THERAPEUTIC DRUG MONITORING: A CASE REPORT OF ANTIBIOTIC-INDUCED OTOTOXICITY

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BACKGROUND: Amikacin (AMK) is an antibiotic indicated for the treatment of severe infections and presents a significant interindividual pharmacokinetic variability, carrying a significant risk of nephrotoxicity and ototoxicity. Ototoxicity, an adverse effect of several antibiotics, can significantly impact patient quality of life. It refers to drug-induced damage to the inner ear, which may result in irreversible hearing loss. This report describes the case of a patient who developed hearing impairment following treatment with AMK. **CASE PRESENTATION:** A 62-year-old male patient attended Santa Maria University Hospital to treat a necrotizing external malignant otitis at left ear. This patient did not present signs of hearing loss when admitted, even during clinical evaluations. He presented as comorbidities diabetes mellitus type II, high blood pressure, and chronic renal failure, with a serum creatinine of 8.35 mg/dL (CrCl estimated by Cockcroft-Gaut of 12.97 mL/min). Daily doses of 700 mg AMK administered once daily intravenously were prescribed as antibiotic treatment. After 8 days of AMK therapy, he presented symptoms of ototoxicity in right ear, as pain and hearing reduction. On the 10th day of therapy, blood samples were drawn to evaluate minimum (Ctrough) and maximum (Cpeak) AMK plasma concentrations at steady state as part of a Therapeutic drug monitoring (TDM) study. AMK plasma concentrations were quantified by LC-MS/MS. This patient presented a Ctrough of 37.1 µg/mL and Cpeak of 51.6 µg/mL. AMK presents a narrow therapeutic index, with Ctrough concentrations over 10 µg/mL correlated with higher risks of toxicity. AMK therapy was suspended after 35 days; however, the patient did not recover his hearing function, confirmed with audiometry tests. The study was approved by the Ethics Committee of UFSM (CAAE: 83200618.7.0000.5346). **DISCUSSION:** This case underscores the need for monitoring during AMK treatment, especially in high-risk populations. Continuous evaluation of clinical signs of adverse effects and toxicity should be closely monitored. TDM may help to optimize the results of AMK treatment, maintaining adequate exposure over time by adequate dosage adjustments, preventing overexposure and toxicity risks, being highly recommended. Indeed, audiometry should be performed, especially in special populations such as the elderly and patients with kidney disease.

Keywords: Therapeutic Drug Monitoring. Ototoxicity. Antibiotics.