

A Single-Center, Open, Comparative Study of the Effect of Using Self-Monitoring of Blood Glucose to Guide Therapy on Preclinical Atherosclerotic Markers in Type 2 Diabetic Subjects

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Abstract

Background:

The aim of our study was to determine the effect of treatment based on preprandial and postprandial self-monitoring of blood glucose (SMBG) on the progression of carotid intima-medial thickness (CIMT) in noninsulin-treated type 2 diabetes mellitus (T2DM) subjects.

Methods:

In this 18-month prospective trial, we recruited subjects 18–70 years of age, treated with metformin and sulfonylurea, with a standardized hemoglobin A1c (HbA1c) level $\leq 9.0\%$. Subjects were randomized to use of fasting/preprandial (FP) SMBG results to adjust evening medication or use of postprandial (PP) SMBG results to adjust morning medication. The primary end point was change in CIMT; change in HbA1c was a secondary end point.

Results:

Of the 300 subjects randomized, 280 (140 in each group) completed all biochemical tests and CIMT analysis. Carotid intima-medial thickness was reduced significantly in PP subjects from 0.78 (± 0.15) mm to 0.73 (± 0.14) mm ($p < 0.005$), but no significant CIMT reduction was seen in FP subjects. A significant reduction in HbA1c was also seen in the PP group ($p < 0.005$) but not in the FP group 1 ($p = 0.165$). Significant improvements in body mass index ($p = 0.038$), waist circumference ($p < 0.001$), systolic blood pressure ($p = 0.008$), and serum cholesterol ($p = 0.02$) were also seen in PP subjects but not in FP subjects.

Conclusion:

Use of postprandial SMBG data to adjust therapy was associated with a significant regression of carotid intima-medial thickening and a reduction in HbA1c in T2DM, whereas no significant improvement in these parameters was seen in subjects who used fasting/preprandial SMBG data for therapy adjustment.

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Abbreviations: (BG) blood glucose, (BMI) body mass index, (CAD) coronary artery disease, (CIMT) carotid intima-medial thickness, (ECG) electrocardiogram, (FP) fasting/preprandial, (HbA1c) hemoglobin A1c, (HPLC) high-performance liquid chromatography, (PP) postprandial, (SECURE) Study to Evaluate Carotid Ultrasound Changes in Patients Treated with Ramipril and Vitamin E, (SMBG) self-monitoring of blood glucose, (T2DM) type 2 diabetes mellitus

Keywords: carotid intima-medial thickness, diabetes, postprandial, preprandial, self-monitoring

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