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

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Background and Purpose: Vancomycin is an antibiotic that requires drug-level monitoring, historically obtaining single trough levels for safety and efficacy, which is the current practice at ARMC. According to recent IDSA guidelines, optimal dosing should attain an area under the curve (AUC) over 24 hours to minimum inhibitory concentration (MIC) ratio of ≥ 400 which theoretically predicts the antibiotic efficacy in adult patients with certain MRSA infections. The IDSA suggested practice requires us to obtain 2 serum vancomycin levels within a dosing interval, making it logistically challenging. However, vancomycin serum trough concentrations between 10-20 mg/L usually achieves an AUC/MIC ≥ 400 when the MRSA MIC is ≤ 1. 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.

Methods: One hundred consecutive patients started on pharmacy-managed vancomycin protocol with at least one steady-state trough level were identified through our institution's monitoring program from October to December 2024. To provide real world results, all patients with stable renal function that were treated with vancomycin for their infection were included, regardless of whether they had a MRSA infection. Excluded patients were those with unstable renal function, changes in serum creatinine ≥ 0.3mg/dL before the first trough level was obtained. Many of these patients receive vancomycin empirically and do not have serious MRSA infections. The IDSA guidance for an AUC/MIC ≥ 400 only applies to patients with serious MRSA infections (including but not limited to bacteremia, sepsis, infective endocarditis, osteomyelitis, and meningitis). 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. This report would help determine the rate of serious MRSA infections as well as MRSA MICs at our hospital. Investigators will examine the data, estimate the vancomycin protocol effectiveness, and report any important findings to enhance our hospital's antimicrobial stewardship program (ASP). Approval by the institutional review board at ARMC was obtained.

Results & Discussion: Among 100 patients included on vancomycin per 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. A higher MRSA MIC requires higher vancomycin trough levels for goal attainment, and the rate of MRSA MIC = 1 was 64% based on our analysis. To better grasp the scope of our assessment, we found 44 patients with MRSA blood cultures in a 7 month period. However, the vast majority of vancomycin protocol patients are treated empirically and did not require an AUC/MIC ≥ 400. We estimate 1 in every 25 consecutive patients on vancomycin protocol were 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 patient 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.