Abstract

Background

Vancomycin is used to treat Gram-positive bacteremia in hemodialysis patients. It is cleared mainly by renal excretion and it is a nephrotoxic drug. To achieve therapeutic concentration, to avoid toxicity, and to see how much its concentration is affected by the dialysis process, measurement of vancomycin trough and peak concentrations is thought important. Recent studies have documented an association between trough serum vancomycin concentration of < 10 mg/L and therapeutic failure, which could potentially promote the emergence of vancomycin .resistance

Aim

To measure serum vancomycin concentration before and after successive sessions of hemodialysis in patients with chronic kidney disease, and to correlate these concentrations with various risk factors, .in order to avoid therapeutic failure or toxicity

Methods

Patients attending Renal Dialysis Unit at Basra Teaching Hospital and receiving vancomycin were recruited for this study (patients with positive hepatitis were excluded). Doses of 500 mg or 1000 mg vancomycin were infused during the last 30 minutes of each dialysis session to compensate for the loss of vancomycin during dialysis. Vancomycin concentration was measured in three consecutive dialysis sessions, and immediately prior to the fourth one. Personal data, clinical findings, and laboratory investigations were recorded for each patient. Serum vancomycin concentration was measured using fluorescence .polarization immunoassay technique

Results

Trough vancomycin blood concentration in eleven patients receiving 500mg vancomycin during the last half hour of hemodialysis session twice weekly did

not reach the lower recommended concentration of 15 µg/ml in 90.5 % of the samples. Peak concentrations of more than 40 µg/ml were recorded in three patients. When patients were categorized into subgroups according to their age, gender, body mass index and creatinine clearance, differences between subgroups were not statistically significant; although, there is a trend towards higher concentration with increasing BMI. Trough vancomycin blood concentration in nine patients who received 500mg vancomycin in the last half hour of a hemodialysis session, three times a week did not reach the lower recommended concentration of 15 µg/ml in 78.9% of samples. There was a trend towards higher concentration with creatinine clearance of less than 10 ml/minutes. Since there were no statistically significant differences between the above-cited two groups, they were combined together (n=20). It was found that in 85% of collected samples, the trough concentrations were below 15 µg/ml, with no statistically significant correlation between variables such as age, gender, BMI and creatinine clearance. An extra three patients received one gram loading dose in the first session followed by 500 mg in the next sessions, trough serum concentration below 15 µg/ml was found in 50% of measured samples. All patients were carefully monitored for adverse effects of vancomycin. Red man syndrome and ototoxicity had not been detected or reported by these patients. Neutrophil counts and renal .function tests were not significantly affected by vancomycin treatment

Conclusion

It seems that administration of 500 mg of vancomycin two or three times a week is not enough to achieve the required trough concentration in most patients, and increasing the dose might be required. In presence of unpredictably high or low concentrations in some patients, routine therapeutic drug monitoring is thought .necessary