

Is the umbilical vein flow associated with abnormal fetal growth?

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Objective

To investigate the relationship between the umbilical vein flow (UVF) measured close to term and abnormal fetal growth in a cohort of pregnant at low-risk of placental insufficiency.

Methods

Prospective multicentre observational study conducted across two tertiary Maternity Units between January 2021 and December 2022. Patients with a singleton appropriate for gestational age fetus between 35-38 weeks of gestation, who attended our antenatal clinic, were included. Pregnancy at higher risk of placental insufficiency or with fetal anomalies were excluded. At ultrasound examination, the abdominal circumference (AC), UV diameter and peak velocity of the UV were measured, and from these variables, the UVF/AC were calculated. The primary outcome was abnormal fetal growth defined as a drop of over 40 percentiles of fetal weight between the 3rd trimester US and delivery.

Results

Overall, 307 fetuses were included in our study. In our population, the median value of the UVF/AC was 0.65 ± 0.27 ml/mm/mm. There were 32 (9.8%) cases of UVF/AC < 10th percentile, and 31 (9.5%) of abnormal fetal growth. Abnormal fetal growth was associated with a lower mean UVF/AC (0.54 ± 0.27 vs 0.66 ± 0.27 ml/min/mm; $p=0.02$) and a higher frequency of an UVF/AC < 10th percentile (9/31 or 29.0% vs 37/296 or 12.5%, $p=0.01$). Subsequently, we divided our population in three subgroups: drop > 40 percentiles, drop between 40 - 20 percentiles and drop < 20 percentiles. We found a significant linear trend of the UVF/AC (0.54 ± 0.27 vs 0.59 ± 0.22 vs 0.68 ± 0.28 ml/min/mm; $p=0.006$) on fetal growth, indicating that higher UVF/AC were associated with a normal fetal growth. There was also a significant effect of UVF/AC < 10th percentile (29.0% vs 18.4% vs 10.5%; $P=0.01$) on fetal growth subgroups.

Conclusion

Our results suggest a direct association between UVF and abnormal fetal growth in a cohort of patients at low-risk of placental insufficiency.