Pre-Dialytic Aminoglycosides:
Back to Basics – A Case Report

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OBJECTIVE:

To report successful use of amikacin for pulmonary nocardiosis in a patient on haemodialysis.

CLINICAL FEATURES:

A 52 year old Caucasian male was admitted to hospital with pulmonary *Nocardia farinica* infection. At the time of treatment he required three times weekly haemodialysis and was immunosuppressed. He developed pancytopenia with first-line medications and subsequently started oral ciprofloxacin and IV amikacin according to sensitivities. He received close monitoring for signs of toxicity and improvement.

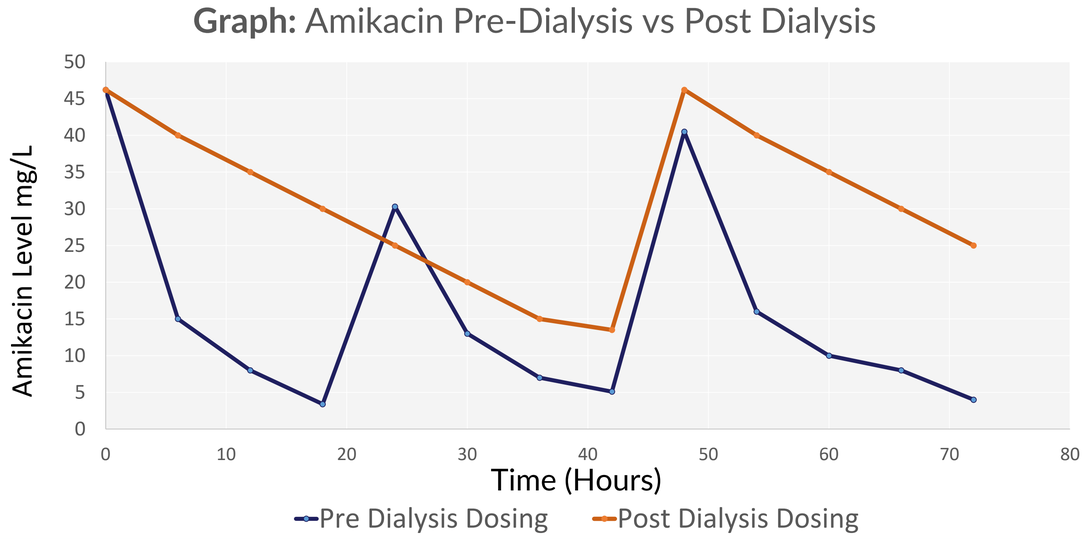
LITERATURE REVIEW:

Current guidelines for the dosing of amikacin in haemodialysis recommend to administer post dialysis. Aminoglycosides exhibit concentration-dependent bactericidal activity; high trough levels do not correlate with efficacy and may expose the patient to unnecessary toxicity. Troughs above 8mg/L are associated with higher risk of adverse effects; irreversible side effects such as ototoxicity and vestibular toxicity are associated with prolonged exposure to toxic trough levels.

PHARMACIST INTERVENTIONS:

After one dose of 'post-dialysis' amikacin the patient had a trough concentration of 13.5mg/L; he was exposed to this toxic trough for 48 hours before the amikacin concentration was reduced by dialysis. To minimise toxicity, administration was changed to one hour before dialysis as per pharmacist recommendation.

Graph: Amikacin Pre-Dialysis vs Post Dialysis



CASE PROGRESS:

With this regimen trough concentrations ranged from 3.4 – 5.1mg/L with therapeutic peaks (30.3 – 46.2mg/L). At two months of IV amikacin the patient showed radiological evidence of improvement, and at completion of 12 months therapy showed no signs of active disease. No signs of toxicity were observed throughout treatment.

Figure 1: CT chest prior to treatment

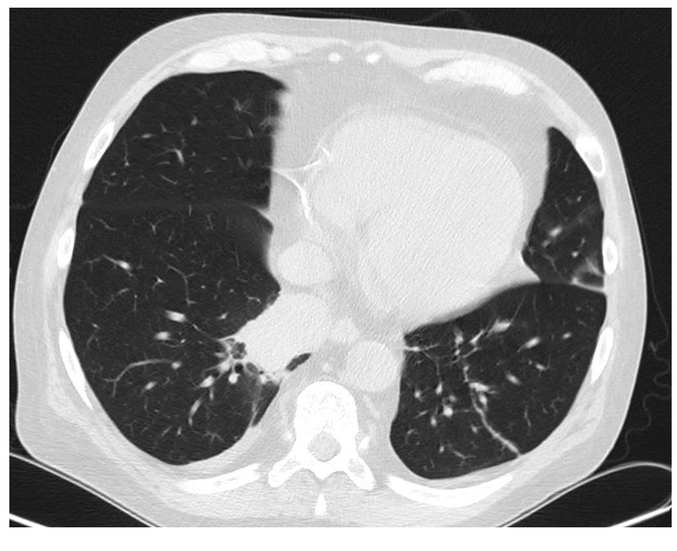
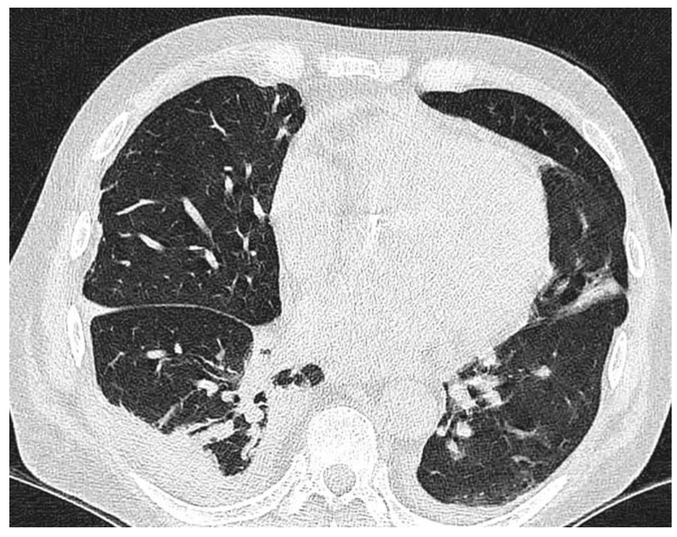


Figure 2: CT chest two months into treatment



CONCLUSION:

Optimal aminoglycoside dosing is imperative for maximising outcomes. Current recommendations in haemodialysis may not optimise the pharmacokinetic properties of aminoglycosides. Pre-dialysis dosing achieved adequate peak levels and favourable trough levels, reducing exposure to amikacin toxicity. This case provides evidence for more favourable dosing of amikacin for patients on haemodialysis and highlights the need to revise the current guidelines.

References:
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