Comparing Minimum Inhibitory Concentrations via Vitek of Methicillin-Resistant *Staphylococcus aureus* Isolates in Pediatric Patients

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BACKGROUND

- Methicillin-Resistant *Staphylococcus aureus* (MRSA) cause serious infections that can affect any age group
- A vancomycin minimum inhibitory concentrations (MIC) may be a useful indicator of a therapeutic vancomycin regimen for a patient's infection

OBJECTIVES

- To evaluate which of the three measured vancomycin MICs (≤ 0.5, 1, 2 µg/mL) is the most common among pediatric patients
- To establish which anti-MRSA treatment is prescribed most often
- To determine whether there is correlation with MIC and length of stay

METHODS

Study Design

•Retrospective, cross-sectional chart review using Epic for data collection of 256 patient cases

Inclusion Criteria

•Pediatric patients aged 18 years or younger at the time of the MRSA infection

•Patients cared for at Cardinal Glennon Children's Hospital from January 2018 through December of 2019

•A confirmed MRSA infection as found by microbiology analyses

•Treated with at least one oral or intravenous anti-MRSA drug

Exclusion Criteria

•Untreated MRSA infections

•Deceased patients

Study Measures: Dependent Variables

•**Primary Outcome:** the number of patients with vancomycin MICs of ≤ 0.5, 1, and 2 µg/mL as measured by a Vitek instrument

•**Secondary Outcome:** hospital locations that had the most MRSA cases, length of stay, anti-MRSA treatment, and causes of the various MRSA infections

Study Measures: Independent Variables

•Age, gender, race

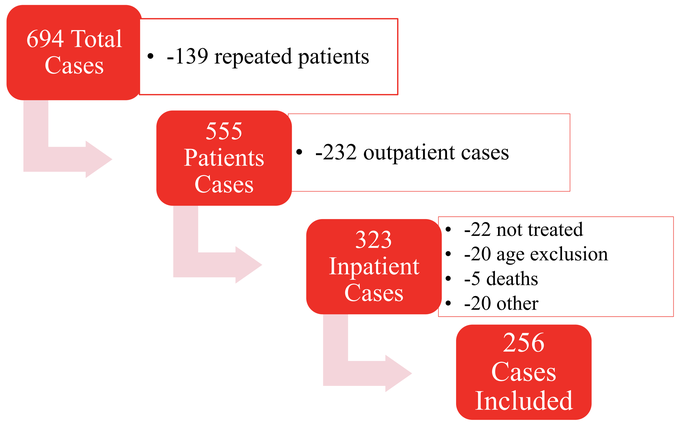
Data Analysis

•Descriptive statistics including means, percentage, and standard deviations were used to describe sample population

•A Mann-Whitney U Test was used to determine significance of the length of stay outcome

METHODS

Figure 1: Patients Inclusion



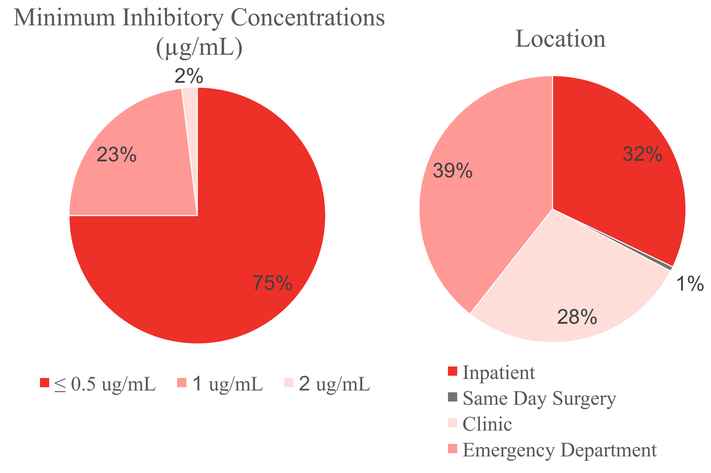
RESULTS

Table 1: Demographic Information

Age (years)	Number of Patients (%)	Mean Age ± Standard Deviation
0-1	80 (31)	6.1 ± 5.6
2-5	58 (23)	
6-10	50 (19)	
11-14	35 (14)	
14-18	33 (13)	

Gender	Number of Patients (%)
Female	130 (50.8)
Male	126 (49.2)

Figure 2: Minimum Inhibitory Concentrations and Services



RESULTS

Table 2: Treatments of Methicillin-Resistant *Staphylococcus aureus*

Treatment	Number of Patients (%)
Clindamycin	182 (70.8)
Vancomycin	39 (15.2)
Sulfamethoxazole/Trimethoprim	21 (8.2)
Linezolid	5 (1.9)
Cephalexin	3 (1.2)
Combination of Above Drugs	4 (1.5)
Other	3 (1.2)

Table 3: Length of Stay

Minimum Inhibitory Concentration (µg/mL) n = 85* *Cystic fibrosis patients excluded	Average (days)	Standard Deviation	Significance
≤ 0.5 µg/mL	4.3	± 3.2	P = 0.026
1 µg/mL	6.9	± 5.8	

Table 4: Causes of MRSA Infections

Cause	≤ 0.5 µg/mL (%)	1 µg/mL (%)	2 µg/mL (%)
Skin & Soft Tissue	166 (86.0)	39 (66.1)	3 (60)
Cystic Fibrosis	7 (3.6)	9 (15.2)	2 (40)
Bacteremia	9 (4.7)	7 (11.9)	-
Bacterial Tracheitis	4 (2.1)	1 (1.7)	-
Pneumonia	3 (1.6)	1 (1.7)	-
Osteomyelitis	1 (0.5)	-	-
Other	3 (1.6)	2 (3.4)	-

LIMITATIONS

- Outpatient adherence was unable to be tracked
- Single center study
- Inadequate documentation
- Vitek differs from microbroth dilution (MBD) technique

CONCLUSION

- The majority of pediatric patients that present with MRSA infections have a vancomycin MIC of ≤ 0.5 µg/mL
- Pediatric patients are most often treated with clindamycin for MRSA infections
- Higher vancomycin MICs may be associated with longer hospital lengths of stay