Effect of MRSA nasal PCR results on vancomycin therapy in nosocomial pneumonia

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ABSTRACT

Methicillin-resistant *Staphylococcus aureus* (MRSA) nasal PCR testing in patients with community-acquired pneumonia has been associated with decreases in both days of vancomycin therapy and number of vancomycin levels without negatively impacting patient-centered outcomes. Nosocomial pneumonias are often treated empirically with intravenous vancomycin; however, few studies have evaluated the appropriate use of MRSA nasal PCR testing in nosocomial pneumonias.

In this retrospective chart review, vancomycin duration of therapy was evaluated in ICU patients with suspected nosocomial pneumonia and a negative MRSA nasal PCR. Patients who had vancomycin discontinued before respiratory culture result were compared to those with vancomycin discontinued after respiratory culture result. Secondary endpoints included number of vancomycin levels, rate of vancomycin re-initiation or anti-MRSA antibiotic escalation, rate of false negative MRSA nasal PCR, rate of clinical instability, rate of acute kidney injury, hospital length of stay, ICU length of stay, and in-hospital mortality.

A total of 75 patients were initially reviewed. Of those, 68 patients had a negative MRSA nasal PCR (46 patients in the "before" culture group and 22 patients in the "after" culture group). Vancomycin duration of therapy was 1.6 days in the "before" group, compared to 2.59 days in the "after" group ($p<0.001$). Number of vancomycin levels was also significantly lower in the "before" group; however, other secondary endpoints did not show a significant difference.

In this retrospective chart review, ICU patients with suspected nosocomial pneumonia who had vancomycin discontinued after negative MRSA nasal PCR but before respiratory culture result was associated with a decreased number of days of vancomycin therapy and vancomycin levels without a significant difference in clinical outcomes. More robust studies are needed to determine the clinical utility of MRSA nasal PCR in nosocomial pneumonias.

OBJECTIVES

Determine the clinical utility of MRSA nasal PCR in ICU patients with suspected nosocomial pneumonia

Primary Endpoint

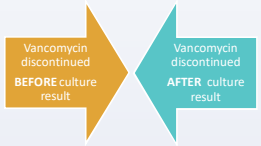
- Days of vancomycin therapy

Secondary Endpoints

- Number of vancomycin levels
- Number of vancomycin levels
- Rate of vancomycin re-initiation and anti-MRSA antibiotic escalation
- Rate of MRSA culture with a negative MRSA nasal PCR
- Rate of clinical instability
- Rate of acute kidney injury
- Hospital length of stay
- Intensive care unit length of stay
- In-hospital mortality

METHODS

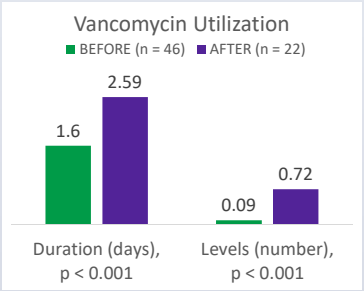
- Retrospective chart review
- ICU patients with suspected nosocomial pneumonia and received vancomycin at least 48 hours after ICU admission



- Statistical methods: student t-test (parametric data), Mann-Whitney U test (non-parametric data), chi-squared test of independence (nominal data)

INCLUSION CRITERIA	EXCLUSION CRITERIA
18 years or older Admitted to an ICU at Regions Hospital Vancomycin ordered at least 48 hours after ICU admission ICD-10 code indicating pneumonia	Under 18 years of age Admission to Burn ICU Cultures collected after vancomycin initiation History of MRSA culture or positive nasal PCR in previous 12 months Required vancomycin for concomitant infection Respiratory culture obtained > 7 days after MRSA nasal PCR MRSA nasal PCR obtained > 3 days after respiratory culture

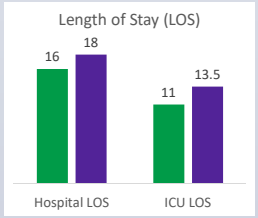
RESULTS

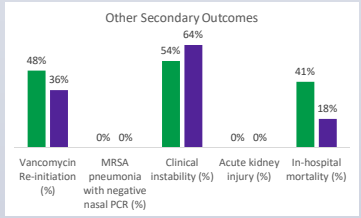


Baseline characteristics:
- 80% male, 20% female
- 60 years old (25-92)

"Before" group:
- Larger constituency in cardiovascular ICU
- More hospital-acquired pneumonia

"After" group:
- Higher baseline serum creatinine
- More ventilator-associated pneumonia





Of 75 patients reviewed, seven had a positive MRSA nasal PCR, and two of those (29%) had MRSA pneumonia, making the incidence of MRSA pneumonia in this study 3%. Of the 68 patients with a negative MRSA nasal PCR, fourteen (19%) grew methicillin-susceptible *S. aureus* (MSSA) on respiratory culture. Approximately 70% of patients grew gram negative bacilli or oropharyngeal flora on respiratory culture.

CONCLUSIONS

Early de-escalation of vancomycin therapy based on negative MRSA nasal PCR may be appropriate in ICU patients with nosocomial pneumonia

- Not associated with an increased incidence of clinical instability or acute kidney injury
- Trend toward greater in-hospital mortality may be a function of poorer prognosis at admission or other unknown variable

STRENGTHS	LIMITATIONS
• Evaluates clinical utility of MRSA nasal PCR in a novel population • Evaluates both efficacy and safety outcomes of early vancomycin de-escalation • Many reported baseline characteristics and specific inclusion criteria help define applicable patient populations	• Retrospective, not matched • Compares two groups of practice • Does not capture patients who were not started on vancomycin due to a negative MRSA nasal PCR • Only included patients who acquired nosocomial pneumonia(s) in the ICU • Definition of clinical instability is simplified and incomplete • Did not collect cause of death

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