Evaluation of the quality of the parenteral nutrition prepared at the neonatal unit

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Background

Parenteral nutrition (PN) is crucial for hospitalized premature infants. The quality of the preparations has a direct impact on the patient’s safety. In our hospital, individualized PN bags for preterm infants are prepared until now partially in the central pharmacy (~2500 per year) and partially at the neonatal unit (~6000 per year).

Purpose

Evaluation of the physicochemical and microbiological quality of the bags prepared on the ward.

Material and Methods

1. Test for bacterial endotoxin by kinetic coloration of LAL (limulus amebocyte lysate)
2. Test for sterility according to Ph.Eur.(2.6.1)
3. Assay of electrolytes (K\textsuperscript{+}, Na\textsuperscript{+}, Ca\textsuperscript{2+}, Mg\textsuperscript{2+}) by capillary electrophoresis and glucose by UV (enzymatic method of hexokinase)¹

Results

No perfusion among the 110 PN tested contained endotoxins (limit: 2.25 EU/ml). All 78 PN tested were sterile.

34\% (37 PN) were not conform to their medical prescription (90\% - 110\%).

14\% (15 PN) from these 34\% were not acceptable from a clinical perspective.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of analysis</th>
<th>Mean value</th>
<th>± SD</th>
<th>Range measured</th>
<th>Internal Acceptable Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>K\textsuperscript{+}</td>
<td>34/110</td>
<td>97.2%</td>
<td>± 8.0%</td>
<td>75-113%</td>
<td>85-110%</td>
</tr>
<tr>
<td>Na\textsuperscript{+}</td>
<td>14/110</td>
<td>99.4%</td>
<td>± 11.7%</td>
<td>85-115%</td>
<td>85-115%</td>
</tr>
<tr>
<td>Ca\textsuperscript{2+}</td>
<td>66/110</td>
<td>97.5%</td>
<td>± 13.7%</td>
<td>71-164%</td>
<td>81-120%</td>
</tr>
<tr>
<td>Mg\textsuperscript{2+}</td>
<td>4/110</td>
<td>95.8%</td>
<td>± 4.5%</td>
<td>92-102%</td>
<td>81-120%</td>
</tr>
<tr>
<td>Glucose</td>
<td>110/110</td>
<td>96.3%</td>
<td>± 8.6%</td>
<td>60-137%</td>
<td>85-120%</td>
</tr>
</tbody>
</table>

Conclusions

- PN bags compounded by nurses of the neonatal unit were quite frequently not accurate on electrolyte or glucose concentrations (14\% ≈ 840 bags per year)
- PN bags were sterile and nonpyrogenic
- The preparation of PN bags at the pharmacy with physicochemical controls before administration seems unavoidable

References


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No conflict of interest