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

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Nominative parenteral nutrition (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 (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.

BACKGROUND
Nominative parenteral nutrition solutions (NPN) compounded at the pharmacy are submitted to several pharmaceutical controls, including osmolarity. Measured osmolarity ≤ 1453 mosmol/L is associated to a nonconformity rate of 8.9%. Theoretical osmolarity is determined using Pereira Da Silva equation (PDS) for measured osmolarity > 1453 mosmol/L and using manufacturer data for measured osmolarity ≤ 1453 mosmol/L.

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

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

<table>
<thead>
<tr>
<th>Osmolarity (mosmol/L)</th>
<th>N=2572 NPN analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-749</td>
<td>1,7%</td>
</tr>
<tr>
<td>750-999</td>
<td>19,6%</td>
</tr>
<tr>
<td>1000-1249</td>
<td>25,5%</td>
</tr>
<tr>
<td>1250-1499</td>
<td>18,4%</td>
</tr>
<tr>
<td>1500-1749</td>
<td>15,5%</td>
</tr>
<tr>
<td>1750-1999</td>
<td>15,3%</td>
</tr>
<tr>
<td>2000+</td>
<td>4,0%</td>
</tr>
</tbody>
</table>

Similar MREs with PDS and MD equations.

Significant difference in MREs in favor of the PDS equation.

From 500 to 999 mosmol/L
Both PDS and MD equations can be used to estimate NPN theoretical osmolaries.

From 1000 mosmol/L to over 2000 mosmol/L
PDS equation is more accurate to estimate NPN theoretical osmolaries.

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

REFERENCES