



Vascular biopsy of the placenta using VOCAL2 ultrasound software in the prediction of IUGR

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Objective

Firstly, to investigate the potential value of placental vascular biopsy using VOCAL2 software at second and third trimester to define the pregnancies at risk with intrauterine growth restriction (IUGR). Secondly, to prove an effective and novel method to use the software, enabling significant, efficient and easily reproducible results during the scan.

Methods

Placental vascular image biopsy was taken using VOCAL2 software, prospectively, during the scan, using a practical approach by optimised machine settings (21 cases with IUGR, 233 controls). This enabled the examiner to take the image in 5 seconds. The 3D power Doppler measurements such as placental vascularisation index (VI), flow index (FI) and vascularisation flow index (VFI) were calculated using the machine software. To compare the placental function with the new measurements, the Doppler measurements of the uterine arteries, umbilical artery and middle cerebral artery were performed. The 5. percentile in birth weight was taken as cut-off to define the newborns with IUGR. Linear regression analysis was used to estimate the difference of each placental vascular index between IUGR and control pregnancies after adjusting for gestational age.

Results

Placental VI, FI and VFI were significantly lower in IUGR pregnancies than in controls ($p=0.03$, $p=0.014$, $p<0.001$). Mean uterine artery and umbilical artery PI were higher in IUGR fetuses at the time of the measurements. After adjusting both FI and VFI for gestational age, they remained lower in the IUGR group than in controls ($p=0.011$ and $p<0.001$).

Conclusion

Placental vascular biopsy is an easy method to perform at second and third trimester of pregnancy to assess the placenta function.