Effect of Poor Glycemic Control on Arterial Stiffness in Pregnancy

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Objectives: Poor glycemic control during pregnancy is associated with increased adverse perinatal outcomes. Our objective was to characterize the association between glycemic control and arterial stiffness in pregnancy.

Methods: In this prospective longitudinal study, women with high-risk singleton pregnancies were recruited from obstetrical clinics in Montreal, Canada. Arterial stiffness was measured in women with gestational diabetes (GDM) or pre-existing diabetes mellitus (DM) using applanation tonometry (SphygmoCor; AtCor) starting at 24 weeks’ gestation (the period at which GDM screening is performed for all women according to standard clinical practice) and every 4 weeks thereafter until delivery. Arterial stiffness indices were compared between women with poor glycemic control and women with adequate glycemic control. Poor glycemic control was defined as average HbA1C > 7%, average fasting glucose > 5.3 mmol/L, average 1h post-prandial glucose > 7.8 mmol/L, insulin dosage > 30 units, large for gestational age fetus, or maximal vertical pocket > 8 cm.

Results: Of the 35 women who delivered in this ongoing study and had GDM (n=18) or DM (n=17), 12 had poor glycemic control throughout their pregnancy. Longitudinal analyses adjusted for maternal age, body mass index, and medical history, showed women with poor glycemic control had significantly increased carotid-radial pulse wave velocity (PWV) at each timepoint: 26-30 weeks: 8.4 vs. 8.0 m/s, p = 0.04; 30-34 weeks: 8.4 vs. 8.1 m/s, p <0.01; 34-38 weeks: 8.5 vs. 8.1 m/s, p = 0.02. No differences were found in carotid-femoral PWV, augmentation index adjusted for a heart rate of 75 beats per minute, or start time of wave reflection between these 2 cohorts.

Conclusion: Women who had poor glycemic control throughout pregnancy showed increased peripheral arterial stiffness from the late 2nd trimester until delivery. Our ongoing study will provide more definite conclusions with increased population size.