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NEPHROLOGY - LETTER TO THE EDITOR

Vancomycin dosing in patients undergoing maintenance hemodialysis

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Editor,

In recent years, increasing pathogen resistance for vancomycin has been observed. According to new recommendations, trough target levels for this drug should be between 15 and 20 μg/ml [1]. Concentrations lower than 10 μg/ml can cause therapeutic failure and bring about vancomycin resistance [2]. To achieve this target, an initial dose of 20–25 mg/kg actual body weight is recommended for all patients.

We examined 22 patients (5 female, 17 male), age 64.32 ± 12.2 years, being treated with hemodialysis for end-stage renal disease between 2011 and 2012. The study protocol was approved by the Ethics Committee of Military Institute of Medicine. All patients were treated using a low-flux dialyzer of varying sizes three times a week for 3–4 h. Vascular accesses were as follows: cuffed catheters (16 patients), noncuffed catheters (five patients) and arteriovenous fistula (one patient). Each patient received an initial dose of vancomycin 20 mg/kg actual dry body weight, rounded by 250 mg with an infusion rate 10 mg/min after dialysis session. Vancomycin trough levels were determined twice: 4 days after the initial dose and 4 days after the second dose. The second dose was related to plasma vancomycin concentration. If vancomycin concentration was at target level (15–20 μg/ml), the same dose was repeated. If concentration was lower than 15 μg/ml, the second dose was increased by 30 %. If vancomycin concentration exceeded 20 μg/ml, a reduced dose was administered. Fluorescence polarization immunoassay test (Axsym system, Abbott) was used to assess plasma vancomycin concentration.

The main reason for vancomycin administration was sepsis (20 patients, 90.9 %), in all cases related to catheter. The most frequent pathogen was methicillin resistant Staphylococcus aureus (13 patients, 72.2 %).

Mean trough vancomycin concentration after the initial dose was 13.26 ± 4.46 μg/ml. Mean vancomycin dose per actual body weight was 20.62 ± 2.35 mg/kg. Mean first total dose was 1,590.91 ± 342.98 mg. Six patients (27.2 %) achieved target trough levels of 15–20 μg/ml. Range 10–20 μg/ml achieved 72.7 % (16 patients). 15 patients (68.1 %) had trough levels below 15 μg/ml, among them six patients (27.2 %) had levels below 10 μg/ml. Only one patient had concentration above 20 (21.42 μg/ml).

After the second dose, the mean trough level of this drug was 20.73 ± 4.58 μg/ml. Mean vancomycin dose per actual body weight was 23.01 ± 10.11 mg/kg. Mean total second dose was 1,777.78 ± 351.85 mg. Nine patients (40.9 %) had trough levels of 15–20 μg/ml. Two patients had trough levels below 15 μg/ml, and no one fell below 10 μg/ml. Eleven patients (50 %) had concentration above 20 μg/ml, among them mean concentration was 23.42 μg/ml.

Initial vancomycin doses in hemodialysis patients should be based on actual body weight; however, one-third of patients do not reach the recommended trough level of 15–20 μg/ml. It seems reasonable that among certain patients higher doses could be used. Subsequent doses of the drug should be related to its serum concentration, type

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of membrane used in dialysis session and time of its administration. Vancomycin dosing protocol in hemodialysis patients requires further evaluation on larger groups of patients.

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References

1. Rybak MJ, Lomaestro BM, Rotscahfer JC et al (2009) Vancomycin therapeutic guidelines: a summary of consensus recommendations from the Infectious Diseases Society of America, the American Society of Health-System Pharmacists and the Society of Infectious Diseases Pharmacists. Clin Infect Dis 49:325–327
2. Howden BP, Ward PB, Charles PG et al (2004) Treatment outcomes for serious infection caused by methycillin-resistant Staphylococcus aureus with reduced vancomycin susceptibility. Clin Infect Dis 38:521–528