COVID-19 in pregnant women can damage the placenta and the fetus

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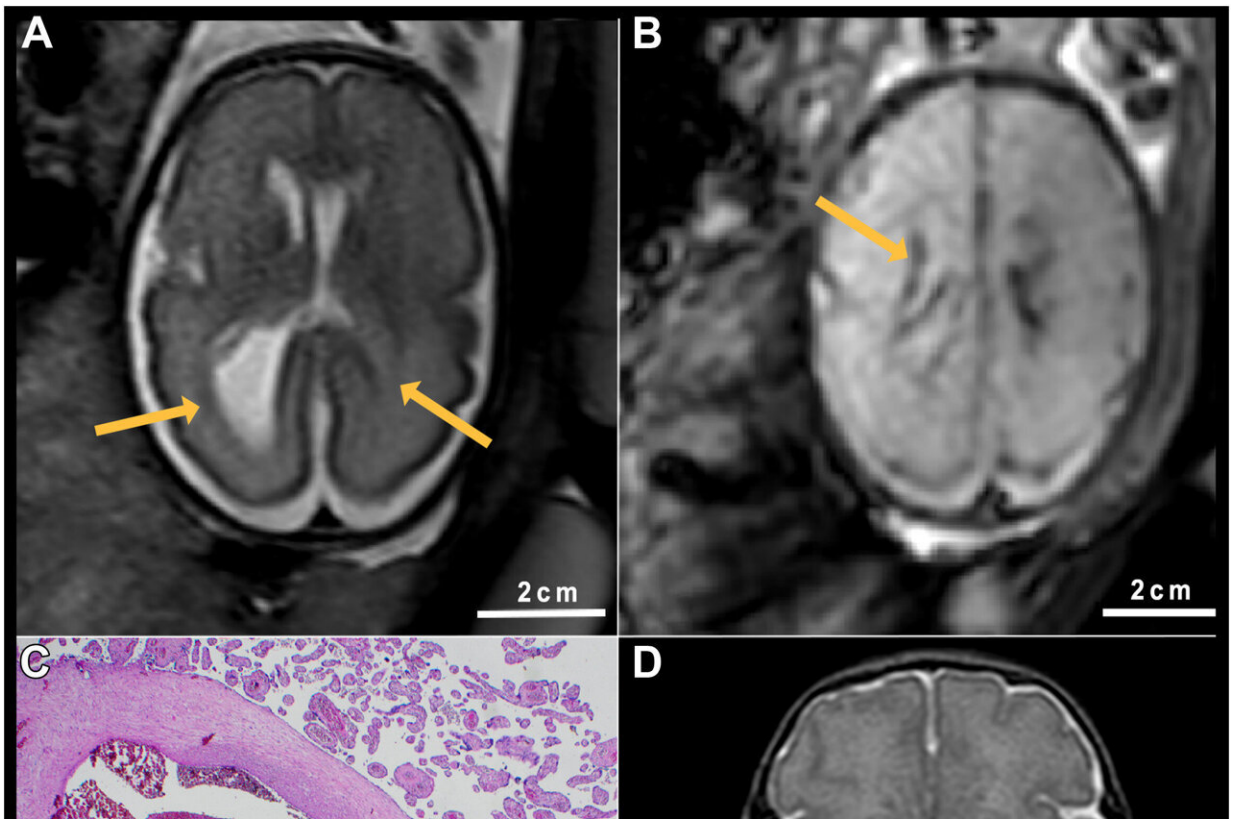

Case of infection with SARS-CoV-2 wild type. A. T2-weighted fetal MRI image at GW 27 + 1 with unilateral ventriculomegaly (arrows) Section at basal ganglion level. B. Blood-sensitive sequence in the same MRI session. The arrow points toward the hemorrhagic deposit of the ventricular wall. Note the placental stasis hemorrhage. Level at semioval center. C. Histological examination of the placenta in this case: Ectatic vessels with the presence of older, organized thrombi. D. T2-weighted sequence of the brain at seven days postpartum. The orange arrow points to a hemorrhagic lesion in the left thalamus. The blue star

marks a perinatal anatomical-left parieto-occipital infarction, characterized by hyperintensity of the white matter. Credit: *The Lancet Regional Health - Europe* (2023). DOI: 10.1016/j.lanepe.2023.100587

Using prenatal magnetic resonance imaging, a group of MedUni Vienna researchers examined the placentas and fetuses of women who tested positive for SARS-CoV-2 during pregnancy. Their research results demonstrate that the different strains of the virus that emerged during the pandemic led to varying degrees of damage: especially in pre-omicron variants, the detected placental lesions could potentially harm both development and health in some of the affected unborn children.

While such damage occurs more infrequently and is less severe with currently circulating omicron sub-lineages, the study authors still advocate early detection measures for pregnant women who test positive for coronavirus. The research was published in *The Lancet Regional Health—Europe*.

Contrary to previous studies, in which SARS-CoV-2-related abnormalities were only identified postnatally and/or through histopathological procedures, the MedUni Vienna research team focused on prenatal imaging findings.

Using prenatal magnetic resonance imaging (MRI), 76 scans of placentas and fetuses of pregnant women were performed in the study: 38 following a confirmed SARS-CoV-2 infection (pre-omicron or omicron variants) and 38 in healthy control cases. It was found that the placentas in both the pre-omicron and the omicron groups revealed abnormalities.

"Infections with pre-omicron variants, such as delta, led to significantly greater damage in the form of vascular events such as blood clots or

bleeding than with the omicron subvariants currently circulating through the population," noted lead author Patric Kienast of Department of Biomedical Imaging and Image-guided Therapy, outlining a key finding of the study.

It can be concluded that the fetuses of infected pregnant women were at a greater risk of impairment in the form of fetal growth restriction or vascular lesions in the organs and the brain at earlier points in the pandemic.

Fewer placental abnormalities in vaccinated women

The researchers attribute the varying extent of damage to the placenta caused by different virus strains to the fact that omicron sub-lineages are less likely than their predecessors to result in severe cases, and to higher vaccination rates as the pandemic has progressed. "In any case, our results showed that the two non-vaccinated study participants developed placental abnormalities following infection with SARS-CoV-2 omicron, compared with just one out of six of the women who had received three doses of the vaccine," confirmed senior author Gregor Kasprian, also from MedUni Vienna's Department of Biomedical Imaging and Image-guided Therapy.

Oxygen, nutrients and metabolic products are exchanged between mother and child in the placenta. Attached to the uterine wall, this organ forms such a strong barrier against the coronavirus that only 3% or fewer of fetuses whose mothers test positive for SARS-CoV-2 are also infected. But as the study shows, the placenta itself is not spared from complications caused by COVID-19. Subsequently, some unborn babies experience stunted growth or bleeding in the brain.

"This is why the placentas of pregnant women who have been infected with SARS-CoV-2 should be examined as soon as possible after testing

positive using prenatal imaging techniques," advised Daniela Prayer from MedUni Vienna's Department of Biomedical Imaging and Image-guided Therapy, citing the importance of scanning, particularly in the case of possible future coronavirus variants with mechanisms similar to delta, for example. By doing so, there is a chance to take measures to safeguard the health of the fetus in a worst case scenario.

More information: Patric Kienast et al, SARS-CoV-2 variant-related abnormalities detected by prenatal MRI: a prospective case–control study, *The Lancet Regional Health—Europe* (2023). DOI: 10.1016/j.lanepe.2023.100587

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