Evaluation of the impact of protein intake on postprandial glycemia in adults with type 1 Diabetes Mellitus with functional insulin therapy

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Introduction

In patients with type 1 Diabetes Mellitus (T1D), protein intake appears to contribute to increased post-prandial blood glucose(1–3).

Aim

To evaluate the effect of protein supplementation on capillary glucose in individuals with T1D.

Methodology

Three moments of evaluation and two phases of study:

1st Evaluation

- Recruitment;
- Collection of sociodemographic, clinical and analytical data;
- Anthropometric assessment and body composition;
- Food history.

Phase 1 (3 consecutive days - control)

- Filled food diaries with food weighting;
- Registered physical exercise;
- Recorded capillary glucose levels and insulin administered at predetermined moments (before each meal and hourly after lunch and after dinner);
- At day 3, the Urinary Urea Nitrogen (UUN) was assessed by 24h urine specimens' collection.

For each individual, the amount supplemented was its average protein intake at lunch in phase 1.

2nd Evaluation

- International physical activity questionnaire (iPAQ);
- UUN evaluation and nutrition composition from the food diaries (using The Food Processor Nutrition Analysis software).
- Calculation * of the protein to be supplemented (powdered egg white).

Phase 2 (3 consecutive days - intervention)

- Equal days to those of phase 1, regarding food intake, insulin administration and physical activity;
- Addition of the protein supplements (24.9g to 45.1g) dissolved in water distributed 30% at breakfast and 70% at lunch;
- Data collection was similar to phase 1.

3rd Evaluation

- Methodology was similar to 2nd evaluation.

Results

Global analysis

<table>
<thead>
<tr>
<th>Capillary glucose (mg/dL)</th>
<th>Bolus (u/dia)</th>
<th>Score (capillary glucose and bolus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 Mean (sd)</td>
<td>129 (37)</td>
<td>15.7 (9.6)</td>
</tr>
<tr>
<td>Phase 2 Mean (sd)</td>
<td>135 (46)</td>
<td>15.7 (8.1)</td>
</tr>
<tr>
<td>p</td>
<td>0.296a</td>
<td>0.894w</td>
</tr>
<tr>
<td>Correlation (p)</td>
<td>0.046 (0.570)</td>
<td>0.973 (&lt;0.001)</td>
</tr>
<tr>
<td>RMSD</td>
<td>58</td>
<td>-</td>
</tr>
</tbody>
</table>

*: Student test; w: Pearson correlation; w: Wilcoxon test; *: Spearman correlation

Individual analysis: Phase 2 – Phase 1 capillary glucose (mg/dL)

For all group A participants, the UUN recorded in phase 2 was higher than that of phase 1, but discrepancies were found between the amount of protein supplied and the increase estimated by the UUN.

Final considerations

In line with other studies, for some participants, in phase 2, protein supplementation was reflected in significant increases in capillary glycemia(1–2). Thus, calculating the amount of rapid-acting prandial insulin to be administered considering only carbohydrates may not be sufficient, at least for some individuals(3).

References
