OPTIMISATION OF ERTAPENEM POSOLOGY IN A CRITICALLY ILL PATIENT BY THERAPEUTIC DRUG MONITORING: A CASE REPORT

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Background and Importance

Therapeutic drug monitoring (TDM) of ertapenem is recommended in critically ill patients (CIP) to address their variability in exposure because of its time-dependent, highly protein bound and hydrophilic characteristics.

Aim and objectives

To describe efficacy and safety in a CIP after optimising the posology of ertapenem.

Materials and methods

A case report in a CIP treated with ertapenem is described. Data were collected from electronic medical records and ertapenem concentrations were measured by high-performance liquid chromatography.

Results

Patient admitted with:

- BMI= 32.6 kg/m^2
- Creatinine = 0.21 mg/dL
- Glomerular filtration rate (GFR) = 700ml/min by the Cockroft-Gault formula
- Albumin = 2.9 mg/dL
- Surgical wound culture positive for **AmpC-producing Klebsiella pneumoniae**

Start **ertapenem 1g q24h** (ertapenem MIC of 0.38 for K.pneumoniae)

Peforming TDM of ertapenem was suggested by the pharmacist after 3 days of treatment.

Ertapenem serum concentrations= 1.65mcg/ml (total drug); 0.16mcg/ml of unbound fraction (fu), considering a protein binding of 90% (by Ulldemolins M. Clin Pharmacokinet. 2011;50(2):99-110).

Fu should be above the MIC, ideally 4 times the MIC (≥1.52 mcg/ml), and fever persisted, therefore in agreement with the medical team **the dosage was optimize to 0.5g q12h** considering its time-dependent pharmacokinetics.

Two days after posology optimization, the patient became afebrile, and 6 days after being with the new regimen, blood concentrations were measured again
resulting in 6.97mcg/mL, and a fu of 0.69 mcg/mL, which is 1.8 times the MIC

Despite not having reached fu of 4 times the MIC, given that the patient remained afebrile after dose optimization and to avoid reaching toxic concentrations due to an increase in the total daily dose, we recommended to maintain the 0.5g q12h dosage for another week, when the infection was solved and the antibiotic discontinued.

No **adverse effects** related to ertapenem were reported.

Conclusion and relevance

The optimization of ertapenem posology, changing the frequency without increasing the total daily dose, allowed increasing ertapenem concentrations and improved the clinical outcome of a CIP with augmented renal clearance, low albumin and high BMI, characteristics that may decrease ertapenem concentrations. No adverse effects were detected after adjustment of the dosing regimen.