Effect of a pharmacist-driven Methicillin-Resistant Staphylococcus aureus polymerase chain reaction (MRSA PCR) protocol on vancomycin usage in patients being treated for suspected pneumonia

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Background

- Methicillin-resistant *Staphylococcus aureus* (MRSA) is a pathogen often covered empirically with vancomycin in patients hospitalized for respiratory tract infections (RTIs).
- The advent of rapid-diagnostic testing with polymerase chain reaction (PCR) assays allows for a reliable early rule-out of MRSA and subsequent de-escalation of unnecessary antibiotics.
- Studies have shown that MRSA PCR assays result more rapidly than respiratory cultures while maintaining reliable specificity.[1,2]

Objectives

- Assess whether the implementation of a protocol allowing pharmacists to order MRSA PCR tests in patients with a suspected RTI resulted in lower vancomycin use at a large, academic medical center
- Affirm the specificity of MRSA PCRs widely reported in the literature
- Identify potential factors affecting the accuracy of MRSA PCRs

Methods

- Retrospective, IRB-exempt chart search
- Study Period:
  - Pre-implementation Group: March 31st, 2019 to July 31st, 2019
  - Post-implementation Group: March 31st, 2021 to June 30th, 2021
- Inclusion Criteria: Hospitalized and received vancomycin within two days of a respiratory culture collection
- Exclusion Criteria: Received vancomycin for greater than 14 days
- Primary Endpoint: Overall vancomycin use pre-implementation vs post-implementation of MRSA PCR protocol
- Secondary Endpoints:
  - Vancomycin use in patients with a negative MRSA culture (No MRSA) pre-implementation vs post-implementation
  - The rate of MRSA PCR assay results that were discordant from respiratory culture results

Results

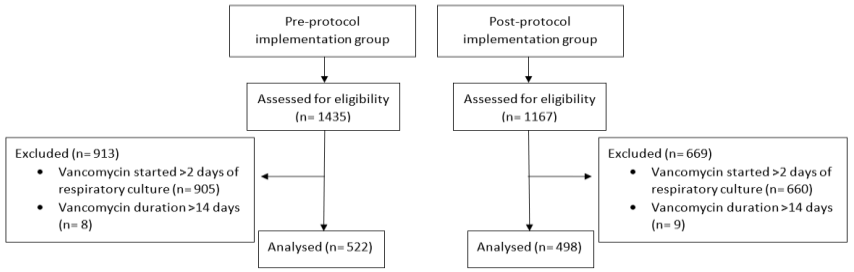

Figure 1: Enrollment and Eligibility

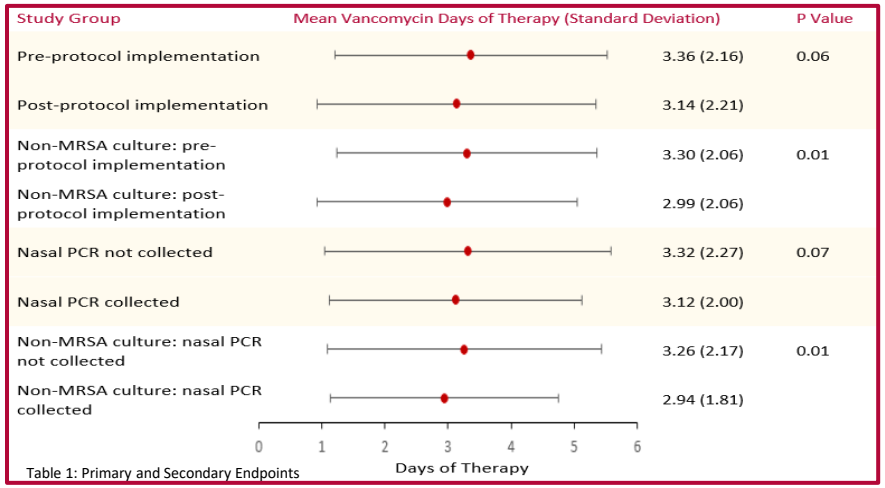

Table 1: Primary and Secondary Endpoints

	Pre-protocol implementation (n= 522)	Post-protocol implementation (n= 498)
MRSA nasal PCR rate (%)	55 (10.5)	301 (60.4)
MRSA nasal PCR major* errors (%)	5 (9.1)	19 (6.3)

*Major error defined as a nasal PCR that showed a false negative result when compared to the subsequent respiratory culture

Table 2: PCR Collection and Error Rate

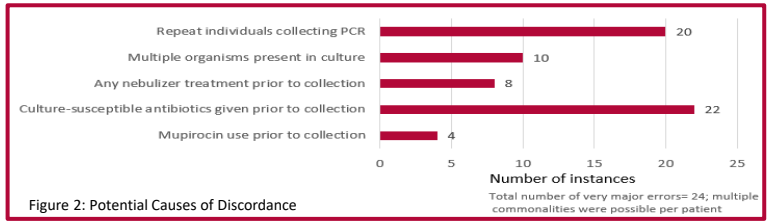

Figure 2: Potential Causes of Discordance

Conclusions

- The implementation of our protocol allowing pharmacists to order MRSA PCRs resulted in nominally lower vancomycin use overall and a statistically significant reduction in non-MRSA vancomycin.
- Analysis of specificity of MRSA PCR results aligned with rates commonly reported in the literature.
- Our intervention was effective in lowering overall and inappropriate vancomycin use while showing accurate results.

References

- Chen K, Malik AA, Sheng Y, et al. Clinical Utility of Molecular Tests for Guiding Therapeutic Decisions in Bloodstream Staphylococcal Infections: A Meta-Analysis. *Front Pediatr*. 2021;9:713447. doi: 10.3389/fped.2021.713447.
- Mergenhagen KA, Starr KE, Wattengel BA, et al. Determining the Utility of Methicillin-Resistant Staphylococcus aureus Nares Screening in Antimicrobial Stewardship. *Clin Infect Dis*. 2020;71(5):1142-1148. doi: 10.1093/cid/ciz974.

Disclosure

The study authors have no potential or actual conflicts of interests.