

Continuous Glucose Profiles in Healthy Subjects under Everyday Life Conditions and after Different Meals

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Abstract

Background:

This study investigated continuous glucose profiles in nondiabetic subjects.

Methods:

Continuous interstitial glucose measurement was performed under everyday life conditions (2 days) and after ingestion of four meals with standardized carbohydrate content (50 grams), but with different types of carbohydrates and variable protein and fat content. Twenty-four healthy volunteers (12 female, 12 male, age 27.1 ± 3.6 years) participated in the study. Each subject wore two microdialysis devices (SCGM1, Roche Diagnostics) simultaneously.

Results:

The mean 24-hour interstitial glucose concentration under everyday life conditions was 89.3 ± 6.2 mg/dl (mean \pm SD, $n = 21$), and mean interstitial glucose concentrations at daytime and during the night were 93.0 ± 7.0 and 81.8 ± 6.3 mg/dl, respectively. The highest postprandial glucose concentrations were observed after breakfast: 132.3 ± 16.7 mg/dl (range 101–168 mg/dl); peak concentrations after lunch and dinner were 118.2 ± 13.4 and 123.0 ± 16.9 mg/dl, respectively. Mean time to peak glucose concentration was between 46 and 50 minutes. After ingestion of standardized meals with fast absorption characteristics, peak interstitial glucose concentrations were 133.2 ± 14.4 and 137.2 ± 21.1 mg/dl, respectively. Meals with a higher fiber, protein, and fat content induced a smaller increase and a slower decrease of postprandial glucose concentrations with peak values of 99.2 ± 10.5 and 122.1 ± 20.4 mg/dl, respectively.

Conclusions:

This study provided continuous glucose profiles in nondiabetic subjects and demonstrated that differences in meal composition are reflected in postprandial interstitial glucose concentrations. Regarding the increasing application of continuous glucose monitoring in diabetic patients, these data suggest that detailed information about the ingested meals is important for adequate interpretation of postprandial glucose profiles.

J Diabetes Sci Technol 2007;1(5):695-703

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Abbreviations: (AUC) area under the curve, (BG) blood glucose, (BMI) body mass index, (IG) interstitial glucose, (SD) standard deviation, (SEM) standard error of the mean

Keywords: continuous glucose monitoring, continuous glucose profiles, healthy subjects, interstitial fluid glucose, postprandial glucose

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