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Emma Kelly

Tibisay Villalobos MD

Kristin M. Held Wheatley PharmD, BCOP

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Duration of Empiric Antibiotic Therapy in Young Febrile Infants

Emma Kelly¹, Tibisay Villalobos-Fry, MD, FAAP², Kristin Held Wheatley, PharmD, BCOP²

¹ LVHN Summer Research Scholar

² Department of Pediatrics, Pediatric Infectious Diseases Section

Lehigh Valley Health Network, Allentown, Pennsylvania

Introduction and Objectives

- Infants younger than 90 days are at risk for serious bacterial infection (SBI) as it has been reported that 3-20% of infants less than 3 months may develop SBI
- Often symptoms are nonspecific and a series of tests—including blood and urine cultures—are obtained in-order-to determine the cause of the fever
- Empiric antibiotic therapy usually is initiated while awaiting culture results until SBI can be ruled out
- In recent years, the use of molecular techniques have shortened the time to detection of organisms in the blood culture
 - On July 6, 2021, LVHN started using BIOFIRE® Blood Culture Identification 2 panel
- This project aims to determine whether antibiotic exposure and time to positivity (TTP) of blood cultures was lessened after the implementation of molecular identification techniques

Methods

Retrospective Medical Chart Review

Data Gathered in RedCap®

Data Analysis

- Using EPIC, data was gathered from infant charts (0-90 days on admission)
 - Demographics
 - Blood cultures
 - Respiratory Viral Panel (RVP)
 - Empiric antibiotic regime

- Calculated:
 - TTP of blood cultures
 - Length of Stay (LOS)
 - Duration of antimicrobial therapy

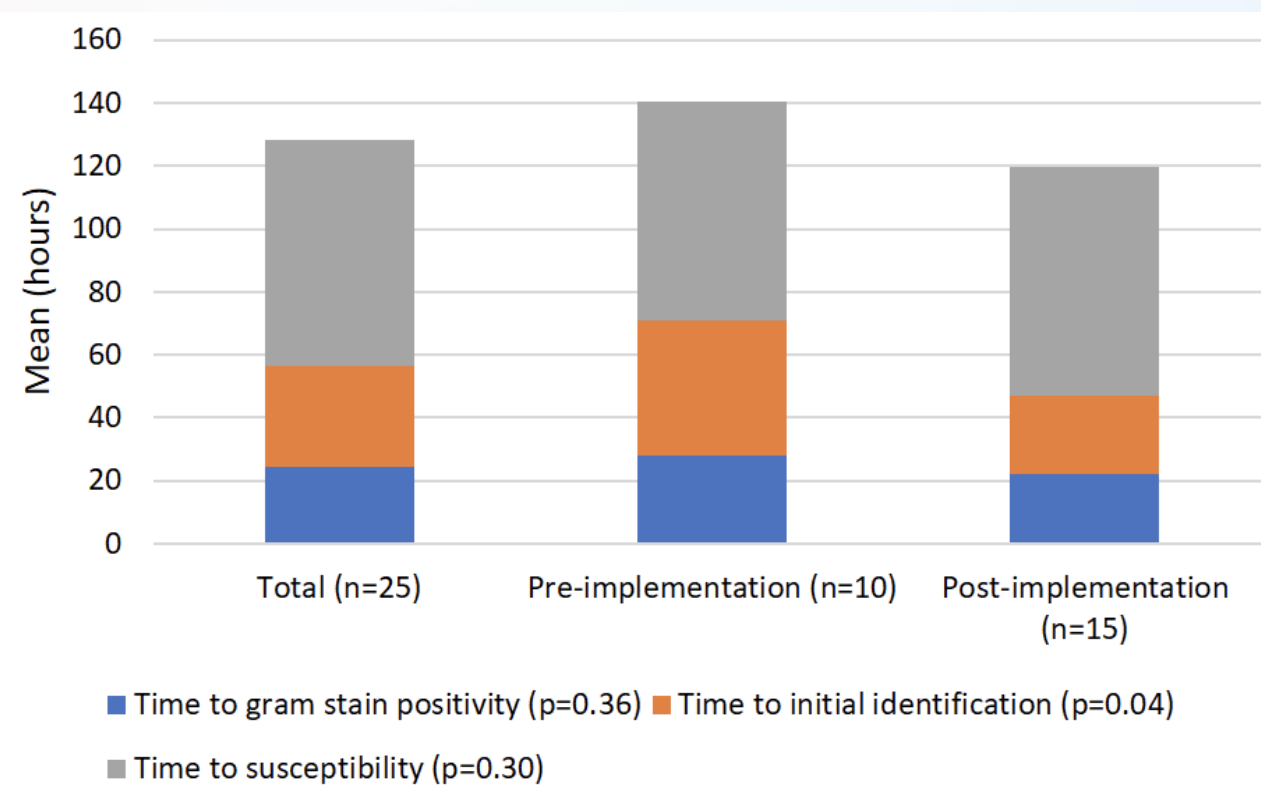
- Descriptive statistics were used to characterize data
- Data were separated based on age group and blood culture molecular technique implementation date
- Independent paired t-test was used to compare outcomes

Results

	Total N=205	Pre-implementation N=95	Post-implementation N=110
	n (%)		
Male gender	113 (55)	60 (63)	53 (48)
Receipt of antibiotics	91 (44)	48 (51)	43 (39)
0-28 days (n=53)	48 (91)	22 (88)	26 (93)
29-60 days (n=120)	33 (28)	20 (37)	13 (20)
> 60-90 days (n=32)	10 (31)	6 (38)	4 (25)
Microbiology of positive blood cultures	25 (12)	10 (11)	15 (14)
Staphylococcus aureus	3 (12)	2 (20)	1 (7)
Streptococcus agalactiae	1 (4)	0 (0)	1 (7)
Escherichia coli	4 (16)	1 (10)	3 (20)
Contaminant	17 (68)	7 (70)	10 (67)

Contaminants included: Staphylococcus epidermidis (6), Staphylococcus hominis (7), Staphylococcus wameryi (1), gram positive rod (1), Bacillus spp. (1), Streptococcus parasanguinis (2), Streptococcus mitis/oralis (1), Leuconostoc mesenteroides subsp. Cremoris (1)

Table 1. Demographics and microbiology results of febrile infants admitted to Lehigh Valley Reilly Children's Hospital between February 15, 2014 and April 30, 2022



Graph 1. Blood culture panel result time frames pre- and post-implementation of BIOFIRE® Blood Culture Identification 2 Panel

	Total N=205	Pre-implementation N=95	Post-implementation N=110
	Mean (hours)		
LOS	50.48	51.56	49.55
0-28 days	88.16	97.06	80.22
29-60 days	36.69	32.44	40.16
> 60-90 days	39.81	45.03	34.59
Negative blood culture	n=180	n=85	n=95
Duration of antimicrobial therapy	24.34	28.21	20.89
0-28 days	66.98	82.10	53.59
29-60 days	7.83	8.15	7.55
> 60-90 days	10.49	8.41	12.57
Negative blood culture + positive RVP	n=92	n=32	n=60
Duration of antimicrobial therapy	9.01	9.86	8.55
LOS	34.58	35.58	34.05

Table 2. LOS and Duration of antimicrobial therapy for febrile infants pre- and post-implementation of BIOFIRE® Blood Culture Identification 2 Panel

Conclusions

- The majority of positive blood cultures were due to contaminant organisms
- The use of the BIOFIRE® system was able to decrease the time to initial identification of blood cultures
- The use of the BIOFIRE® system did not impact LOS
- When evaluating patients with negative blood cultures, duration of antimicrobial therapy was reduced, most notably in patients 0-28 days
- Patients with a negative blood culture and positive RVP also showed a decrease in both duration of antimicrobial therapy and LOS



References