

SARS-CoV-2 Infection During Pregnancy: Does Fetal MRI Show Signs of Impaired Fetal Brain Development?

PURPOSE

The world is kept in suspense by the ongoing pandemic of the novel coronavirus (SARSCoV-2). While pregnant women seem to be more vulnerable to COVID-19 and therefore may show more severe courses of the disease, the likelihood and impact of a vertical transmission to the fetus remains unclear. The purpose of this study was to use fetal MRI to investigate whether fetal brain development is affected in cases of SARS-CoV-2 infection during pregnancy.

METHODS AND MATERIALS

33 patients with SARS-CoV-2 infection during pregnancy were prospectively examined; fetal-MRI scans were acquired at 1.5 Tesla. T2-, T1-, and diffusion-weighted brain images were evaluated in consensus by two board-certified radiologists with 3 and 4 years of experience in fetal MRI. Structures of the brain stem and the posterior fossa were assessed quantitatively.

RESULTS

Mean gestational age (GA) was 28.4 weeks (min. 18 weeks; max. 39 weeks). Mean onset of symptoms was at 18.3 weeks GA, ranging from 4 to 34 weeks. Most common maternal symptoms were anosmia/hyposmia (29/33; 87.9%), ageusia (26/33; 78.8%), dry cough (19/33; 57.6%), fever (9/33; 27.3%) with a maximum temperature of 40.8°C (mean 38.6°C) and dyspnea (10/33; 30.3%). The assessed opercularisation of the Sylvian fissure, the cortical folding and the transverse cerebellar diameter were age-appropriate in all fetuses. Furthermore, a.p.-diameter and craniocaudal extent of pons, medulla oblongata, midbrain and cerebellar vermis were all within age-appropriate limits compared to an independent age-cohort (Dovjak et al., OUG 2021). No calcifications, edema or ventricular enlargement were detected. 7 fetuses showed mild asymmetry of the lateral ventricles with a maximum difference of 4 mm.

CONCLUSIONS

In 33 cases of SARS-CoV-2 infection during various stages of pregnancy all fetuses showed normal brain development, including cortical folding and brain stem segmentation. There were no findings indicative of infection of the fetal brain.

CLINICAL RELEVANCE/APPLICATION:

While evidence regarding vertical transmission of SARS-CoV-2 during pregnancy remains sparse our study did not reveal signs of infection or impaired development of the fetal brain on fetal MRI.