FETUS, PREMATURITY

Abstracts 388 – 537

388 Fetal growth: genetic control, variations and environmentally caused interferences

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OBJECTIVE: To find and to describe mathematically the genetic principles that control fetal growth and their exceptions.

STUDY DESIGN: Retrospective cohort study of anthropometric data from 38,881 ultrasounds and 52 million births in the USA and of the quantitative effect of independent variables (single gene mutations, chromosomal abnormalities, race, sex, gestational age, maternal weight, placental function, smoking, genetic disease, uterine perfusion, maternal diabetes, and hypertension), on the dependent variables: fetal growth, size and weight.

RESULTS: The following principles were derived and proven: 1. Genetically controlled growth: all the distributions of dependent variables are Gaussian and symmetric. 2. Individuality: a few fetuses had all the measurements at the same centile, most had great variability. 3. Variability of growth patterns: same mother's fetuses with the same or different father had different patterns, birth weights and mean centiles. 4. Constancy of development: Fetal growth is genetically controlled through the cellular cycle, matrix formation and programmed cellular death; the daily rate of growth is constant for each category (centile of growth). 5. Time related growth interference: the effect of race, fetal sex and smoking does not become statistically significant until around 32 weeks. The principles above suffer interferences type: 1. Supply: placental failure of different etiologies, 2. Hormonal: diabetes and other growth factors, 3. Vascular: hypertension, 4. Genetic: single and multiple gene mutations and abnormalities (including chromosomal) that markedly alter the genetically programmed (normal) growth pattern. The results of some of these interferences have recognizable patterns and some are modifiable by medical intervention.

CONCLUSION: The effects of the principles of fetal growth and of the interfering factors are the quantitative bases for clinical analysis of development, age, weight, disease, and for the study of the origin of adult disease in utero.

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389 Fetal tachyarrhythmias: the comparison between cases with or without intrauterine treatment: a retrospective data analysis in Japanese population

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OBJECTIVE: Although the Fetal therapy(Ftx) for fetal tachycarrhythmias (FT) is now performed relatively often recently,the management of FT has not been standardized because of limited data on how Ftx affects the clinical course. The aim of this study was 1) to review the efficacy and safety of Ftx using the data on Japanese population and 2) to determine the impact of FTx on the FT natural history.

STUDY DESIGN: Data for 2004 to 2007 on fetuses with sustained FT were obtained from 750 Japanese perinatal care institutes.Cases were classified as supraventricular tachycardia (SVT), atrial flutter, ventrivcular tachycardia and others. Data on fetal diagnosis, the presence of fetal hydrops (FH), associated anomalies and Ftx (the types of antiarrhythmic agents, efficacy and side effects) were collected. Presence of neonatal tachycardia, gestational ages, delivery mode, neonatal management and outcome were also analysed. All cases were categorized into groups with or without Ftx and compared obstetrical and neonatal prognoses.

RESULTS: 82 cases (14 FH) were analyzed. SVT was the most common fetal diagnosis (n=44). Ftx was performed for 41 using various agents-(digoxin, flecainide and sotalol). The data showed high overall efficacy for FT and FT with FH (92.7% and 82.7%). 3 death cases were reported. As shown in thetable, treated cases showed significantly lower incidence of preterm birth , cesarean-section and neonatal tachycardia.

CONCLUSION: Ftx has successfully improved FT, even for the cases with HF. This nation-wide retrospective data analysis confirms that FTx has beneficial effects on the clinical course of FT. The main benefit of Ftx is a reduced incidence of premature birth, cesarean section and neonatal arrhythmias.

Fetal tachycardia with/without fetal therapy(*P<0.05).

	Ftx (%)	non-Ftx (%)
n	41	41
hydrops	11 (26.8)	3 (7.3)
cesarean section	12 (29.3)*	29 (70.7)*
preterm	5 (12.2)*	17 (41.5)*
neonatal tachycardia	20 (48.8)*	32 (78)*
death	1 (2.4)	2 (4.9)

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390 Adverse neonatal effects of magnesium sulfate given to the mother

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OBJECTIVE: Given the increasing indications for administration of magnesium sulfate to pregnant women, we sought to determine if such therapy was associated with adverse effects in the newborn infant.

STUDY DESIGN: This is a retrospective cohort analysis of women who received magnesium sulfate for prevention of eclampsia. Magnesium sulfate was given intravenously beginning with a 6 gram loading dose followed by 2-3 gram/hour based on serum magnesium levels. Newborn hypotonia was diagnosed if at birth the infant exhibited less than normal tone/activity unresponsive to naloxone and persistent at admission to the nursery. Maternal serum magnesium levels were measured within four hours of delivery. Women undergoing general anesthesia were excluded.

RESULTS: Between January 2000 and February 2009, 6827 women with preeclampsia were treated with magnesium sulfate as described and 388 (5.7%) infants were diagnosed to have hypotonia. There was a direct relationship between maternal magnesium levels and hypotonia and this persisted after correction for gestational age and umbilical artery pH (Figure 1). A similar adjusted analysis was also performed for intubation in the delivery room and magnesium concentration in maternal blood was significantly associated with intubation.