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ORIGINAL ARTICLES

Concealed Maternal Blood Glucose Excursions Correlate with Birth Weight Centile

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Abstract

Background:

The objective of this study was to test the hypothesis that maternal blood glucose excursions correlate with deviation from optimized birth weight.

Methods:

Patients were recruited for 3-day continuous glucose monitoring (CGM) plus self-blood glucose monitoring followed by routine diabetes screening at 26–28 weeks gestation. Patients and caregivers were blinded to CGM results. The magnitude and duration of blood glucose (BG) excursions were measured as a "glycemia index." A customized birth weight centile was calculated.

Results:

Twenty-three patients consented, 21 completed the study: 5 diabetic and 16 nondiabetic individuals. The duration of CGM was 72 (±7.2) hours, and each patient performed self-BG monitoring ≥3 times per day. All diabetic and 10 nondiabetic patients had several measured BG excursions above 130 mg/dl. A positive correlation was observed between birth weight centile and glycemia index above 130 ($p < 0.03$); the trend persisted for nondiabetic patients alone ($p < 0.05$). No significant correlation was noted between birth weight centile and average 3-day CGM values, 3-day fasting BG, average 3-day self-BG monitoring values, or diabetes screening BG value.

Conclusions:

The glycemia index has a better correlation with birth weight centile than BG measured by conventional methods in a mixed diabetic and nondiabetic population. Fetal exposure to maternal blood glucose excursions correlates positively with fetal growth, even in nondiabetic patients with apparently normal glucose tolerance.

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Abbreviations: (BG) blood glucose, (CD) cesarean delivery, (CGM) continuous glucose monitoring, (GDM) gestational diabetes, (GI) glycemia index, (GI-130) GI above 130, (MI-CHO) metabolic impairment of carbohydrates, (IR) insulin resistance, (SBGM) self-blood glucose monitoring

Keywords: CGM, diabetes, fetus, glucose, growth, pregnancy

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