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Commentary

SARS-CoV-2 Infection during Gestational Ages

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STUDY DESCRIPTION

COVID-19 epidemic is presently spreading worldwide. The number of verified cases presently exceeding 11.5 million people, about deaths, and Italy representing one of the most affected countries. Severe COVID-19 cases parade a dysfunctional vulnerable response characterized by higher blood plasma levels of IL-1β, IL-2, IL-6, IL-7, IL-10, Granulocyte Colony-Stimulating Factor (G-CSF), IP-10 (CXCL10), MCP1 (CCL2), MIP1α (CCL3) and Tumor Necrosis Factor (TNF), that intervene wide lung inflammation and fail to successfully annihilate the pathogen.

Pregnancy is known to increase the threat of severe illnesses in response to viral infections. Thus, the impact of SARS-CoV-2 infection during gestational ages might be mischievous and the implicit transmission should be completely studied.

Real-time PCR was performed to detect the virus on maternal and newborns nasopharyngeal swabs, vaginal swabs, and umbilical cord plasma, placenta and umbilical cord necropsies, amniotic fluids and milk. Maternal umbilical cord plasma and milk were tested for specificanti-SARS-CoV-2 antibodies. RNA expression quantification of genes involved in the seditious response was performed on particular placentas. On maternal and umbilical cord plasma of the same subjects, chemokines were quantified.

SARS-CoV-2 is found in at- term placentae and in the umbilical cord blood, in the vaginal mucosa of pregnant women and in milk. Likewise, we report the presence of specificanti-SARS-CoV-2 IgM and IgG antibodies in the umbilical cord blood of pregnant women, as well as in milk samples. Eventually, a specific seditious response is elicited by SARS-CoV-2 infection in pregnant women at both systemic and placental level, and in umbilical cord blood plasma.

Maternal physiological acclimations to pregnancy are known to increase the threat of developing severe illness in response to viral infections, similar as influenza, primary data suggest that the prognostic of SARS-CoV-2 infection could be more severe as well in pregnant women. Vertical transmission of SARS-CoV and MERS, the two other animal coronaviruses known to infect humans, was no way proved to do. Thus, the number of reported cases of infected pregnant women was veritably low and not sufficient to draw firm conclusions.

On the other hand, as the number of SARS-CoV-2-positive cases is raising worldwide, multiple reports concentrate on SARS-CoV-2-positive pregnant women. No trace of the virus was detected by real-time PCR, so far, still, two independent articles described elevated SARS-CoV-2-specific IgG and IgM antibody levels in the blood of three newborns of SARS-CoV-2 infected mothers. As IgG, but not IgM, are typically transferred across the placenta, this is suggestive of in-utero infection. Furthermore, placental sub-membrane and cotyledon was reported positive to the virus in a 20 weeks miscarriage of a SARS-CoV-2-positive pregnant woman. A newly reported, the two known SARS-CoV-2 receptors Angiotensin Converting Enzyme 2 (ACE2) and Transmembrane Protease Serine 2 (TMPRSS2) are extensively spread in specific cell types of the maternal-fetal interface. Thus, the impact of the virus on placenta and the potential transmission of SARS-CoV-2 need to be farther precisely addressed.

This commentary explosively supports the hypothesis that in-utero vertical transmission is possible in SARS-CoV-2 positive pregnant women. This is essential for defining proper obstetric organization of COVID-19 pregnant women, or acknowledged indications for mode and timing of delivery. We also investigated the role of the antibody and the inflammatory responses in placenta and plasma from SARS-CoV-2-positive pregnant women and fetuses.

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