Evaluation of the current dosage regimen of gentamicin and vancomycin in neonates and the treatment-associated risk of oto- and nephrotoxicity

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Abstract

The current tendency of aiming for gentamicin peak levels of up to 12 mg/L and the concern that with the currently used dosing regimen adequate peak levels are not achieved led to the initiation of this study. In adults oto- and nephrotoxicity are well-known side-effects of gentamicin and vancomycin, however, current literature points to a lower incidence in neonates. Since vancomycin is empirically used in combination with gentamicin, an enhanced toxic effect is of particular interest. Data on gentamicin and vancomycin peak and trough levels, patient demographics, serum creatinine levels after birth, after gentamicin treatment, and before discharge, and audiology outcome were collected retrospectively from existing databases. All patients that have received treatment with gentamicin or vancomycin within a two-year period were eligible for the study. The proportion of patients that have achieved the current gentamicin target peak range of 6-10 mg/L and the higher proposed target peak range of 8-12 mg/L and trough <2 mg/L with the current dosing regimen were identified. Similarly the efficacy of the empiric vancomycin regimen to achieve target trough levels of 10-20 mg/L and peak levels <40 mg/L was analysed. It was found that especially in the treatment of very preterm neonates the gentamicin target peak level was not achieved effectively, suggesting the use of a higher dose and adjusting the dosing interval accordingly. A higher incidence of ototoxicity was observed in premature, very low birth weight neonates that have received treatment with gentamicin and vancomycin for an extended period of time. However, due to the presence of confounding factors and the increased risk of hearing impairment in neonates born very prematurely, the causality of treatment and hearing impairment needs to be further investigated.

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