

Maternal hemodynamics in patients with severe obesity and gestational diabetes

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Objective. Severe obesity during pregnancy induces a low-grade chronic inflammatory state, systolic and diastolic dysfunction and impaired arterial and venous function.

The aim of this study was to evaluate maternal hemodynamics in severely obese pregnancies (BMI > 35) compared with severely obese with Gestational Diabetes (GD).

Materials and Methods. 90 severely obese pregnant women were involved in this study, 73 without GD (group B) and 17 with GD (group C); these were compared with 20 normal weight patients without GD (group A). The hemodynamic assessment was performed in the third trimester.

Results. The SVR was higher in group C (1173.4 ± 164.5) than group B and A (842.2 ± 73.6 and 948.7 ± 131.8 respectively) (p < 0.001). The CO was higher in group B (8.7 ± 0.7) than group C and A (6.6 ± 1 and 7.5 ± 1.1 respectively) (p < 0.001). The SV was significantly decreased in group C (74.6 ± 17.3) than group A and B (88.1 ± 16.3 and 89 ± 11.6 respectively) (p = 0.013). Group C showed lower values of INO (1.5 ± 0.3) than group A (1.9 ± 0.4) (p = 0.007) and B (1.7 ± 0.3) (p = ns). The PKR was higher in group C (26.6 ± 9.8) than group B (18.7 ± 5.1) (p = 0.01) and A (22 ± 7.1) (p = ns).

Conclusions. Obese patients with GD show an hypodynamic circulation, high vascular resistance, low CO and INO. The pathological hemodynamic adaptation worsens in GD patients, through endothelial dysfunction, vascular rigidity and alterations in the heart muscle as shown by systolic and diastolic dysfunction.

	GROUP A NORMAL WEIGHT (n: 20)	GROUP B OBESE (n: 73)	GROUP C OBESE + GD (n: 17)	P VALUE
SVR d.s.cm ⁻⁵	948,7 ± 131,8	842,2 ± 73,6	1173,4 ± 164,5	< 0,001 †‡§
CO L/min	7,5 ± 1,1	8,7 ± 0,7	6,6 ± 1	< 0,001 †‡§
CI L/min/m ²	4,3 ± 0,6	3,9 ± 0,3	3 ± 0,3	< 0,001 †‡§
HR bpm	89,7 ± 15,8	96,9 ± 14,5	92,1 ± 13	ns
SV cm ³	88,1 ± 16,3	89 ± 11,6	74,6 ± 17,3	0,013 ††
PKR	22 ± 7,1	18,7 ± 5,1	26,6 ± 9,8	0,01 †
TfC ms	377,5 ± 39,8	375,4 ± 80,7	374 ± 31,5	ns
INO W/m ²	1,9 ± 0,4	1,7 ± 0,3	1,5 ± 0,3	0,007 †
SBP mmHg	116 ± 8,9	122,6 ± 8,8	127 ± 16	0,049 †
DBP mmHg	74,2 ± 7,8	71,4 ± 9,3	80,8 ± 8,8	0,007 ††

SVR: Systemic Vascular Resistance; CO: Cardiac Output; CI: Cardiac Index; HR: Heart Rate; SV: Stroke Volume; PKR: Potential to Kinetic Energy Ratio; TfC: Time Flow corrected; INO: Inotropy Index; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; GD: Gestational Diabetes

† group C vs group A; ‡ group C vs group B; § group A vs group B