

Metabolic recovery at 12 months postpartum among individuals with glucose intolerance in pregnancy

Background: Glucose intolerance in pregnancy is associated with long-term risk for Type 2 Diabetes (T2D). We evaluated metabolic characteristics and β -cell function during pregnancy and at 12 months postpartum among varying levels of glucose intolerance in pregnancy.

Methods: This is a planned follow-up to the Gestational Diabetes Diagnostic Methods (GDM2) trial, which randomized pregnant individuals to either a 75-gram oral glucose tolerance test (OGTT) with GDM diagnosed using the IADPSG criteria, or a 100g OGTT with GDM diagnosed by the Carpenter-Coustan (CC) criteria. All participants with treated GDM, those with untreated mild glucose intolerance (MGI, one abnormal value on CC criteria), and half of the participants with normal glucose tolerance were invited for a 75g OGTT at 12 months postpartum. Stumvoll, Matsuda, and Disposition Indices (DI) were measured to evaluate insulin sensitivity, resistance, and β -cell function and other metabolic factors were assessed.

Results: Of the 407 individuals seen at 12 months, 49 (12%) had MGI and 53 (13%) had treated GDM (CC and IADPSG). MGI was associated with lower insulin sensitivity, lower beta cell function, dyslipidemia, and alterations in leptin and adiponectin similar to those individuals with treated GDM (Table). Measures of metabolic function, insulin sensitivity and β -cell function demonstrated similar rates from pregnancy to postpartum after adjusting for maternal age, BMI, and history of GDM.

Conclusions: Patients with MGI have impaired β -cell function and significant metabolic abnormalities at 12 months postpartum similar to individuals with treated GDM and require ongoing follow-up for progression to T2D. The similar rate of change from pregnancy to postpartum in insulin sensitivity, β -cell function, and metabolic assessments among groups indicates that individuals were returning to their baseline levels of glucose tolerance rather than recovering from pregnancy-induced glucose intolerance.

TABLE: Maternal Metabolic Outcomes at 24-28 Weeks' Gestation and 12 Months Postpartum				
Characteristic	No GDM (n=305)	Mild Glucose Intolerance (n=49)	Treated GDM (n=53)	P-value
Pregnancy				
Stumvoll Index	1,470.5 (±607.6)	1,465.5 (±750.9)	1,755.6 (±848.3)	0.037
Matsuda Index (n=402)	23.5 (±18.3)	13.3 (±8.1)	9.4 (±8.4)	<0.001
Disposition Index (n=402)	27,937 (±14,892)	15,359 (±5,479)	12,519 (±5,222)	<0.001
Triglycerides (mg/dL)	160.3 (±57.3)	200.4 (±73.5)	203.8 (±71.7)	<0.001
Cholesterol (mg/dL)	235.7 (±43.2)	231.4 (±46.8)	233.0 (±50.7)	0.75
HDL Cholesterol (mg/dL)	70.9 (±15.1)	66.1 (±14.3)	64.8 (±12.6)	0.007
LDL Cholesterol (mg/dL)	132.9 (±36.9)	126.4 (±40.9)	127.4 (±42.1)	0.38
Leptin (ng/ml) (n=403)	52.2 (±50.6)	81.1 (±125.6)	97.2 (±128.2)	<0.001
Adiponectin (µg/ml) (n=402)	20.2 (±13.4)	16.6 (±8.2)	14.6 (±6.9)	<0.001
12 months postpartum				
Stumvoll Index (n=321)	1,371.9 (±876.4)	1,350.2 (±594.8)	1,475.8 (±567.0)	0.25
Matsuda Index (n=377)	41.0 (±41.6)	28.7 (±26.6)	20.0 (±15.9)	<0.001
Disposition Index (n=321)	35,422 (±20,974)	27,441 (±17,559)	22,328.3 (±13,175)	<0.001
Triglycerides (mg/dL) (n=378)	83.8 (±47.4)	103.4 (±53.8)	111.6 (±57.5)	<0.001
Cholesterol (mg/dL) (n=378)	174.5 (±35.7)	175.4 (±24.6)	189.8 (±40.6)	0.024
HDL Cholesterol (mg/dL) (n=378)	57.5 (±17.5)	52.5 (±13.0)	52.7 (±11.8)	0.042
LDL Cholesterol (mg/dL) (n=377)	100.9 (±28.1)	102.1 (±22.9)	114.7 (±35.1)	0.028
Leptin (ng/ml) (n=328)	36.8 (±53.4)	71.2 (±144.7)	81.3 (±108.9)	<0.001
Adiponectin (µg/ml) (n=328)	20.2 (±9.4)	17.3 (±8.2)	15.3 (±6.0)	<0.001

Legend: All data shown as mean ±SD. Data were compared using the Kruskal-Wallis Test. Variables with incomplete data are noted with the n available.