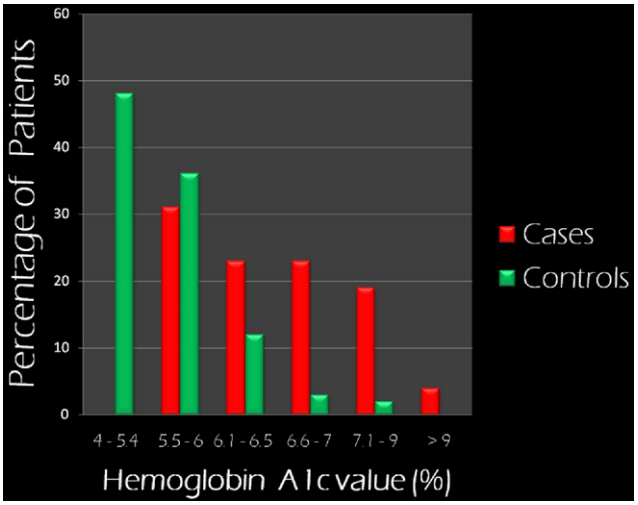


## 246 Excess glucose levels limit first trimester trophoblast migration and induce an anti-angiogenic profile

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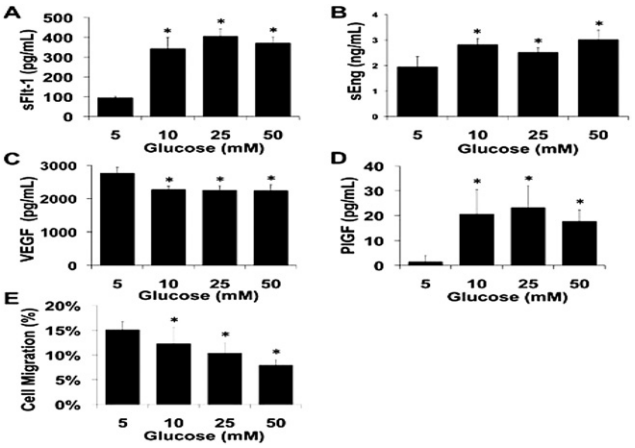
**OBJECTIVE:** Diabetes mellitus (DM) confers a 3 to 11.7-fold risk of preeclampsia (PEC), but the underlying mechanisms for this association is poorly understood. Two leading hypotheses are: 1) impaired invasion and transformation of the maternal uterine vasculature by the trophoblast early in gestation, and 2) an altered angiogenic factor profile at the maternal-fetal interface, leading to an inadequate uteroplacental vascular system. The objective of this study was to determine the effects of excess glucose on first trimester trophoblast migration and secretion of angiogenic factors.

**STUDY DESIGN:** The human first trimester trophoblast cell line (HTR-8) was treated with media containing glucose at 5 mM (normoglycemic), 10 mM (borderline hyperglycemic), or 25 and 50 mM (hyperglycemic). After 72 hours, supernatants were collected and assayed by ELISA for soluble fms-like tyrosine kinase-1 (sFlt-1), soluble endoglin (sEng), vascular endothelial growth factor (VEGF), and placental growth factor (PlGF). After 48 hours, a cell migration assay was performed using a two-chamber colorimetric assay. Statistical significance was determined by ANOVA.

**RESULTS:** Compared to glucose at the normoglycemic level of 5 mM, borderline and hyperglycemic glucose levels (10, 25, and 50 mM) significantly up-regulated trophoblast secretion of the anti-angiogenic factors, sFlt-1 and sEng ($p<0.001$; $n=3$, Fig A & B). Borderline and hyperglycemic glucose levels significantly reduced trophoblast secretion of pro-angiogenic VEGF, but increased pro-angiogenic PlGF secretion, when compared to normoglycemic levels ($p<0.001$; $n=3$, Fig C & D). High levels of glucose (10 - 50 mM) also reduced trophoblast migration ($P<0.001$; $n=3$, Fig E) when compared to glucose at 5 mM.

**CONCLUSION:** Exposure of first trimester trophoblasts to excess glucose generates an anti-angiogenic milieu and limits cell migration. Impaired invasion and vasculogenesis during this crucial period of placentation may contribute to the development of PEC in patients with pre-gestational DM.




## 247 Use of glucose stabilizer technology in the management of acute hyperglycemia in pregnancy

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**OBJECTIVE:** Management of acute hyperglycemia continues to present a significant challenge. Web-based insulin software was initiated at a large, urban private hospital to improve glycemic control in patients with diabetes. There have been few studies in pregnancy that evaluate the effectiveness of web-based insulin software in pregnant patients. The purpose of this study is to evaluate the usefulness of this modality in pregnancy.

**STUDY DESIGN:** Pregnant patients with gestational, Type I or Type II IDDM with hyperglycemia from July 1, 2010 through July 1, 2011 were eligible to be enrolled for use of the stabilizer. Optimal glucose value was defined as less than 110 mg/dl. The coefficient was calculated assuming that a pregnant patients insulin needs would be increased approximately 2-fold. To prevent error, a designated nurse specialist was available for assist with implementation. Data was collected and analyzed using the standard web-based software program.

**RESULTS:** 25 patients with hyperglycemia were entered into this study. Type I-44%, Type II-36%; Gestational-20%. The average gestational age at the time of enrollment was 34.2 weeks. The average glucose at enrollment was 165.7 mg/dl. The average time to the target goal was 1.72 hours. There were no hypoglycemic episodes.

**CONCLUSION:** Web-based insulin software provides a safe and effective way to treat acute hyperglycemia in the pregnant population.

## 248 Maternal overweight and obesity account for a greater proportion of adverse pregnancy outcomes than does gestational diabetes (GDM) defined by International Association of Diabetes in Pregnancy Study Groups (IADPSG) criteria

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**OBJECTIVE:** The IADPSG defined GDM with a 75-gram oral glucose tolerance test (OGTT) as any fasting glucose $\geq$92, 1-hr $\geq$180, or 2-hr $\geq$153 mg/dl. Concern has been raised that application of these criteria may increase the number of patients while minimally reducing adverse pregnancy outcomes. Many morbidities associated with GDM are also associated with overweight and obesity (OW/OB), as well as excess weight gain (WG). The purpose of this study was to determine if OW/OB and excess WG account for a higher proportion of large for