (13.3)	4 (13.3)	
No antibiotics	5 (16.7)	1 (3.33)	

Clinical Outcomes

Outcomes, days	Pre Group (n=30)	Post Group (n=30)	p-value
Time to de-escalation	2.7	1.8	0.0061
Length of stay	5.3	4.3	0.0475
Length of Therapy, days			
Inpatient	4	4	0.1982
Outpatient	7	7	0.7772
Total	9	9.5	1
Non-ICU outcomes, days			
Time to de-escalation	2.7	1.8	0.0221
Length of stay	5	4.1	0.047
Time to Oral	3.8	2.9	0.0832
Length of Therapy, days			
Inpatient	4	3.5	0.2228
Outpatient	7	7	0.9546
Total	10	9	0.8379
ICU outcomes, days			
Time to de-escalation	2.2	1.9	0.2045
Length of stay	7.3	5.6	0.2901
Time to Oral	5	3.6	0.4166
Length of Therapy, days			
Inpatient	7	5	0.3643
Outpatient	5	5.5	0.7327
Total	9	10.5	0.6476

Clinical Outcomes (continued)



Discussion

Patient Population

- A total of 60 patients were include in this study: 30 patients in the pre-intervention group and 30 patients in the post-intervention group.
- The most common age group was patients 60-69 years of age (43% vs 43%)
- The most common causative organism for the BSI was found to be Escherichia coli (76.7% vs 50%),

Clinical Outcomes

- During the intervention period a decrease was noted in median time to de-escalation of therapy in the non-ICU groups (2.7 days vs 1.8 days, p=0.0221)
- A decrease in length of stay was also noted in the length of stay in the non-ICU groups (5 days vs 4.1 days, p=0.047)
- There was no statistical difference in the total length of therapy (combined inpatient and outpatient duration) between the Non-ICU groups (10 days vs 9 days, p=0.8379)

Study Limitations

- Non-randomized
 - Different time periods and providers in pre-post-intervention groups
- Small sample size
- Did not match by organism
- Did not analyze percentage of interventions accepted

Conclusions

- With the rapid real time results and AMT interventions there was a decrease in time to de-escalation
- This reinforces conclusions from previous studies
- There was also a decrease in length of hospital stay between the two groups
- No difference was found between the two groups in regards to total length on antibiotic therapy
- There was no noted significance in the difference in time to PO between the groups. A larger study could help to identify if this is true.
- This study helps to highlight the significant impact of an AMT can have on patient outcomes, and the cost savings that can be achieved through antimicrobial stewardship

Disclosure

- None of the investigators have anything to disclose

References

- Kochanek K.D., Murphy S.L., Xu J,m et al. National Center for Health Statistics. 2019. Deaths: final data for 2017. National Vital Statistics Reports; vol 68, no.9. National Center for Health Statistics, Hyattsville, MD.
- Tansarli G.S., Andreatos N., Pliakos E.E., et al. A systematic review and meta-analysis of antibiotic treatment duration for bacteremia due to Enterobacteriaceas. *Antimicrob.* 2019;63(5):e02495-02518.
- Huang A.M, Newton D., Kunapuli A., et al. Impact of rapid organism identification via matrix-assisted laser desorption/ionization time-of-flight combined with antimicrobial stewardship team intervention in adult patients with bacteremia and candidemia. *Clin Infect Dis.* 2013;57(9):1237-1245.
- Messacar K., Parker S.K, Todd J.K., et al. Implementation of rapid molecular infectious disease diagnostics: the role of diagnostic and antimicrobial stewardship. *J Clin Microbiol.* 2017;55(3):715-723.