

The impact of switching from trough-guided to area under the curve-guided vancomycin dosing on hospital resources

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Learning Objectives:

1. List factors that hospitals should consider prior to implementing area under the concentration-time curve (AUC)-guided vancomycin dosing (AUC-gd).
2. Discuss the potential impact of switching from trough-guided vancomycin dosing (Tr) to AUC-guided dosing on hospital resources.
3. Describe the incidence of vancomycin-associated nephrotoxicity between two different therapeutic drug monitoring strategies, target trough of 15-20 mcg/mL versus target AUC₂₄ of 400-600 mg·h/L
4. Identify patient characteristics and risk factors that may contribute to the incidence of vancomycin-associated nephrotoxicity

Purpose:

The therapeutic monitoring of vancomycin for serious methicillin-resistant *Staphylococcus aureus* infections 2020 consensus guidelines published by the American Society of Health-System Pharmacists recommend the use of area under the concentration-time curve-guided dosing (AUC) for invasive infections over targeting serum trough concentrations. This method can be more labor intensive due to the potential increase in number of vancomycin serum concentrations needed. The primary objective of this study was to quantify the change in the number of vancomycin serum concentrations that were drawn using trough-guided dosing (Tr) compared with AUC-guided dosing (AUC).

Methods:

This was quasi-experimental study of adult patients who received intravenous vancomycin for at least 72 hours for an invasive infection. Patients who were dosed utilizing Tr were compared to those dosed utilizing AUC. The number and collection times of vancomycin serum concentrations were compared between the two groups to quantify the difference in the number of concentrations needed per patient. The collection times of vancomycin serum concentrations were also categorized into 4-hour intervals to determine if the change in dosing strategy disproportionately affected a certain shift.

Results:

A total of 385 patients were included in the study, with 192 and 193 patients in the Tr group and AUC group, respectively. 502 concentrations were drawn in the Tr group compared with 745 drawn in the AUC group ($p < 0.001$). Median duration of therapy was 5.9 days in the Tr group versus 5.6 days in the AUC group. A median of 2 serum concentrations were drawn per patient in the Tr group compared to 3 serum concentrations per patient in the AUC group. The largest increases were seen during the 00:00-03:59, 16:00-19:59, and 20:00-23:59 time intervals.

Conclusion:

AUC-guided vancomycin dosing increased the use of hospital resources during afternoon and midnight shifts. Further study is needed to determine the financial impact of AUC-guided vancomycin dosing.