

AMIKACIN PEAK LOADING IN OBESE PATIENTS: APPLICATION OF ADJUSTED BODY WEIGHT FORMULA WITH MODERN POSOLOGIES. ARE 30 MG/KG ENOUGH? **eP010**

C. Lu¹, M. Meddour², N. Van Grunderbeeck², M. Nyunga³, M. Boyer-Besseyre⁴, J. Gois⁵, E. Parmentier-Decrucq⁶, J. Mallat², D. Thevenin², N. Lemaire¹
¹Pharmacy, CH Lens, Lens, France ²ICU, CH Lens, Lens, France ³ICU, CH Roubaix, Roubaix, France ⁴Surgical ICU, CHRU Lille, Lille, France
⁵ICU, CH Tourcoing, Tourcoing, France ⁶ICU, CHRU Lille, Lille, France

Introduction

Obesity is a risk factor for under- and overdosing of antibiotics, that can lead to loss of efficacy, resistance of pathogens, or toxicity. Amikacin (AMK) is a frequently used aminoglycoside in cases of severe Gram-negative bacilli infections. Its efficacy depends mainly on peak concentration (C_{peak}), that should superate 8 times the MIC for the first doses during the first 48 hours, to guarantee maximal efficacy. .
 Posologies have been upgraded in the last years to reach this target, but few data about amikacin peak loading in obese patients are reported so far. It is recommended that the dosing in obese patients should be calculated following the **Adjusted Body Weight formula: ABW = IBW +0,4 x (TBW - IBW)**. IBW = Ideal Body Weight, TBW = Total (observed) Body Weight.
 Some authors suggest a 30mg/kg dose of Total Body Weight in critically ill patients but no study has focused on obese patients.
 The aim of the study was **to evaluate amikacin peak loading in obese patients, and to determine if the ABW formula with current french guidelines posologies (25-30mg/kg of observed body weight) can provide sufficient peak concentrations (>64mg/l)**.

Materials and Methods

An Excel[®] calculator was developed to determine posologies for obese patients, following the ABW formula¹. A prospective multicentric study was conducted with following inclusion criteria: Patients > 18 years old, Body Mass Index (BMI) >30 kg/m², treatment by AMK. Informed consent was required from each patient or a legally authorized representative to participate in the study, after approval from the local ethic committee. C_{peak} was measured 30 minutes after the end of a 30 minutes controlled infusion. Correlation (Spearman test) was searched between C_{peak} and dose in mg/kg of TBW, BMI, SOFA and APACHE 2 scores. A chi2 test was performed to compare patients treated with dose <30mg/kg to those with dose >30mg/kg on the C_{peak}>64mg/l criteria. Statistical analysis was performed with SPSS[™] software.

HEIGHT (cm)		170		Enter height and weight of your patient	Body Mass Index (BMI) $BMI = TBW / (Height (m))^2$ 41,52 TBW = Total Body Weight Ideal Body Weight (IBW) $PIT = X + 0,91 (Height (cm) - 152,4)$ $X (Woman) = 45,5 ; X (Man) = 50$ Estimated Adjusted Body Weight (AJBW) = $PIT + (FC \times (PCT - PIT))$ FC (Correction Factor)
Total Body Weight (kg)		120			
		MAN	WOMAN	Ideal Body Weight and corrected weight are automatically calculated and are reported in the other spreadsheets for clinical settings	
Ideal Body Weight (IBW) (kg)	correction factor 0,4 (aminosides)	65,0	61,5		
Estimated Adjusted Body Weight (AJBW) (kg)	correction factor 0,3 (beta-lactams)	82,2	79,1		

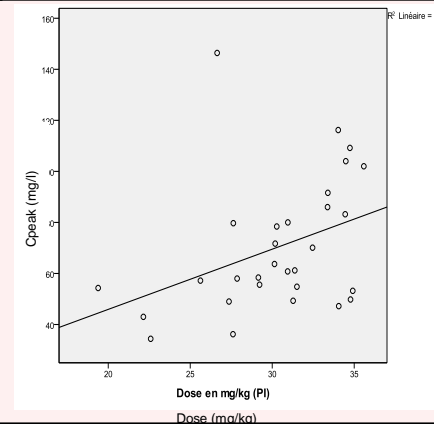
AMINOGLYCOSIDE													Calculator		
Amikacin			Gentamicin			Tobramycin									
usual dose (mg/day)	15	20	25	30	5	6	7	8	3	4	5	6	7	8	
Adjustment formula	Adjusted Body Weight (correction factor 0,4)														
RECOMMENDED DOSE IN MEN (mg/d)	1 314	1 752	2 190	2 628	438	526	613	701	263	350	438	526	613	701	
RECOMMENDED DOSE IN WOMEN (mg/d)	1 274	1 698	2 123	2 547	425	509	594	679	255	340	425	509	594	679	

C_{peak} was measured 30 minutes after the end of a 30 minutes controlled infusion

Results

38 patients were included : 21 men and 17 women

	Mean	Min	Max
Age	63,2	23	82
BMI (kg/m ²)	37,6	30,5	61,6
AMK posology (mg/kg)	30,2	19,4	35,6
SOFA score	7,25	1	16
APACHE 2 score	22,3	5	38



Mean C_{peak} was 71.9 mg/L mg/L but only **50 % of patients reached 64 mg/L**.

Statistical analysis :

A correlation was found between ABW dose in mg/kg and C_{peak} (p=0,002), but none between C_{peak} and BMI, SOFA and APACHE 2 scores (p=0,5, p=0,8, p=0,3 respectively).

Patients treated with an ABW dose >30mg/kg were statistically different from those treated with an ABW dose <30mg/kg to achieve a C_{peak} >64mg/l (p=0,007).

Conclusions

Amikacin posologies keep evolving according to PK/PD knowledge. To obtain a C_{peak} supering an 8 MIC ratio (64mg/l) for *Pseudomonas aeruginosa* and *Enterobacteriaceae* in obese patients, **a dose >30mg/kg using the ABW formula could be necessary.**

References

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