Sonoembryology of the fetal posterior fossa at 11+3 to 13+6 gestational weeks on three-dimensional transvaginal ultrasound

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Objective
To describe the sonographic appearance and temporal changes of the structures of the posterior cranial fossa in fetuses at a crown-rump length (CRL) between 45 to 84 mm in transvaginally acquired three-dimensional volume blocks.

Methods
This was a prospective, cross-sectional, observational study including 80 fetuses, whose mothers attended Kepler University Hospital Linz or the Ambulatorium für Fetalmedizin Feldkirch for first-trimester sonography. Three-dimensional volume blocks were acquired in a standardized way and after processing the sonographic characteristics of the brainstem, cerebellar vermis, choroid plexus, anterior membranous area (AMA) and Blake’s metapore were described. Measurements of the length of the cerebellar vermis, the length of the AMA and the medulla-oblongata-pons angle (MOPA) were performed. In 20 fetuses the intra- and interobserver repeatability was calculated.

Results
The sonomorphologic characteristics of posterior fossa structures as cerebellar vermis, AMA, Blake’s metapore, choroid plexus, pons and medulla oblongata were described. There is a significant correlation between CRL and vermis length, CRL and MOPA and CRL and AMA.

Conclusion
Transvaginal three-dimensional sonography allows a detailed depiction of the structures of the posterior fossa their temporary changes in early pregnancy.