Journal of Diabetes Science and Technology
Volume 2, Issue 6, November 2008

ORIGINAL ARTICLES

Group of Signs: A New Method to Evaluate Glycemic Variability

Francesco Zaccardi, M.D.,[1] Paola Di Stefano,[2] Elena Busetto,[2] Marco Orsini Federici, M.D.,[2] Andrea Manto, M.D.,[1] Fabio Infusino, M.D.,[3] Gaetano Antonio Lanza, M.D.,[3] Dario Pitocco, M.D.,[1] and Giovanni Ghirlanda, M.D.[1]

Abstract

Background:

Glycemic variability is an important parameter used to resolve potential clinical problems in diabetic patients. It is known that glycemic variability generates oxidative stress and potentially contributes to the development of macro- and microvascular complications in diabetes. By controlling glycemic variability, it is possible to reduce these complications and to set the therapy for all patients with diabetes. The aims of this study were to (1) propose a new standardized, objective, and flexible approach to measure glycemic variability by a continuous glucose monitoring system (CGMS)—the group of signs (GOS) method; (2) compare the correlation between mean amplitude of glucose excursion (MAGE), a well-known index of glycemic variability calculated by the physician and the MAGE defined with the GOS method, in order to validate the GOS; and (3) suggest new indexes of glycemic variability.

Methods:

We tested the GOS algorithm on data collected by a CGMS every 5 minutes for 24 hours on 50 patients. Consequently, for 8 patients we calculated and compared the physician's MAGE in the standard way and by the GOS method.

Results:

Comparison between the two methods has shown high correlations, from a minimum correlation of 86% to a maximum of 98%, with p values <0.01 (Pearson test).

Conclusions:

Preliminary data suggest that the proposed algorithm is a valid, efficient, and reliable method able to calculate the standard MAGE on CGMS data systematically and to create other alternative glycemic variability indexes.

J Diabetes Sci Technol 2008;2(6):1061-1065

Author Affiliations: [1]Internal Medicine Institute, Catholic University, Rome, Italy; [2]Medtronic Italia, Milan, Italy; and [3]Cardiology Institute, Catholic University, Rome, Italy

Abbreviations: (BG) blood glucose, (CGMS) continuous glucose monitoring system, (DCCT) Diabetes Control and Complications Trial, (FPG) fasting plasma glucose, (GOS) group of signs, (HbA1c) hemoglobin A1c, (iso-$PGF_{2\alpha}$) 8-iso-prostaglandin $F_{2\alpha}$, (MAGE) mean amplitude of glucose excursion, (PPG) postprandial glucose, (ROS) reactive oxygen species, (SD) standard deviation

Keywords: continuous glucose monitoring system, diabetic complications, glycemic variability, indices of variability

Corresponding Author: Dr. Dario Pitocco, Policlinico Gemelli-Servizio di Diabetologia, L.go Agostino Gemelli 8, 00168 Rome, Italy; email address dario.pitocco@rm.unicatt.it