Clinical Utility of Methicillin Resistant *Staphylococcus Aureus* (MRSA) Nasal PCR to Streamline Antimicrobial Use in Treatment of Diabetic Foot Infection (DFI) with or without Osteomyelitis (OM)

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Background

- Inappropriate use of broad-spectrum antibiotics is an ongoing **global health emergency**.

Multidrug-resistant organisms (MDROs)	Longer hospital length of stay (LOS)
Renal Toxicity	*Clostridioides difficile* infection

- DFI guidelines recommend empiric MRSA-targeted therapy in cases of high prevalence or severe infection; however, they do not make recommendations on de-escalation.
- This increases unnecessary use of broad-spectrum antibiotics, which has prompted investigation for strategies to **optimize** antibiotic use.
- One emerging strategy is the **utilization of MRSA nasal PCR**.
  - ✓ The MRSA nasal PCR has been utilized for MRSA-targeted therapy de-escalation in pneumonia (PNA), given negative predictive values (NPV) have been >90% in various studies.
  - ✓ There is growing literature to suggest MRSA nasal PCR also carries high NPV in DFI similar to what has been seen in PNA.
- In response to local data demonstrating a 94% NPV for MRSA nasal PCR in DFI, our institution implemented an intervention to utilize this test for early de-escalation or avoidance of empiric MRSA-targeted antibiotics in DFI.

Objective

- This study evaluates the effect of MRSA nasal PCR testing on MRSA-targeted antimicrobial use and clinical outcomes in patients with DFI with or without OM.

Methods

Retrospective | **Single Center** | **Pre- and post-intervention**

Inclusion Criteria
- ≥ 18 years old
- Admitted with DFI
- MRSA nares PCR obtained with culture data

Exclusion Criteria
- Pregnant
- History of MRSA infection within 1 year prior to the index admission for DFI

Primary Outcome

Duration of empiric MRSA targeted antibiotic therapy - hours

Secondary Outcome

MRSA coverage added back	Readmit	LOS	Mortality	AKI

Results

Table 1. Baseline Characteristics

	PRE (n = 83)	POST (n = 67)	P-value
Age (median [IQR])	66.8 [56.1-72.9]	63.7 [55.7-68.5]	0.11
Male (%)	97.6	97.1	1.00
A1C (mean)	8.3 ± 2.2	8.5 ± 1.9	0.63
Comorbid conditions (%)			
Vascular disease	27 (32.5)	22 (32.4)	0.98
Transplant	1 (1.2)	1 (1.5)	1.00
Malignancy	11 (13.2)	2 (2.9)	0.02
OM	36 (43.3)	36 (52.9)	0.24
Microbiologic cultures (%)	6 (7.2)	0	0.03
Swab	33 (39.7)	26 (38.2)	0.85
Wound	42 (50.5)	44 (64.7)	0.08
Tissue	16 (19.2)	5 (7.4)	0.04
Abscess	46 (55)	30 (44.1)	0.17
Bone			
Organisms isolated (%)			
MRSA	10 (12.0)	12 (17.6)	0.34
MSSA*	18 (21.7)	26 (38.2)	0.03
Other gram positive	41 (49.3)	36 (52.9)	0.66
Gram negative	38 (45.8)	18 (26.4)	0.02
Anaerobes	14 (16.9)	8 (11.8)	0.38
Culture negative	13 (15.7)	9 (13.2)	0.67

*Methicillin susceptible Staphylococcus aureus

Table 2. Primary Outcomes

	PRE (n = 83)	POST (n = 67)	P-value
Duration of empiric MRSA targeted antibiotic therapy (hours, median [IQR])	72 [27-120]	24 [12-72]	< 0.01

Table 3. Secondary Outcomes

	PRE (n = 83)	POST (n = 67)	P-value
MRSA coverage added back for MRSA (%)	0.0	0.0	---
9- month readmission (%)	18.1	30.9	0.06
LOS (days, median [IQR])	8.0 (5.0-13.0)	9.0 (6.3-14.0)	0.32
In hospital mortality (%)	2.4	2.9	1.00
AKI (%)	15.7	6.1	0.07

Table 4. NPV of MRSA Nasal PCR in Study Cohort

	PRE (n = 83)	POST (n = 67)
NPV (%)	94	95

Discussion

- A total of 150 patients (of 200 patients screened) were included for analysis (83 PRE; 67 POST). A sample size of 32 patients in total was estimated to meet 80% power.
- There was a significant decrease in empiric MRSA-targeted antibiotic therapy use, from a median of 72 (IQR, 27-120) hours in the PRE group, to 24 (IQR, 12-72) hours in the POST group ($p < 0.01$).
- Our study has limitations. Some notable include the single-center design and veteran population limit generalizability to other populations and institutions. We also did not assess emergency department or outpatient antibiotic hours, so the reported empiric MRSA-targeted antibiotic therapy use in hours may be underestimated since DFI are treated for 2-6 weeks depending on OM presence.

Conclusions

- This study of patients presenting to a VA hospital with DFI identified a statistically significant decrease in median duration of inpatient MRSA-targeted antibiotic use post-protocol implementation. This suggests a favorable effect of MRSA nasal PCR for de-escalation or avoidance of MRSA-targeted antibiotics in DFI.

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Disclosures

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