Normal Fetal Posterior Fossa in Magnetic Resonance imaging: New Biometric Reference Data and Possible Clinical Significance

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Objectives
Posterior fossa malformations are a common finding in prenatal diagnosis. The purpose of this study was to re-evaluate existing normal biometric data of fetal posterior fossa in MRI, suggest and evaluate new parameters, and demonstrate the possible clinical applications of this data.

Methods
A retrospective review of 215 normal fetal MR examinations and 5 examinations of fetuses with a diagnosed pathological posterior fossa. 6 Previously reported parameters, and 8 new parameters were measured. 3 New parameter ratios were calculated. Inter-observer agreement was calculated using intra-class correlation coefficient.

Results
151 To 211 MRI examinations were selected adequate for measuring each structure, resulting in a normal biometry curve according to gestational age, for each parameter. Analysis of the ratio parameters showed that vermian lobes ratio and cerebellar hemispheres ratio stay constant with gestational age, and vermis to cisterna magna ratio varies with gestational age. Measurements of the 5 pathological fetuses are presented on the normal curves. Inter-observer agreement was excellent, with most parameters’ intra-class correlation coefficient above 0.9, and only 2 parameters below 0.8.

Conclusion
The biometry curves derived from new and existing biometric data and presented in this study may expand and deepen the biometry we use today, while keeping it simple and repeatable. Applying this extensive biometric data on suspected pathologies may be the next step in diagnosing fetal posterior fossa pathologies.

Figure 1: T2 MR sagittal (a) and axial (b) view of fetal posterior fossa measurements.

Figure 2: Biometry curves of the new parameters.

Figure 3: Application of the new data on 5 pathological posterior fossa fetuses.