Impact of Weight-Based Dosing Guidelines on Vancomycin Dosing and Trough Levels, Including in Obese Patients

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ABSTRACT

Background: In 2009, the American Society of Health System Pharmacists (ASHP). Infectious Diseases Society of America (IDSA) and Society of the Infectious Diseases-Pharmacists (SIDP) released guidelines on vancomycin. The appropriateness of these guidelines for a local population, particularly the subset of obese patients, has not been well studied.

Methods: A retrospective chart review was done on patients at an acute care, university affiliated, community hospital who received intravenous vancomycin for documented or suspected infection before and after implementing the 2009 guidelines. Before 2009, patients received vancomycin 1 g every 12 hours. After the guidelines, patients were dosed on actual body weight (ABW), 15 – 30 mg/kg or 25-30 mg/kg, in 6/2/0 patients, every 6-12 hours. We compared the frequency of therapeutic trough, nephrotoxicity and trough group levels stratified by Body Mass Index (BMI).

Results: There were no significant differences in therapeutic troughs and nephrotoxicity. Adjusted for BMI, there was a significant difference in trough levels between the two groups, P=0.017. However, a large number of patients in the conventionally dosed group were excluded due to inconsistent doses in the ABW group, and there was a high number of supra-therapeutic trough levels.

Conclusion: Obese patients may require an alternate dosing strategy on the ABW dosing based on the 2009 national guidelines resulted in supra-therapeutic levels in patients with high BMIs. Implementing guidelines based on dosing resulted in more consistently and appropriately drawn levels.

METHODS

The study was conducted at The Queen’s Medical Center (QMC) a 500-bed, university affiliated, community teaching hospital in Honolulu, Hawaii between 2012-14 according to protocols approved by the QMC Institutional Research and Review Committee and the University of Hawaii Human Subjects Program.

• Retrospective review of the electronic charts of hospitalized patients who received intravenous vancomycin for documented or suspected infection between March-June 2008 (conventional) and March-June 2012 (ABW-dosing).

• Pre-guidelines in 2008, patients received vancomycin 1 g every 12 hours. By 2012 patients were dosed based on ABW, 15-30 mg/kg or 25-30 mg/kg in seriously ill patients every 8-12 hours.

• Inclusion criteria: 1. adults 18 yrs. 2. hospital stay at least 3 days. 3. vancomycin levels: 3. initial trough dose obtained within 96 hours of treatment initiation. Exclusion criteria: 4. calculated creatinine clearance <60ml/min/1.73m2; 2: hemodialysis, 3: given vancomycin with inconsistent dosing schedule; 4: trough level checked before third consecutive dose; 5: prescribed vancomycin for prophylaxis.

• Definitions: vancomycin levels: therapeutic (15-20mcg/mL), supra therapeutic (20+mcg/mL), Nephrotoxicity was defined as an increase in serum creatinine level of 0.5mg/dl or an increase of 50% from baseline on at least two consecutive days during the period from start of vancomycin to 72 hours after treatment completion. Obesity was defined as having a BMI > 30.

• Chi-square test (p<0.05) was used to show the difference between the 2008 and 2012 groups in achieving therapeutic trough levels, rates of nephrotoxicity and patient demographics. The Jonckheere- Terpstra test was used to compare differences in percentages of different trough groups (GAS, Cari, NC).