

Role of maternal hemodynamics and fetal ultrasound parameters to predict adverse pregnancy outcomes in women with gestational diabetes mellitus

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Objective. To evaluate the effect of poor maternal glycemic control on maternal hemodynamics and fetal ultrasound parameters and their association with adverse pregnancy outcomes, to offer a personalized management in gestational diabetes mellitus (GDM).

Materials and Methods. This was a prospective case-control study of 57 women with GDM and 23 normal pregnancies as a control group. Women with GDM were divided into good-GDM and poor-GDM groups according to their glycemic control at examination. All the groups were submitted, between 31-33 weeks of gestation, for a maternal hemodynamics measurement, using a non-invasive device (USCOM-1A[®]) and a fetal ultrasound evaluation to assess fetal biometry, velocimetry Doppler and interventricular septum (SIV) thickness. Data of perinatal outcomes were obtained.

Results. The poor-GDM group showed higher values of CA, Estimated Fetal Weight (EFW) and fetal SIV thickness, compared to the good-GDM group and control group. They also reported higher Umbilical Vein blood flow and umbilical vein medium diameter, compared to the others. Maternal hemodynamics in women with GDM, despite their glycemic control, showed higher RVS and lower CO, CI and INO. A higher rate of induction of labor and cesarean sections occurred in women with uncontrolled GDM. They also showed a higher neonatal birthweight and higher risk of neonatal intensive care unit admission.

Conclusions. Fetal SIV thickness, umbilical vein blood flow and diameter and fetal biometry showed a correlation with a poor glycemic control in women with GDM. Maternal hemodynamics assessment was also compromised in these women. These parameters may offer a better pregnancy management by detecting potential adverse outcomes in GDM.

Table 1. Fetal biometry, Fetal velocimetry Doppler and maternal hemodynamics assessment. Comparison between two groups: † group C vs group A; ‡ group C vs group B; § group A vs group B.

	Physiological pregnancy (Group A)	Well-GDM (Group B)	Poor-GDM (Group C)	P-value
Fetal biometry				
EFW (gr)	1983,4 ± 380,4	1958,8 ± 448,1	2316,3 ± 621,3	0,029 †, ‡
SIV (mm)	4,7 ± 0,8	4,5 ± 0,5	5,3 ± 0,8	< 0,01 †, ‡ ns §
Fetal Velocimetry Doppler				
PI AO	0,86 ± 0,2	0,84 ± 0,1	0,87 ± 0,1	ns
PI ACM	1,89 ± 0,1	1,84 ± 0,4	1,79 ± 0,2	ns
CPR	2,2 ± 0,5	2,0 ± 0,3	2,1 ± 0,2	ns
QVO (ml/min)	154,2 ± 16,3	177,6 ± 32,5	216,1 ± 40,5	0,004 †, ‡
DIAM VO (mm)	6,8 ± 0,7	6,8 ± 0,5	7,4 ± 0,7	0,04 †, ‡
Maternal Hemodynamics Assessment				
RVS	814,2 ± 127,6	962,5 ± 270,4	983,5 ± 161,4	0,03 †, §
CO	8,4 ± 1,3	7,5 ± 1,5	7,2 ± 1,3	0,039 †, §
CI	4,4 ± 0,8	4,05 ± 0,8	3,6 ± 0,7	0,008 †, ‡
HR	94,1 ± 15,7	89,4 ± 12,1	92,52 ± 11,7	ns
SV	91,4 ± 15,7	83,9 ± 17,6	79,6 ± 19,2	ns
PKR	21,0 ± 8,1	25,7 ± 14,4	26,4 ± 9,6	ns
IFc	374 ± 37,9	392,2 ± 40,2	381,6 ± 41,7	ns
INO	1,9 ± 0,4	1,7 ± 0,5	1,5 ± 0,3	0,017 †