Impact of fasting and postprandial glycemias on overall glycemic control
Importance of postprandial glycemias to achieve target HbA1c levels

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Introduction
HbA1c levels reflect overall glycemic exposure over the past 2-3 months and are determined by both fasting and postprandial plasma glucose concentrations.

Cross sectional studies suggest that attainment of HbA1c goals require specific targeting of postprandial hyperglycemia.

We therefore undertook a prospective intervention trial to assess the relative contribution of controlling fasting and postprandial hyperglycemia in T2DM in achieving recommended HbA1c goals.

Methods

N: 164
Age (years): 62.4 ± 0.9 d
Gender: 90 men / 74 women
BMI: 28.8 ± 0.6
Diabetes duration (years): 8.4 ± 0.6

Before intervention and after three months patients were asked to measure a seven-point diurnal blood glucose profile and HbA1c levels were obtained. Subjects participated in a one week intensified training program for lifestyle intervention.

- reduction in calorie intake
- avoidance of rapidly absorbed carbohydrates
- avoidance of high fat and high protein consumption
- importance of physical activity
- to eat 3 meals/day

Goal of therapy: FPG<110 and PP PG<150 mg/dl

Therapeutic Approach:
- FPG >110 but <154 mg/dl => metformin
- On metformin and FPG >110 mg/dl => sulfonylurea
- On metformin plus sulfonylurea and goals were not achieved => NPH insulin at bedtime (titrated to target), sulfonylurea were discontinued
- FPG initially >154 mg/dl => NPH + metformin, other OAD’s were discontinued
- Once at FPG goal, PP PG >154 mg/dl => repaglinide (prior to the meal)
- If goals were not achieved repaglinide was stopped => short-acting insulin
All patients were seen at least once a week initially and at three months thereafter.

Results

Effects of intensified treatment regimens (N=164)

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c (%)</td>
<td>8.7 ± 1</td>
<td>6.5 ± 1</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>FPG (mg/dl)</td>
<td>174 ± 4</td>
<td>117 ± 2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Post breakfast (mg/dl)</td>
<td>233 ± 6</td>
<td>159 ± 3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Pre lunch (mg/dl)</td>
<td>170 ± 6</td>
<td>116 ± 2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Post lunch (mg/dl)</td>
<td>213 ± 5</td>
<td>155 ± 4</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Pre dinner (mg/dl)</td>
<td>176 ± 5</td>
<td>133 ± 4</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Post dinner (mg/dl)</td>
<td>227 ± 6</td>
<td>164 ± 4</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Bedtime (mg/dl)</td>
<td>201 ± 5</td>
<td>143 ± 3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Average postmeal (mg/dl)</td>
<td>224 ± 4</td>
<td>159 ± 3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Daylong (mg/dl)</td>
<td>199 ± 4</td>
<td>141 ± 2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>84.0 ± 1.4</td>
<td>82.9 ± 1.5</td>
<td>&lt; 0.36</td>
</tr>
</tbody>
</table>

Conclusions

- good glycemic control can be achieved in middle aged otherwise healthy patients with type 2 diabetes without concomitant weight gain or severe hypoglycemia
- both fasting and postprandial hyperglycemia need to be targeted
- postprandial glycemias contributes more than fasting glycaemia to HbA1c as HbA1c levels decrease
- control of postprandial glycemias is essential for obtaining HbA1c goals of <7%

Note
The current study has been specifically cited by the current International Diabetes Federation guidelines (IDF) on the importance of postprandial glucose control to achieve HbA1c goals.