

Effect of maternal smoking during pregnancy on fetal circulation and growth

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Objective

To understand the pathogenic mechanism of smoking on abnormal fetal growth by assessing the umbilical, and middle cerebral pulsatility index (MCA-PI, and UmA-PI, respectively) cerebroplacental ratio (CPR) and middle MCA peak systolic velocity (MCA-Vmax).

Methods

A hundred and eighty-one pregnant women were included in the study, 118 of whom were ever smoker and 62 were smoker. Smoking status of the cases were based on the participants statements and confirmed with breath CO test. Patients were undergo Doppler examination according to the current guidelines at 24, 28, 32 and 36 weeks and the results were expressed as z- scores. UmA-PI, MCA-PI, CPR (MCI-PI/UmA-PI), MCA- Vmax were compared between control and smoking groups. As a subgroup analysis, effect of heavy smoking (>10/day) on fetal growth and Doppler indexes were also compared.

Results

Body mass index (BMI), gravida, rate of gestational hypertension and neonatal intensive care admission is significantly higher in smoking group. Birth weight and gestational age at birth was significantly higher in control group [3355 (1960.0-4660.0) vs 3162.5(550.0-4190.0), $p=0.003$, and 274.0(250.0-294.0) vs. 271(175.0-288.0), $p=0.015$, respectively]. When controlled for confounding factors, no significant difference was detected between smokers and control groups with regard to UmA-PI, MCA-PI, MCA- V Max and CPR, at 24th, 28th, 32th, 36th weeks. EFW at all gestational ages were significantly lower in smoker group ($p=0.033$). At subgroup analysis, no significant difference was detected between control and heavy smokers in terms of EFW and all Doppler parameters.

Conclusion

Smoking during pregnancy is associated decreased fetal growth and increased abnormal neonatal outcome. However, it has no demonstrable effect on any of the Doppler indexes and velocities at any given gestational ages. Abnormal effect of smoking on fetal growth seems not to operate through impaired uteroplacental circulation.