

# Imaging evaluation of the fetal posterior fossa

*Avaliação por imagem da fossa posterior fetal*

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In the present issue of **Radiologia Brasileira** there is an interesting study aimed at determining reference intervals for the fetal cisterna magna volume by means of the two-dimensional (2D) method with the multiplanar mode of Three-dimensional ultrasonography (3D US)<sup>(1)</sup>. The recent development in medical imaging have allowed for an accurate assessment of the fetal morphology. The study of the posterior fossa (PF) is included in all the routines for evaluation of the fetal morphology. The normal echographic parameters in this area rule out the main abnormalities of the cerebellum and vermis. However, in cases where any abnormality of the PF is found, a further and more accurate echographic evaluation of the central nervous system (CNS) should be undertaken<sup>(2)</sup>.

US is ever the main method of choice in the fetal evaluation. However, in some cases, it may present some restrictions for a good evaluation of the CNS. Reverberation artifacts from the cranial bones and the low sensitivity in the detection of cortical malformations as well as those destructive of the cerebral parenchyma and cerebellum constitute some of the examples. Other limiting factors for a good echographic study include maternal obesity, oligohydramnios, inappropriate cephalic position, low qualification of the investigator and small field of view on the echographic image<sup>(3,4)</sup>.

The routine prenatal evaluation of the CNS by 2D US includes three main imaging planes: transthalamic, transventricular and transcerebellar. A baseline evaluation of the PF is based on the axial plane with special attention to the transducer angulation so that the cavum of the septum pellucidum, cerebral peduncles and cerebellar hemispheres can be visualized. It is important to note that if the transducer is angulated in the semicoronal plane, the anteroposterior measurement of the PF may be artificially increased<sup>(5,6)</sup>. With such an evaluation, one can say that the PF is normal as the three following criteria are met: measurement of the cisterna magna  $\leq$  10 mm; cross-sectional diameter of the cerebellum compatible with the gestational age; and normal cerebellar anatomy, defined by a vermis surrounded by two symmetrical hemispheres separating the fourth ventricle anteriorly and the cisterna magna posteriorly.

Provided no abnormality is found on such planes, the fetal brain normality can be presumed. If any abnormality is found, additional sections should be evaluated, besides the possibility of utilizing a transvaginal probe and 3D technology<sup>(6,7)</sup>. In cases where all these resources do not allow for a complete evaluation, magnetic resonance imaging should be recommended<sup>(8,9)</sup>.

Although the standard axial planes can demonstrate most PF anomalies, it may be difficult to make an accurate diagnosis. Subtle changes in the vermis, for example, may be occult. Malingier et al. have proposed the utilization of the sagittal plane with transvaginal approach for a better evaluation<sup>(3)</sup>. The development of 3D US has brought advantages in the evaluation of the PF<sup>(10)</sup>. New tools, such as surface mode and multiplanar imaging have been incorporated into the evaluation both at transabdominal and transvaginal approaches. With multiplanar mode, the visualization of the axial, coronal and sagittal planes has become much easier. Thus, on a single image acquisition, it is possible to make an evaluation of all those imaging planes in addition to a volumetric evaluation<sup>(3,9-11)</sup>.

Therefore, the imaging evaluation of the PF can be facilitated by the 3D technology. However, such advance in echographic imaging is still limited by the inappropriate positioning of the fetal cephalic pole or by the decreased volume of amniotic fluid, among others. Thus, in cases where US is not conclusive, the utilization of magnetic resonance imaging should ever be considered.

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