

Fetus as a patient
May 26-28, 2011
Taormina, Italy

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ORTHOSTATIC CHALLENGED CARDIAC CONTRACTILITY IN PRE-ECLAMPSIA, AS MEASURED BY IMPEDANCE CARDIOGRAPHY

Aim: To evaluate maternal cardiac contractility following orthostatic challenge in normal pregnancy (NP) and pre-eclampsia (PE) using impedance cardiography (ICG).

Methods: 16 women with NP, 12 with early-onset PE (EPE) and 14 with late-onset PE (LPE) underwent a consecutive series of ICG-examinations in different positions: (a) supine 1, (b) standing, (c) sitting and (d) supine 2. Parameters of contractility, i.e. acceleration index (ACI), velocity index (VI) and heather index (HI), were evaluated. Means and SD were calculated and compared statistically using t-test.

Results: ACI values increased after position change $a > b$ and $b > c$ in NP, but did not change in EPE or LPE. As a result, ACI was significantly higher in NP compared to EPE and LPE during positions b and c: 1.29 ± 0.56 vs $0.78 \pm 0.36 \text{ s}^{-2}$ ($p=0.01$) and 1.26 ± 0.42 vs $0.82 \pm 0.23 \text{ s}^{-2}$ ($p < 0.01$). Measurements for other contractility parameters showed similar results.

Discussion: Contractility increases when moving to upright positions in NP, but not in PE. Our observations can be explained with basic cardiovascular physiology: when supine, pelvic compression of the gravid uterus provokes a decrease in venous return, which in turn induces a decrease in systolic function. In pre-eclampsia, this does not occur, indicating changes in either venous return and/or systolic function. Expansion of studies on cardiac contractility in pre-eclampsia is needed, in order to understand much better the mechanisms of abnormal cardiac adaptation during pregnancy and the role of venous return in pre-eclampsia. Our study illustrates that impedance cardiography is useful for this type of research.

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**VASCULAR PULSE TRANSIT TIME IN NORMAL PREGNANCY AND PRE-ECLAMPSIA: A NEW
PARAMETER FOR MEASUREMENT OF VASCULAR TONE?**

Aim: To evaluate venous and arterial pulse transit times, defined as time-interval between maternal ECG and sonographic Doppler waves (EDT) or impedance cardiogram (ICG), in normal pregnancy (NP) and pre-eclampsia (PE).

Methods: 16 women with (NP), 12 with early-onset (EPE) and 14 with late-onset (LPE) PE were analysed. At the level of renal interlobar and hepatic veins, and at the level of the uterine arteries, EDT was measured between corresponding ECG and Doppler wave characteristics. Using ICG, the pre-ejection period (PEP) was measured. EDT and PEP were corrected for gestation-induced changing heart rate (RR). Means and SD were calculated and compared statistically using t-test.

Results: In NP, EDT of the left kidney increased significantly from first trimester to term, i.e. 0.40 ± 0.09 to 0.50 ± 0.09 ($p < 0.01$). This was also true for the right renal interlobar veins, hepatic veins, uterine arteries and for PEP. Left kidney EDT was significantly shorter in EPE and LPE compared to NP, i.e. 0.37 ± 0.11 vs 0.52 ± 0.07 ($p < 0.001$) and 0.40 ± 0.07 vs 0.50 ± 0.09 ($p < 0.01$), respectively. Again, results were comparable for other organs.

Discussion: Our observed increase in pulse transit times corresponds with the generalized vasorelaxation during normal pregnancy. These pulse transit times were significantly decreased in pre-eclampsia, reflecting an increase of vascular tone at arterial and venous compartments. Our study illustrates that these time-intervals may be useful as a measure for vascular tone in normal pregnancy and pre-eclampsia.