Title: Clinical impact of a pharmacist driven vancomycin outpatient parenteral antimicrobial therapy (V-OPAT) Service

Authors

Alexandra Lindo, PharmD; Pegah Shakeraneh, PharmD, BCIDP, AAHIVP; Matthew W. Davis, PharmD , BCIDP; Dayna McManus, PharmD, BCPS, BCIDP; Indigo Moss, PharmD; Jeffrey E. Topal, MD

Background: Vancomycin is frequently prescribed for outpatient parenteral antimicrobial therapy (OPAT) and is associated with an increased risk of adverse drug events and readmissions during treatment. The incidence of acute kidney injury (AKI) during vancomycin OPAT (V-OPAT) ranges from 5-50% according to existing literature. Research has revealed that pharmacist involvement is crucial for the management and monitoring of vancomycin therapy. At Yale New Haven Hospital (YNHH), infectious disease clinicians were responsible for monitoring V-OPAT in the past. However, in 2020, YNHH implemented a pharmacist-led V-OPAT service as a safety and quality initiative. This study aims to evaluate the impact of the pharmacist led V-OPAT service on clinical and safety outcomes.

Methods: A retrospective chart review was conducted to assess 214 patients who were discharged on V-OPAT from October 1, 2020, through September 30, 2021. Patients were excluded if they were lost to follow up, discharged to hospice, less than 18 years of age, receiving outpatient dialysis, expected to receive V-OPAT for a duration less than 7 days, or had no vancomycin troughs drawn at steady state prior to discharge. Baseline characteristics including age, gender, height, weight, creatinine clearance, co-morbidities, body mass index, concurrent nephrotoxic agents used upon discharge, and vancomycin infusion site were collected. The primary endpoint was the rate of hospital readmission due to AKI, defined as an increase in serum creatinine by greater than or equal to 0.3 mg/dL within 48 hours, or an increase in serum creatinine greater than or equal to 1.5 times baseline within the prior 7 days. Secondary endpoints included the incidence of AKI, rate of vancomycin levels within therapeutic range (9 to 16 mcg/mL), number of errors prevented by pharmacists during the transition to V-OPAT, hospital and emergency department re-admission rates, vancomycin-related hospital and emergency department readmission rates, and rate of hospital or emergency department readmissions related to intravenous access issues. Descriptive statistics were employed for data analysis.

Results: Of the 214 patients included in this retrospective review, 66% were male, and the mean age was 62 years. The average Charlson Comorbidity Index score at baseline was 4, indicating a moderate risk of mortality with an estimated 10-year survival of 53%. A total of 42% of patients were discharged on nephrotoxic agents concomitantly with vancomycin. Over half of the patients (53%) received their V-OPAT infusion at a skilled nursing facility or an extended care facility. The primary endpoint, hospital readmission due to AKI, occurred in 1.4% of the study population, which is lower than the incidence rate (2.7%-4.3%) reported in the literature. The incidence of AKI in this study was 9%, which is on the lower end of the range (5%-50%) reported in the literature. Among the patients who had a vancomycin trough level checked post-discharge, 67% were within the therapeutic range and only 5% had a trough level greater than 20 mcg/mL. Pharmacists prevented a total of 27 errors during V-OPAT therapy, primarily related to incorrect dosing of vancomycin. The hospital and emergency department readmission rates were 20% and 19%, respectively, with only 3.3% and 1.9% being attributed to vancomycin-related causes. Occlusion or dislodgment and replacement of the line were the most common causes of intravenous access-related readmissions during V-OPAT.

Conclusion: The introduction of a pharmacist-led V-OPAT service at YNHH demonstrated a trend towards lower rates of adverse safety outcomes and hospital readmissions due to AKI compared to the rates reported in the literature. The implementation of a pharmacist led V-OPAT service may add value to healthcare institutions by enhancing both clinical and safety outcomes. Further research that compares the clinical and safety outcomes of a pharmacist led V-OPAT service to those of a physician led V-OPAT service is necessary to determine the true value that pharmacists bring to the care of patients receiving V-OPAT.