**Title:** Impact of AUC-Guided Versus Trough-Guided Vancomycin Dosing at a Community Hospital

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**Background:** In 2020, the Vancomycin Dosing and Monitoring Guidelines were updated to no longer recommend trough-guided monitoring. Guidelines now recommend an Area Under the Curve/Minimum Inhibitory Concentration (AUC/MIC) ratio of 400-600 mg·hr/L. Research has demonstrated that AUC/MIC targets can be obtained at troughs less than 15 mg/L, while decreasing rates of nephrotoxicity and acute kidney injury (AKI).

**Objective**: To evaluate the safety and efficacy of the former practice of vancomycin trough-guided dosing and monitoring compared to implemented vancomycin AUC/MIC-guided dosing and monitoring.

**Methods:** This single-center, retrospective, comparison cohort study was approved by the facility's Institutional Review Board. The primary outcome investigated the risk of AKI as defined per the KDIGO guidelines, comparing the trough-guided dosing group (10/01/2019 – 10/31/2020) and the AUC-guided dosing group (01/01/2021 – 01/31/2022). This study interval allowed for a two-month run-in time for establishment of the new vancomycin dosing protocol. Secondary outcomes included total daily vancomycin dose (TDD), percent of therapeutic levels with first blood draw, days of therapy per 1000 patient days, and 30-day readmission. Patients ≥ 18 years who had a pharmacy consult to dose vancomycin, received vancomycin for at least three consecutive calendar days, and had at least one vancomycin level within four calendar days were eligible for inclusion. Exclusion criteria included vulnerable populations, spinal injury, unstable renal function one day before or after the day of vancomycin initiation, renal replacement therapy at baseline, outpatient vancomycin prior to admission, target trough < 15 mg/L, pulse dosing, and missing data.

**Results:** The study population (N=248) was comprised of equal trough-guided subjects and AUC-guided subjects. There was no statistically significant difference in AKI between the trough-guided and AUC-guided patients; 5.6% (7/124), 8.1% (10/124), $p$=0.453, respectively. Of these, 85.7% (6/7) trough-guided and 60.0% (6/10) AUC-guided patients were treated in the critical care unit (CCU). Incidence of AKI in CCU patients in the trough-guided versus AUC-guided subjects was 19.4% (6/31) and 26.9% (7/26). The average TDD for trough-guided and AUC-guided groups was 2,714 ± 1064 mg/day and 2,381 ± 879 mg/day, $p$=0.008. The mean days of vancomycin therapy for the trough-guided and AUC-guided subjects were 5.5 ± 3 days and 5.7 ± 3.7 days, $p$=0.600. Incidence of patients who had an initial therapeutic trough or AUC/MIC vancomycin level was 37.1% (46/124) and 53.2% (66/124), $p$=0.011, respectively. Among CCU patients, similar initial therapeutic levels were observed for both trough-guided (38.7%) and AUC-guided (38.5%) subjects, $p$=0.985. Thirty-day hospital readmission incidence was not statistically significant: 4% (5/124) of trough-guided and 2% (2/124) of AUC-guided subjects, $p$=0.446.

**Conclusion:** This research was largely consistent with the 2020 vancomycin recommendations stating AUC/MIC guided dosing and monitoring is safe and efficacious in the hospital setting. AKI was similar between both dosing models. This may be secondary to individualized dosing prior to AUC-guided dosing and a small sample size. Incidence of AKI in CCU patients may be higher due to varying pharmacokinetics. Patients dosed via AUC/MIC are now receiving less vancomycin and achieving higher rates of initial therapeutic levels in comparison to trough-guided dosing.