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Maternal Cigarette-Smoking During Pregnancy Disrupts Rhythms in Fetal Heart Rate

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Objective To examine the effects of maternal cigarette smoking during pregnancy on the developing infant's autonomic regulation before the possible effects of parturition and neonatal withdrawal could alter outcome measures. **Methods** Heart rate variability (HRV) was assessed for 10 min during late gestation for 21 cigarette-exposed (CE) and 22 nonexposed (NE) fetuses. **Results** HRV was significantly lower in fetuses whose mothers smoked cigarettes during pregnancy. Spectrum analysis of that variability showed temporally organized rhythms at a frequency similar to rhythms previously found in fetal cyclic motility (approximately .3 cycles per min). Lower powered rhythms—associated with poorer development—at the first, second, and dominant rhythms, as well as lower overall power of the power spectrum, were found for CE fetuses. Pearson correlations showed significant negative correlations between the amount of maternal cigarette smoking during the first trimester of pregnancy and measures of fetal HRV and power of spectral peaks. **Conclusions** Results show that CE fetuses have lower HRV and disrupted temporal organization of autonomic regulation before effects of parturition, postnatal adaptation, and possible nicotine withdrawal contributes to differences in infant neurobehavioral function.

Key words: fetus; heart rate; prenatal environment; prenatal drug exposure; cigarette smoking.

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