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

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) 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>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\% \approx 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