

Optimising gentamicin single-daily dosing and conventional dosing regimens in adults orthopaedic patients: A retrospective study

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ABSTRACT

Introduction: Gentamicin is routinely prescribed as a single-daily dosing (SDD) or conventional dosing (CD). However, in our setting, the target concentrations are sometimes not attained. This study aimed to evaluate the adherence to gentamicin dosing recommendation, the serum concentrations achieved in various initial dosing regimens and to assess target attainment in the subsequent samples. **Methods:** In this retrospective study, all adult orthopaedic patients treated with gentamicin and performed therapeutic drug monitoring (TDM) from April 2018 to April 2022 at Miri Hospital were retrieved from the TDM Registry. Demographic data and steady-state gentamicin concentrations were extracted from the TDM request form, electronic laboratory database and Pharmacy Information System. Data were analysed using descriptive statistics and Pearson's chi-square. **Results:** Our study revealed that 47.1% and 77.5% of patients received initial SDD doses of less than 3mg/kg and MDD doses of lower than 1.5mg/kg/dose. About 47.1% and 75.8% achieved suboptimal gentamicin concentration in the respective initial samples. In patients with normal renal function, 12-hourly dosing provided the best probability of attaining targets, compared to 8-hourly dosing ($\chi^2=27.35(1)$, $P<0.001$). Analysis showed that 80.0% of the subsequent samples achieved targeted concentrations. **Conclusion:** This work revealed opportunities for improvement in gentamicin dose initiation practice to optimise target attainment in adult orthopaedic patients. The study highlighted that 12-hourly dosing is favourable in conventional regimens and the need to initiate doses of at least 1.5mg/kg/dose to aid rapid target achievement. Factors influencing the failure to achieve target concentrations in the subsequent samples warrant further evaluation.