20th World Congress in Fetal Medicine

Sexual dimorphism of the fetal brain biometry: magnetic resonance imaging based study

Katorza E, Barzilay E, Gafner M
Sheba Medical Center, Ramat Gan, Israel

Objective

Fetal growth assessment is a key component of prenatal care. Sex-specific fetal brain nomograms on ultrasound are available and are clinically used. In recent years, the use of fetal MRI has been increasing; however, there are no sex-specific fetal CNS nomograms on magnetic resonance imaging (MRI). The study aimed to assess the differences in fetal brain biometry and growth trajectories and to create population-based standards of the fetal brain on MRI.

Methods

In this cross-sectional study, brain structures of singleton fetuses with normal brain MRI scans were analyzed: biparietal diameter, occipitofrontal diameter, trans-cerebellar diameter, and the corpus callosum were measured and converted into centiles. Sex-specific nomograms were created.

Results

A total of 3848 MRI scans were performed in one tertiary medical center between 2011 and 2019; of them, 598 fetuses met the inclusion criteria, 300 males and 298 females between 28- and 37-weeks' gestation. Males had significantly larger occipitofrontal diameter than females (median 75%, IQR 54-88%; median 61%, IQR 40-77%) and biparietal diameter (median 63%, IQR 42-82%; median 50%, IQR 25-73%), respectively ($p < 0.001$). The cerebellum had the greatest growth rate, with a 1.5-fold increase in diameter between 28 and 37 weeks' gestation, with no measurement difference between the sexes ($p = 0.239$). No significant difference was found in the corpus callosum ($p = 0.074$).

Conclusion

Measuring both sexes on the same nomograms may result in over-estimation of male fetuses and under-estimation of females. We provide fetal sex-specific nomograms on two-dimensional MRI.