

Effect of maternal smoking during pregnancy on fetal umbilical venous flow

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Objective

To understand the pathogenic mechanism of smoking on abnormal fetal growth by assessing the umbilical vein flow dynamics by means of Doppler examination.

Methods

A hundred and eighty pregnant women were included in the study, 118 of whom were never 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 at 24, 28, 32 and 36 weeks and the results were noted. Umbilical vein diameter (UVD), time averaged maximum velocity (TAMV) were measured at free floating segment and UV flow was calculated as $QUV = (UVD/2)^2 \times 3.14 \times TAMV \times 60$. QUV adjusted to fetal weight was calculated as QUV/EFW . UVD, TAMV, QUV, QUV adjusted were compared between control and smoking groups.

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]. EFW at all gestational ages were significantly lower in smoker group ($p=0.033$). When controlled for confounding factors, no significant difference was detected between smokers and control groups with regard to UVD, TAMV, QUV, QUV adjusted at 24th, 28th, 32th, 36th weeks (For QUV adjusted; 26.67 ± 5.03 vs 25.13 ± 4.36 , 23.56 ± 4.89 vs 24.69 ± 5.34 , 20.71 ± 3.82 vs 20.98 ± 4.75 , 17.29 ± 3.41 vs 16.72 ± 4.57 , $p=0.61$).

Conclusion

Smoking during pregnancy is associated decreased fetal growth and increased abnormal neonatal outcome. However, it has no demonstrable effect on umbilical venous flow. Abnormal effect of smoking on fetal growth seems not to operate through impaired uteroplacental circulation.