



Brainstem-vermis and brainstem-tentorium angles: 3D ultrasound study of the interobserver agreement

Illescas T, Martínez-Ten P, Bermejo C, Estévez M, Adiego B
Delta Ultrasound Diagnostic Center in Obstetrics and Gynecology, Madrid, Spain

Objective

Cystic anomalies are the most frequent abnormalities found in the fetal posterior fossa. There's a wide range of malformations, from mild variations of normality (megacysterna magna, Blake's pouch cyst) to severe anomalies (vermian agenesis or hypoplasia, Dandy-Walker malformation). The brainstem-vermis angle (BVA) and the brainstem-tentorium angle (BTA) have been proposed to quantify the alterations of the vermis and the tentorium associated to these malformations. Our objective is to evaluate the interobserver agreement for the measurement of the BVA and the BTA during the ultrasound fetal scan.

Methods

Four experts in prenatal ultrasound measured the BVA and the BTA on a mid-sagittal view of the fetal brain, obtained from 3D sets in 15 fetuses with any posterior fossa pathology. These experts were blinded for the clinical data of the patients. According to Robinson (2007) and Volpe (2012), a line was drawn on the dorsal aspect of the brainstem. The BVA is the interposed angle between this line and a second line, tangential to the ventral surface of the vermis. The BTA is the angle between the first line and a third line tangential to the tentorium. The intraclass correlation coefficient (ICC) was used to test consistency and absolute agreement of the measurements among the 4 observers. The concordance is poor when $ICC < 0.40$ and excellent when $ICC > 0.75$.

Results

Consistency ICC for the measurements was 0.74 (95%CI: 0.54-0.89) for the BVA and 0.55 (95%CI: 0.29-0.78) for the BTA. Absolute agreement ICC was 0.67 (BVA) y 0.45 (BTA). Differences were statistically significant among the observers ($p < 0.01$).

Conclusion

The measurement of the BVA and the BTA showed a moderate consistency between observers therefore they should be interpreted cautiously. A more precise methodology for the measurement of these angles should be described.