

Association of feto-placental Doppler with placental histopathology in fetal growth restriction and preeclampsia

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Objective

The aim of this study was to investigate the association of fetoplacental Doppler and placental histological lesions in a large cohort of pregnancies complicated by preeclampsia (PE) and/or fetal growth restriction (FGR), as compared to uncomplicated pregnancies.

Methods

A prospective cohort study of 359 pregnancies complicated by FGR defined by birth weight < 10th centile (n=176), PE & FGR (n=113), PE (n=70), and 157 uncomplicated pregnancies. Uterine, umbilical and middle cerebral artery pulsatility index (PI) were assessed. Cerebroplacental ratio (CPR) was calculated by dividing the middle cerebral artery PI by the umbilical artery PI. Abnormal parameters were considered when PI >95th centile for uterine and umbilical artery, or <5th centile for middle cerebral artery and CPR. Placental lesions were histologically categorized to vascular (maternal/ fetal side), inflammatory or other lesions according to the 2014 Amsterdam Placental Workshop Group Consensus Statement.

Results

All abnormal fetoplacental Doppler parameters were associated with maternal side vascular lesions -mainly malperfusion-(uterine artery (OR=4. 3, 95% CI: 2. 9 - 6. 5), umbilical artery (OR=5. 8, 95% CI: 2. 7 – 12. 3), middle cerebral artery (OR=4. 5, 95% CI: 2. 5 – 8. 2), CPR (OR=3. 2, 95% CI: 2 – 5. 3)). This association was evident mainly in FGR groups with and without PE, being nonsignificant in controls or PE without FGR. Fetoplacental Doppler parameters were not significantly associated with fetal vascular, inflammatory or other placental lesions in any of the study groups.

Conclusion

Uterine, umbilical and middle cerebral artery Doppler are associated to placental malperfusion lesions in the maternal side, supporting the use of fetoplacental Doppler as a surrogate of placental insufficiency in FGR.