

## Use of fetal MRI in fetuses referred with central nervous system abnormalities: a single-institution experience

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**Objective.** To compare sonographic *vs* fetal MRI (fMRI) diagnosis in suspected central nervous system (CNS) abnormalities and to evaluate if the diagnosis using fMRI altered the management of the pregnancy.

**Materials and Methods.** A retrospective monocentric cohort study including all pregnant women undergoing a fMRI after ultrasound (US) for a suspected CNS malformation between 2010 and 2021 at Policlinico of Modena, University Hospital. For all cases we recorded: gestational age (GA) at US GA at fMRI, US and fMRI diagnosis, pregnancy outcome, postnatal or autoptic diagnosis. Malformations were categorized into 7 groups for analysis. The last US diagnosis before fMRI was used for comparison. We evaluated in which percentage the fMRI diagnosis differed from US and how it altered the management of the pregnancy.

**Results.** During the study period 97 pregnant women underwent fMRI (median GA at MRI: 30 (26.2-32.8) weeks) and a median time interval of 7 (2-12) days between US and fMRI. The fMRI diagnosis was different from the sonographic diagnosis in 29.9% (n = 29/97) of cases. The management was changed by the fMRI in 20/29 (69%) of cases, being ameliorated in 8/29 and worsened in 12/29. Considering the whole population, fMRI altered the management in 20.6% (20/97), worsening it in 12.4%.

In the worsened cases, in 4/12 fMRI showed additional cortical malformations, in 2/12 it showed germinal matrix cysts, in 1/12 it provided a diagnosis of teratoma, in the remaining cases it added additional information to characterize the anomaly. In cases with ameliorated prognosis (n = 8), in 2 cases the MRI did not confirm a suspicion of synechia, in 6 cases the MRI was normal with a US diagnosis of narrow-hidden CSP (4 cases) or biometry of the corpus callosum < 5<sup>th</sup> centile (n = 2). The pregnancy outcome was available for 80/97 (82.5%) fe-

tuses; the remaining 17 were lost at follow up. Eleven (11/80, 13.8%) women opted for termination of the pregnancy: among these, three autoptic reports were not available; in the remaining 8 the concordance with prenatal diagnosis was 100%.

Sixty-nine fetuses were liveborn (86.3%); a post-natal ultrasound or MRI was available in 41/69 (59.4%) with a different/additional postnatal diagnosis in only 6/41 cases (14.6%) which are presented in **Table 1**.

**Conclusions.** fMRI represents an important tool in cases with suspected CNS anomaly; it adds information in 20% of cases with a better identification of cortical anomalies.

**Table 1.** Comparison of prenatal and postnatal imaging (only additional findings are reported).

Prenatal diagnosis	Additional Postnatal findings	Time of postnatal imaging
Monolateral ventriculomegaly and septum in the left frontal horn	Malrotation of the left hippocampal region; hemosiderinic focus in the left cerebellum area	79 days
Bilateral Ventriculomegaly, interhemispheric cyst	White matter hyperintensity of the parietal area and optical radiations	534 days
Mega cisterna magna	White matter hyperintensity of the lobar area bilaterally; thrombosis of midollar veins	45 days
Mega cisterna magna	Arachnoid cyst in the temporal-polar area	223 days
Sub-arachnoid cyst	Dilatation of the cervical ependymal canal (hydro syringomyelia?)	64 days
Arachnoid interhemispheric cyst	Partial hypo-agenesis of the corpus callosum (reduced growth of the splenium)	81 days