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Introduction

Maintaining blood glucose levels between 80 and 110 mg/dL in ICU patients lowers morbidity and mortality (1). This Tight Glucose Control (TGC) recommendation brought high interest on point-of-care glucometers that are required to titrate the insulin infusion. To achieve accuracy in this population, the use of glucometers included in blood gas analysers is advocated (2). We conducted a clinical evaluation of the Nova Biomedical StatStrip®, a glucometer that eliminates interference, particularly oxygen and hematocrit (3), with a blood gas analyser (RapidLab 1265) and the reference method in the laboratory.

Materials and methods

In this prospective observational study, arterial blood glucose was simultaneously measured with RapidLab 1265 (blood gas analyzer), the StatStrip® Nova Biomedical and in the central laboratory as reference using the hexokinase method. Linear correlations, Bland-Altman and the Kanji (2) and a modified Kanji approaches were used to evaluate the accuracy.

Results

A total of 370 matched analysis were randomly performed in 315 patients admitted in an adult intensive care unit (surgical, medical and acute cardiac care). Mean SOFA score was 4.5 (min : 0; max : 22). The range of the reference method for glucose was 34 - 526 mg/dL. One patient had 1025 mg/dl and was not included in statistical analysis as the glucometer indicated an high out-of-range value. Linear correlations were very good for both glucometers as the Pearson R² was 0.9807 for the RapidLab 1265 and 0.9822 for the StatStrip® Nova Biomedical. Biases were defined as point-of-care minus laboratory glucose values. These mean biases were -3.1 mg/dL for the RapidLab 1265 blood gas analyzer and -0.4 mg/dL for the StatStrip® Nova Biomedical. The analysis of the 20% discrepancy (Kanji’s Approach) showed 1 case for each POC glucometer in the study of 369 that is out of the target. The 10% discrepancy reveals 24 (6.5%) and 25 (6.8%) cases out of this thinner target, as reported in table 1. Chi-Square test showed no statistical difference between this two proportions.

<table>
<thead>
<tr>
<th>Point-of-care method</th>
<th>number of comparisons</th>
<th>Bias (mg/dL)</th>
<th>SD</th>
<th>number of &gt; 10 % discrepancies</th>
<th>number of &gt; 20 % discrepancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>RapidLab 1265</td>
<td>369</td>
<td>-3.1</td>
<td>10</td>
<td>25 (6.8%)</td>
<td>1 (0.3%)</td>
</tr>
<tr>
<td>Novabiomedical StatStrip®</td>
<td>369</td>
<td>-0.4</td>
<td>8</td>
<td>24 (6.5%)</td>
<td>1 (0.3%)</td>
</tr>
</tbody>
</table>
Conclusions

The very low biases (0.4 mg), the very low rate of significant (> 20%) discrepancy (0.3%) appear sufficient for safe tight glucose monitoring in adult ICU with StatStrip NovaBiomedical.

References: