19th World Congress in Fetal Medicine

Fetal ventricles evaluation at 1st trimester: ultrasound diagnosis and association with neural tube defects

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Objective

To evaluate the association between first trimester sonographic measurements of the lateral ventricles and neural tube defects (NTDs) at 11^{+0}-13^{+6} weeks of gestation.

Methods

Single centre prospective study. The ultrasound measurement of the fetal ventricles was obtained on the axial view of the fetal head at 11^{+0}-13^{+6} weeks' gestation using three different methods. We selected a non-consecutive series of fetuses with NTD detected in the first trimester, and a group of normal fetuses as controls. On this view, the ratio between the choroid plexus (CP) and ventricle lengths (CPVLr), areas (CPVAr) and the ratio between CP areas and head area (CPHAr) were measured for both groups. Measurements obtained from the two groups were compared, and the association of each parameter with NTD has been investigated.

Results

Out of 369 fetuses, 11 with NTDs were included (8 open spina bifida and 3 cephalocele). In normal fetuses all ratios were correlated with crown-rump length ($p<0.01$). CPVLr, CPVAr were significantly increased in the NTDs group ($p<0.01$) with mean values 0.79 ±0.05 and 0.70 ±0.08, compared to 0.71 ±0.22 of normal cases. CPHAr showed a non-significant increasing trend (0.32 ±0.05). The CPVLr and CPVAr best cut-off values to detect NTDs were 0.72 and 0.56 respectively, with areas under the ROC curve of 0.86 for CPVLr and 0.95 for CPVAr.

Conclusion

Ratios used to describe ventriculomegaly at 11-13 weeks are increased in case of NTDs. CPVAr shows higher association with NTDs, and the evidence of an increased CPVLr or CPVAr at 11-13 weeks should prompt detailed evaluation of the fetal spine.