

## **Distribution of ventricular volumes in fetuses with isolated non-severe ventriculomegaly and neurodevelopmental outcome**

Hahner N, Benkarim OM, Perez-Cruz M, Piella G, Sanroma G, Gonzalez Ballester MA, Gratacos E, Eixarch E

Fetal i+D Fetal Medicine Research Center, BCNatal - Barcelona Center for Maternal- Fetal and Neonatal Medicine (Hospital Clínic and Hospital Sant Joan de Déu), Institut Clínic de Ginecologia, Obstetrícia i Neonatologia, Institut d'Investigacions Biomèdiques, Barcelona, Spain

### **Objective**

To evaluate whether regional volumetric parameters of the lateral ventricles by magnetic resonance (MR) were associated with adverse outcome compared to standard 2d-linear-measurement of ventricular width by ultrasound (US) in isolated non-severe ventriculomegaly (INSVM).

### **Methods**

We prospectively included 42 healthy controls and 42 INSVM fetuses with uni- or bilateral ventriculomegaly between 10.0 and 14.9mm. Fetuses with associated malformation, infection or abnormal microarray were excluded. MR was performed at two time points depending on the onset of INSVM (early 27 weeks and late 33 weeks) using 1.5T scanner including 4 axial, 2 coronal and 2 sagittal stacks. High-resolution 3D fetal brain images were reconstructed, and lateral ventricles segmented and parcellated into 5 regions. Neurodevelopment was assessed performing Bayley-III at 20 months. Statistical analysis was adjusted by gestational age and gender.

### **Results**

3D reconstructions succeeded in 81% of fetuses. Ventricular volume was 2.1 vs 7.4cm<sup>3</sup> in INSVM ( $p<0.01$ ). Significant enlargement was found in all ventricular regions compared to controls. When evaluating the association of ventricular parameters with outcome, ventricular width measurement by US did not show association with abnormal Bayley-III (Pseudo-R=0.001;  $p=0.98$ ), but regional ventricular volumes, especially anterior horn volumes presented significant association with poorer outcome (Pseudo-R=0.519;  $p<0.01$ ).

### **Conclusion**

Fetuses with INSVM showed increased volumes in all regions of the lateral ventricles compared to controls, being anterior horn volumes significantly associated with postnatal outcome. These findings suggest that addition of advanced imaging analysis and volumetric assessment might provide more information and could be useful to select those cases with adverse outcome.