WHICH MODEL TO ESTIMATE AT BEST THE THEORETICAL OSMOLARITY OF NOMINATIVE PARENTERAL NUTRITION?

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BACKGROUND

Nominative parenteral nutritions (NPN) compounded at the pharmacy are submitted to several pharmaceutical controls, including osmolarity

Measured osmolarity > 1453 mosmol/L

Theoretical osmolarity is determined using Pereira Da Silva equation[1] (PDS)

Measured osmolarity ≤ 1453 mosmol/L

Theoretical osmolarity is determined using the manufacturer data

Osmolarity control is associated to a nonconformity rate of 8,9%

AIM

To decrease the osmolarity nonconformity rate by determining the best suited formula to calculate the theoretical osmolarity

MATERIALS AND METHODS

Retrospective analysis of the NPN osmolarity values on the last 27 months production

NPN divided into 7 ranges according to their measured osmolarity

Comparison of the Mean Relative Errors (MRE) between the theoretical osmolarities calculated with the PDS and MD equations and the measured osmolarity using a Student test

RESULTS

N=2572 NPN analyzed

Osmolarity (mosmol/L)	500-749	750-999	1000-1249	1250-1499	1500-1749	1750-1999	2000+
%	1,7%	19,6%	25,5%	18,4%	15,5%	15,3%	4,0%
	p=0,99	p=1	p=0,027	$p=6,5x10^{-45}$	$p=2,4x10^{-12}$	$p=2,05x10^{-129}$	$p=1,66x10^{-36}$

Similar MREs with PDS and MD equations

Significant difference in MREs in favor of the PDS equation

CONCLUSION AND RELEVANCE

From 500 to 999 mosmol/L

Both PDS and MD equations can be used to estimate NPN theoretical osmolarities

From 1000 mosmol/L to over 2000

mosmol/L, PDS equation is more accurate to estimate NPN theoretical osmolarities

The actual theoretical osmolarity calculation method should be revised in favor of the MD equation for NPN with osmolarities under 1000 mosmol/L and PDS equation for NPN with osmolarities over 1000 mosmol/L

References

1. L. Pereira-da-Silva. A Simple Equation to Estimate the Osmolarity of Neonatal Parenteral Nutrition Solutions. *Journal of Parenteral and Enteral Nutrition*, *28*(1), 34-37.