Personalization of linezolid dosing regimen at a tertiary-care hospital setting: how much does it impact on drug exposure and therapy costs?

P.G. Cojutti, F. Pea, M. Baraldo

Institute of Clinical Pharmacology, Azienda Ospedaliero-Universitaria Santa Maria della Misericordia, Udine, Italy; Dept. of Experimental and Clinical Medical Sciences, University of Udine, Udine, Italy

Introduction

Therapeutic drug monitoring (TDM) was shown to be a valuable tool for drug dosage individualization. In order to impact on prescribing practices, TDM results should be interpreted on the basis of the patient's pathophysiological characteristics and co-medications. Clinical pharmacological advice (CPA) should be provided to the attending physician explaining how and why drug dosages should be modified.

TDM of linezolid, an anti-Gram positive antibiotic, has been recently advocated by different authors with the intent of minimizing the wide variability of plasma exposure, in terms of trough concentrations (C_{min}), observed when using standard dosages (600 mg every 12 hours).

The aim of this study was to assess the role of CPA based on TDM of linezolid in optimizing drug exposure in a large cohort of hospitalized adult patients and to evaluate its economic impact.

Methods

A one-year retrospective analysis (January 2014 - December 2014) of linezolid CPA for dosing adjustments was conducted in a tertiary-care hospital setting.

The effectiveness of the TDM-based approach was assessed by calculating the pre-post intervention rate of linezolid C_{min} within the desired range (2-7 mg/L), and the clinicians' adherence rate to the CPAs. Consumption and cost analyses were conducted by assessing the difference between the number of linezolid doses actually administered and the number of doses that the same patient would have theoretically received according to the standard regimen.

Results

544 CPAs for linezolid dose adjustments were provided to 168 patients in 2014. At first TDM, while patients were administered the fixed-dosing regimen, a high variability of linezolid C_{min} was observed (C_{min} min-max range: 0.18-54.3 mg/L) with only 51.2% of patients being in therapeutic range. The personalized approach yielded to 74.6% of C_{min} in therapeutic range in those patients who underwent five or more TDM assessments (+23.4%). Clinician's adherence rate to the CPAs was of 94.7%. Overall, linezolid dosage was mainly reduced (56.9% of cases), whereas dose augmentation were needed only in a minority of cases (7.7%).

A total of 1258 linezolid doses (unitary dose 600 mg) were spared thanks to the TDM-based CPA approach in 2014 with a final saving for the national health-care system of 60038,05 €.

Conclusion

Personalization of linezolid dosing regimen by means of active computerized CPAs based on TDM was effective both in improving linezolid exposure and in determining substantial cost saving.