Evaluation of pharmacist intervention on Vancomycin dosing and nephrotoxicity prevention

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Introduction
Vancomycin is a glycopeptide antibiotic used to treat severe gram-positive infections due to organisms that are resistant to other antibiotics such as methicillin-resistant staphylococci and ampicillin-resistant enterococci. Vancomycin is bactericidal and exhibits time-dependent or concentration-independent bacterial killing. Many strains of enterococcus have high MIC values for vancomycin, and for these bacteria vancomycin may only demonstrate bacteriostatic properties. This study aims to evaluate the impact of pharmacist interventions on vancomycin dosing and nephrotoxicity prevention.

Material and methods
This was a comparative study which was performed in the Shariati Hospital between June 1 and September 30, 2016. 200 adult patients undergoing vancomycin therapy were included, half of patients received pharmacist intervention and half of patients received routine medical care without pharmacist involvement. However, the medical charts and laboratory data of patients receiving vancomycin were reviewed by a pharmacist. The pharmacists' interventions included: the initial dosage determination, therapeutic drug monitoring, and monitoring of kidney function. The two groups were compared to evaluate the outcome of pharmacist intervention.

Results
During the first monitoring period, a total of 200 patients were evaluated. The most common reason for vancomycin use was fibrile neutropenia and pneumonia (39.13%). In pharmacist intervention group, trough plasma concentration of vancomycin was measured in all patients, whereas in non-pharmacist intervention group the vancomycin level was checked only in 40% of patients. The percentage of trough concentrations which tightened within therapeutic range was significantly higher in pharmacist intervention group, 62 versus 41% (P < 0.05). The incidence of nephrotoxicity was significantly lower in pharmacist-intervention group, 28 versus 16% (P < 0.05).

Discussion
In our study we demonstrated that the pharmacist intervention in vancomycin dosing and therapeutic drug monitoring may improve drug efficacy and safety profile. Hamilton et al., Lipsky et al. and Tavakoli et al. had confirmed the effectiveness of pharmacist interventions on vancomycin prescribing and utilization, but they did not observed significant improvement in drug dosing and adverse effects. Therefore, it is necessary to evaluate the effects of pharmacist intervention on vancomycin dosing by performing more large studies.

Conclusion
Pharmacist intervention may improve optimal dosing of vancomycin and decrease the incidence of acute kidney injury concomitantly.

Key words
Vancomycin, TDM, pharmacist intervention