Amikacin: a landscape survey of prescribing, Therapeutic Drug Monitoring and toxicity monitoring requirements in locally approved guidelines

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Background

All systemically administered aminoglycosides have a narrow therapeutic window and there is wide variability in the relationship between the dose and the measured plasma level. Consequently, over the last forty years, dose individualisation and therapeutic drug monitoring (TDM) have been integral to the management of patients treated with aminoglycosides.

One of the frequently monitored aminoglycosides for which there is a pressing need for clear guidance is amikacin. Following an extensive literature search and review, insufficient published data was identified to support evidence-based guidelines.

In order to inform expert opinion guidance, a landscape survey of British Society for Antimicrobial Chemotherapy (BSAC) members was undertaken to document locally approved guidelines for amikacin use.

Material/methods

An internet-based survey requesting information on the use of amikacin for non-TB indications was sent to all 650 BSAC members via e-mail.

Results

Eighty-eight responses to the survey were received from 85 unique locations, 73 of which were completed in full. In 15 surveys, not all questions posed were answered. Four responses were received from outside the UK.

Guidelines
48/87 respondents reported having local guidelines recommending amikacin use however, four did not have guidelines to support dosing or monitoring. 39/87 respondents stated that they did not have a local guideline for amikacin use, however, 34 of these respondents reported using amikacin.

Dose Calculation
35/36 respondents based the amikacin starting dose on the patient's weight and 30/30 started with 15 mg/kg/day. Of the 34 respondents who had guidelines for dosing in obesity, the majority (22) used adjusted body weight [ideal body weight (IBW) + (40% of total body weight – IBW)], while 8 used IBW. One response was received for each of 'actual body weight' and 'up to IBW +20%' whilst the remaining three responses did not specify the formula used.

Therapeutic Drug Monitoring (TDM)
35/36 stated that TDM is recommended in their guideline. Of these, 25 responded that trough levels only are used whilst ten stated that peaks and troughs are measured. Target troughs were ≤ 2 mg/L or ≤5 mg/L for once daily dosing (n = 6) and ≤ 5 mg/L or ≤10 mg/L for twice daily dosing (n = 6). The minimum peak ranged from 20 to 50 mg/L for once daily dosing (n=5) and was 30 mg/L for twice daily dosing (n=6).

Additional Monitoring
Of 35 respondents, 10 recommended auditory testing, 7 vestibular testing and 25 renal function or creatinine monitoring.

Conclusions

This survey shows that many organisations are using amikacin in the absence of locally approved guidance. There were variations in methods used to dose amikacin, TDM targets and monitor toxicity. Development of an expert opinion based guideline is required to optimise patient therapeutic outcomes and minimise toxicities.

The British Society for Antimicrobial Chemotherapy