Fetal Risk Assessment in Pregnancies Complicated by Diabetes Mellitus

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Abstract

Background:

Hypoglycemia and hyperglycemia can pose a number of serious risks to pregnant mothers with diabetes, but these risks are not always related to glucose concentrations directly. Previous studies have shown the utility of using mathematical transformation functions to create patient risk profiles that can then be used to analyze and predict adverse outcomes in individuals with diabetes. We propose a novel use of these functions to analyze the risks posed to the fetus in pregnancies complicated by diabetes.

Methods:

We retrospectively analyzed 71 h continuous glucose monitoring system (CGMS Gold, Medtronic Northridge, CA) third trimester tracings obtained during a normal pregnancy and in those complicated by gestational diabetes mellitus (GDM), type 2 diabetes mellitus (T2DM), and type 1 diabetes mellitus (T1DM). We then used a transformation function to calculate fetal and maternal risk in each case.

Results:

In the normal pregnancy (0.93), the risk was at a minimum. Along with mean glucose values, the risk increased in those cases where gestation was complicated by GDM (3.12), T2DM (7.85), and T1DM (16.94). In contrast, the original patient risk profile yielded a minimal value for the GDM tracings.

Conclusions:

Total fetal risk increases from normal to GDM to T2DM to T1DM pregnancies. This new risk assignment better distinguishes the stages of fetal risk than the original method and therefore may be useful in future clinical trials and applications to predict risk for adverse outcomes in pregnancies complicated by diabetes.

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Abbreviations: (A1C) glycosylated hemoglobin, (BG) blood glucose, (CGM) continuous glucose monitoring, (GDM) gestational diabetes mellitus, (HBGI) high blood glucose index, (LBGI) low blood glucose index, (SMBG) self-monitoring of blood glucose, (T1DM) type 1 diabetes mellitus, (T2DM) type 2 diabetes mellitus

Keywords: continuous glucose monitoring, fetal risk, gestational diabetes mellitus, high blood glucose index, low blood glucose index, transform function

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