Vancomycin exhibits time-dependent bactericidal activity against gram-positive organisms in which the ratio of the area under the serum drug concentration time curve to the minimum inhibitory concentration ratio has been identified as the best parameter for measuring vancomycin efficacy. Many clinicians prefer the use of continuous vancomycin infusion (CVI) despite the fact that current guidelines do not recommend this method of administration, including guidelines for the therapeutic monitoring of vancomycin from the American Society of Health-System Pharmacists, the Infectious Diseases Society of America (IDSA), and the Society of Infectious Diseases Pharmacists, and the IDSA guidelines for the treatment of MRSA infections.

CVI therapy is used to maximize the time-dependent activity of vancomycin and to maintain steady-state serum vancomycin concentrations. Additionally, CVI may lower the risk of nephrotoxicity since steady-state concentrations may be achieved with lower daily doses than those needed to attain similar trough with intermittent vancomycin infusion (IVI). Although renal toxicity is rare with vancomycin, it is the adverse event of most concern.

Methods

Study Design and Setting

A retrospective observational study compared the efficacy and rate of nephrotoxicity associated with CVI as compared to IVI. The study enrolled all patients discharged from a local adult and a local children’s hospital who had gram-positive infections treated with vancomycin and who were admitted to this home infusion provider’s service during a two-year period from January 2011 through December 2012.

Patients

The study enrolled 47 patients treated with vancomycin.

- Nineteen patients were treated with CVI.
- Twenty-eight patients were treated with IVI.

Exclusion criteria: Pregnancy, history of chronic kidney disease, or currently receiving dialysis.

Primary Endpoints

The study’s primary endpoints were efficacy and rate of nephrotoxicity.

- Efficacy is defined as completion of therapy on the originally prescribed infusion method of vancomycin, no hospitalizations for worsening infection, and no restart of therapy within 60 days of discharge from home infusion service.

- Rate of nephrotoxicity is defined as an increase of 0.5 mg/dL or 50% or more from baseline serum creatinine (Scr) level in two consecutive tests, or a decrease in creatinine clearance (CrCl) to <50 mL/min or a decrease of >10 mL/min from a baseline CrCl of <50 mL/min.

Results

A total of 23 patients in the IVI group and 16 patients in the CVI group completed the study. Both groups had a similar efficacy rate.

- The CVI group had an efficacy rate of 56.3% (9/16).
- The IVI group had an efficacy rate of 56.5% (13/23).
- OR 0.989, 95% CI 0.273-3.581, p=1.00
- Neither group had any patients with nephrotoxicity.

A total of seven patients were lost to follow-up and therefore were not included in the results (three patients from the CVI group and four patients from the IVI group).

Conclusions and Recommendations

Our study found that the CVI and IVI groups had comparable efficacy results, as well as similar nephrotoxicity outcomes. These results suggest that CVI may be a viable alternative to IVI — the administration of CVI for gram-positive infections may be a logistically and pharmacodynamically convenient choice for patients as compared to IVI. The optimal dosing regimen of vancomycin warrants further investigation, and additional prospective, randomized, controlled trials are required to investigate efficacy, safety and dosing of CVI administration.