Prevalence of Risk Factors for Vancomycin-Associated Nephrotoxicity in a National Cohort

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ABSTRACT

Background: Vancomycin (VAN) is one of the most widely used antibiotics. Several patient-related risk factors for VAN-associated nephrotoxicity have been identified, including advanced age, renal function, and obesity. Despite the increased risk of nephrotoxicity among VAN-treated patients with these risk factors, VAN continues to be used in these patients. The objective of this study was to describe the prevalence of risk factors for VAN-associated nephrotoxicity in a national cohort of VAN-treated patients.

Methods: We conducted a retrospective cohort study of Veterans (2010-2013) treated with >2 days of intravenous VAN in the hospital setting. We assessed the prevalence of previously established risk factors for VAN-associated nephrotoxicity, including age (≥65), baseline serum creatinine (Scr), chronic kidney disease (CKD), obesity, intensive care unit (ICU) stay, diabetes (DM), hypertension (HTN), congestive heart failure (CHF), cancer, and concomitant aminoglycoside or piperacillin-tazobactam use during the VAN-related admission. Obesity was defined as a BMI >30 kg/m². Current comorbid conditions and concomitant antibiotic exposures were determined using ICD-9 codes and pharmacy barcode medication administration data, respectively. We used descriptive statistics to summarize the data.

Results: In our 4-year study period, we identified 40,781 admissions where patients were treated with VAN for >2 days. Patients were mostly white (74%, n=29,998) and male (97%, n=39,422). Mean age was 67±12 years; 55% (n=22,593) were white. Baseline Scr was high (≥1.3) in 37% (n=15,265) of patients. There were 7,422 (18%) patients treated in the ICU. The overall prevalence of CKD was 20% (n=8,214), obesity was 38% (n=15,073), DM was 40% (n=16,240), HTN was 58% (n=23,468), CHF was 20% (n=8,295), and cancer was 19% (n=7,578). The prevalence of concomitant piperacillin/tazobactam use was 61% (n=24,933) and aminoglycoside use was 3% (n=1,115) during the admission.

Conclusions: This study demonstrates a high prevalence of several risk factors for nephrotoxicity in a national cohort of Veterans treated with VAN. Future studies should identify which risk factors have the greatest impact on VAN-associated nephrotoxicity among Veterans.

BACKGROUND

Vancomycin is frequently used in hospitalized patients.

Nephrotoxicity is a well-known risk associated with vancomycin treatment.

Several risk factors for vancomycin-associated nephrotoxicity have been previously published.

These risk factors are common within the Veterans Affairs population, even among patients who receive vancomycin.

The prevalence of these risk factors in patients receiving vancomycin is unknown.

OBJECTIVE

To describe the prevalence of previously published risk factors for vancomycin-associated acute kidney injury in a national cohort of vancomycin-treated patients.

METHODS

We conducted a retrospective cohort study among inpatient Veterans nationally who received antibiotics during admission.

From August 2010 to August 2013, we identified patients receiving intravenous vancomycin for more than 2 days.

The prevalence of published risk factors for nephrotoxicity, including age ≥ 65, baseline serum creatinine, chronic kidney disease, obesity, diabetes, hypertension, congestive heart failure, cancer, intensive care unit stay, and aminoglycoside or piperacillin/tazobactam use during the admission.1-6

Cockcroft-gault equation was used to calculate creatinine clearance, using ideal body weight.

Presence of current comorbidities was defined by ICD-9 codes during the admission. Concomitant antibiotic exposures were determined using pharmacy bar code medication administration data during the admission.

Obesity was defined as a body mass index ≥ 30 kg/m².

Descriptive statistics, including means and percentages, were used to summarize the data.

RESULTS

We identified 40,781 admissions with >2 days of intravenous vancomycin treatment.

Patient demographics and prevalence of risk factors for nephrotoxicity are shown in Table 1.

CONCLUSIONS

There is a high prevalence of known risk factors for vancomycin- associated nephrotoxicity in Veterans treated with vancomycin.

Future research should identify which risk factors have the greatest impact on vancomycin-associated nephrotoxicity among Veterans.

REFERENCES


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