International Session

IS-139 Relation of Umbilical Cord pH and Fetal Heart Rate Patterns to Maternal Age

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Objective : We postulated that advancing maternal age would cause decreased blood vessel perfusion. This would cause lower umbilical cord blood pH and more abnormal fetal heart tracings. **Method :** Records of all singleton, term pregnancies from 1993 - 1999 weighing 2500 gm with a live fetus were assessed for maternal age, parity, fetal heart rate tracing, method of delivery (vaginal or cesarean section, and indication), umbilical cord pH's and Apgar scores at 1 and 5 min in 5-year age groups. All data was tabulated and analyzed. **Results :** There were no significant differences in cord blood pH's, birthweights, or fetal heart trace abnormalities (p = 0.05). There was increased incidence of birthweights over 4000g in older mothers and increased number of cesarean deliveries. **Conclusions :** Increasing maternal age did not affect cord pH or fetal outcome. The increasing cesarean deliveries with advancing age were not related to increased fetal distress.

IS-140 Fetal Aortic Pressure Pulse Waveform Associated with Growth in utero and Blood Pressure after Birth

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[Objective] Diameter pulse waveform of the fetal descending aorta (DA) was measured using a phase locked echo tracking system coupled to a B-mode ultrasonic imager. We studied the relationship diameter pulse (pressure pulse) waveform in the DA in fetuses with intra-uterine growth disturvance. [Methods] Serial study between 21 and 40 weeks were carried out in 22 women with normally grown fetuses. We studied 25 women with small-for-gestational age fetuses (SGA) with utero-placental insufficiency (high umbilical artery pulsatility index), and 6 women with large-for-gestational age fetuses (LGA). We measured the maximum systolic and minimum diastolic diameter of the DA, the pulse amplitude. [Results] In normal growth group, there was an increase in systolic and diastolic diameter of the DA pulse amplitude with advancing gestational age. In the SGA fetuses, systolic and diastolic diameter of the DA was within normal range. There was an increase in the diastolic diameter of the DA was within normal range. There was an increase in the diastolic diameter of the DA was within normal range. There was an increase in the diastolic diameter of the DA was within normal range. There was an increase in the diastolic diameter of the DA was within normal range. There was an increase in the diastolic diameter per unit estimated fetal weight. In the LGA fetuses, there was an increase. The SGA fetuses, there was an increase in the pulse pressure and a reduction in stroke volume after birth, while in the LGA fetuses there was an increase in the pulse pressure and pulse amplitude. [Conclusion] The changes of blood pressure could be correlated with growth in utero. It is possible that hypertension is initiated in the SGA fetuses.

IS-141 Random Walk Analysis for Fractal Structure of Full-term Fetal Heart Rate Fluctuations

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[Objective] We aimed to analyze fractal structure of fetal heart rate (FHR) fluctuations at body movement and no body movement periods (BMP and NBMP) using a random walk analysis. [Methods] The FHRs and fetal body movements in 78 normal cases at full tem were concomitantly recorded every 250 msec and 1 sec over 10 min by actocardiography. The random walk analysis, which we reported as QIS-A in a journal, was applied to 59 10-min FHR records composed of 43 at BMP and 16 at NBMP : (1) division of 10-min FHRs into boxes of equal length n; (2) FHR-walk trajectory by n-steps of difference between FHR and the mean in each box; (3) quartile of all trajectories, F (n); (4) α , the slope of the line relating log F (n) to log n, calculated by the piecewise linear regression analysis. Differences between scaling relationships, e.g., α s, at BMP and NBMP were assessed with Student's *t* test. [Results] Each case had a crossover pattern of α 1 and α 2, which were above and below a crossover point (7.2 - 21.4 sec). The value of a crossover point, 1, and 2 at BMP were significantly different from those at NBMP : 12.8 ± 8.1 bpm (mean ± SD) vs. 4.0 ± 2.1, 1.6 ± 0.1 vs. 1.5 ± 0.1, and 1.3 ± 0.2 vs. 1.0 ± 0.2; p<0.01. [Conclusion] Our proposed indices of fractal correlation properties reveal the relationship between fractal structure of FHR fluctuations and fetal behavioral states from a point of non-reductionism.

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