COVID-19 IN PREGNANCY: SARS-COV-2 INFECTION-CAUSED MORPHOLOGICAL CHANGES AND DECREASED HLA-G EXPRESSION

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Background: After COVID-19 pandemic, one of the major concerns has been represented by the effects of SARS-CoV-2 infection in altered immune conditions, such as pregnancy, and the factors involved in different susceptibility of pregnant women [1, 2].
Aim: Assess the tissue-level tropism and impact of SARS-CoV-2 infection in gestational COVID-19.
Methods: 7 subjects with clinical manifestations of respiratory SARS-CoV-2 infection have been evaluated for alteration at a morphological level in the villi (of both placenta and chorion), chorionic and basal plate, and umbilical cord tissues, comparing the findings with those of 7 non-COVID control subjects.
The analysis have been performed by immunohistochemistry (IHC) in order to measure the expression of Human Leukocyte Antigen-G (HLA-G) and SARS-CoV-2 Nucleoprotein (NP).
Results: None of the umbilical cords stained for NP, however both the placental and chorionic villi, chorionic and basal plate, respectively, were positive for NP antigen with statistical significance ($p<0.01$). Samples from the placenta and chorionic villi had the highest NP positive. Leukocyte infiltration in the basal plate and significant concentrations of the fibrinoid component in placental and chorionic villi samples were linked with the presence of NP staining. While, independently from NP staining, all placental and chorionic villi samples tested positive for HLA-G. HLA-G was expressed in half of the basal plate samples resulted positive for NP and all of the NP positive chorionic plate samples. In contrast, all non-COVID participants' tissue samples tested positive for HLA-G and had higher H-scores than pathological samples ($p<0.05$).
Conclusions: Changes in morphology and a reduction in HLA-G expression in comparison to the control group are associated with the presence of SARS-CoV-2 NP in prenatal tissues. These findings raise the possibility that SARS-CoV-2 infection may have an impact on changes in morphology and protein expression during pregnancy, which may have an effect on the probability to be infected, gestational problems, and transmission from the mother to the fetus/new born.

Keywords: COVID-19; pregnancy; HLA-G; immunohistochemistry

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