

Ultrasonic fetal and placental tissue characterisation and the role of 3D and Doppler ultrasound in lung maturity in preeclamptic and diabetic patients

Podobnik P, Podobnik M, Gebauer B, Brlečić I, Miličić I
Clinic Podobnik, Zagreb, Croatia

Objective

To investigate the relationship between the gestational age and quantitative assessment of ultrasonic signs of placental tissue, fetal lungs and liver tissue and to correlate Doppler parameters from main stems of the pulmonary arteries and lung volume to determine fetal lung maturity in normal pregnancies and in pregnancies complicated with preeclampsia and diabetes.

Methods

The placenta, fetal lungs and fetal liver in 300 normal pregnancies, 300 preeclamptic pregnancies and 300 diabetic pregnancies were examined by ultrasound at 24-41 weeks of gestation. The coefficients of variation were used to characterise the tissue in different groups during pregnancy. Doppler velocimetry was performed in the main stems of pulmonary arteries. We used VOCAL system to measure lung volumes in normal, preeclamptic and diabetic pregnancy.

Results

The coefficients of variation in mature fetuses were greater than 30% for placentas in-vivo, greater than 34% for placentas in-vitro, greater than 29% for liver tissue and greater than 30% for lung tissue. We found in mature fetuses mean peak systolic velocity higher than 60 cm/s and PI lower than 3.00 and fetal lung volume greater than 60 mL. In mature fetuses with preeclampsia we found higher mean peak systolic velocity in comparing with normotensive patients, but in mature fetuses with diabetes we found lower peak systolic velocity in comparing with normotensive patients. We did not find significant difference between lung volumes in all investigated patients.

Conclusion

The coefficient of variation values for placentas in-vivo and in-vitro, and fetal lungs and liver increase during pregnancy in normal and preeclamptic patients with increasing gestational age and decrease in diabetic patients. The mean peak systolic velocity in pulmonary arteries increase during pregnancy in normal and preeclamptic patients and decrease in diabetic patients. Lung volumes increase during pregnancy in normal, preeclamptic and diabetic patients.