Effectiveness of Vancomycin Dosing to Achieve AUC/MIC Targets for MRSA Infections in Hospitalized Patients

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Introduction

- Vancomycin monitoring and dose adjustments are based on single trough levels at ARMC. According to IDSA guidelines, achieving an AUC/MIC target of 400–600 mg·h/L is recommended to optimize clinical efficacy for serious MRSA infections such as bacteremia, infective endocarditis,, osteomyelitis, and meningitis.
- Obtaining 2 vancomycin levels within a dosing interval is needed to determine if AUC/MIC ≥ 400, making this logistically challenging. Newer published calculators for a single vancomycin trough level can also predict AUC/MIC target attainment.
- This study aims to evaluate the effectiveness of the ARMC vancomycin dosing protocol, utilizing only trough levels, in achieving the recommended AUC/MIC target range for treating serious MRSA infections. Moreover, results will determine the frequency at which patients who are started on our vancomycin protocol require and achieve the desired AUC/MIC goal.

Objective

The purpose of this study is to evaluate the effectiveness of our vancomycin dosing protocol in achieving the recommended AUC/MIC target for serious MRSA infections.

Methods

- Patients were identified through our institution's vancomycin protocol monitoring sheets from October to December 2024 for this analysis. Included patients had at least 1 trough level at steady state and stable renal function. Excluded patients were those with unstable renal function, changes in serum creatinine ≥ 0.3mg/dL before the first trough level.
- Data collection included laboratory values, cultures and sensitivities, and treatment diagnoses. Estimated AUC/MIC ratios for all included subjects were determined utilizing a published calculator for a single vancomycin trough level. Additionally, a TheraDoc-generated report was used to identify patients with MRSA bloodstream infections from July 2024 to January 2025.
- Investigators will examine data and report findings to enhance our hospital's antimicrobial stewardship program (ASP). Approval by the institutional review board at ARMC was obtained.

Results

Patient Characteristics and Culture Findings (n=100)	
Average age in years − n (SD)	55.5 (± 15.7)
MRSA / not meeting goal of AUC/MIC ≥ 400 - %	4.0
Patients managed effectively - %	96.0
MRSA positive with MIC=1 − %	64.0
MRSA positive with MIC of ≤ 0.5 − %	36.0

Discussion

- Among 100 patients included on vancomycin pharmacy protocol, we found that 96%, many of which did not have serious MRSA infections, were safely managed with the vancomycin trough-based protocol.
- Overall, 4% of subjects with serious MRSA infections did not attain the goal of AUC/MIC ≥ 400; all having a MRSA MIC of 1.
- We found 44 patients with MRSA blood cultures in a 7-month period and the rate of MRSA MIC = 1 was 64%.
- We estimate 1 in every 25 consecutive patients started on vancomycin protocol are at risk for not achieving the target AUC/MIC goal per IDSA. The AUC/MIC goal may correlate with decreasing MRSA resistance and preventing treatment failures, although the published evidence is modest and outcome studies are inconsistent.
- Despite these uncertainties, our findings will be utilized to improve our current vancomycin monitoring protocol and incorporate the use of calculator programs to attain an AUC/MIC ≥ 400 for patients with serious MRSA infections.

Conclusion

Our institution's vancomycin protocol is generally effective at achieving optimal vancomycin blood levels for patient outcomes and safety. Future patients with confirmed serious MRSA infections where the MIC=1, new strategies will be employed to ensure that vancomycin dosing and trough levels align with the recommended AUC/MIC target per IDSA to optimize efficacy and potentially improve patient outcomes..