Clinical Pearl: Transplacental SARS-CoV-2 Antibody Transfer: Yes?!

Joseph R. Hageman, MD, Mitchell Goldstein, MD

Our daughter lives in rural Illinois with her husband and three girls, ages 6, 4, and 2 years. They live on a farm and have been very careful, and have worked hard to remain healthy and safe. She is pregnant at 19 weeks' gestation, and things have been going well. That is, until eight days ago, when her husband developed a cough and some fever. His father also became symptomatic, and now she and her daughters have all developed some congestion and various signs and symptoms of COVID-19, including some fever, cough, diarrhea, muscle aches, and fatigue. She, her husband, and his father have all been tested and are positive by nasopharyngeal RCT-PCR test. The children are presumed to be positive. This morning when she awoke and tried to take a deep breath, she had pleuritic chest pain and dyspnea. They have had a pulse oximeter, and her oxygen saturation was 97% in room air. She called her obstetrician, who felt it best for her to go to the hospital's emergency department, where she had delivered her three daughters. She drove herself to the hospital. There she was afebrile and remained in room air. Her chest radiograph was unremarkable. She was given an albuterol inhaler with a spacer and took 2 puffs with subsequent improvement in her ability to breathe and increase her cough productivity. Her laboratory studies were all within normal limits, including her D-dimer and a negative myoglobin test, except for a potassium level of 3.2 mEq/L and her electrocardiograms were also normal. After a discussion with her physicians on oral hydration, she was discharged home, acetaminophen for the chest discomfort, and her albuterol inhaler with spacer q 4-6 hours, her pulse oximeter, and with close follow up. As of January 6, she continues to improve, and her baby is moving in utero.

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So what do we know about the clinical course and risks to pregnant women with COVID-19 infection/disease during Pregnancy during the second and third trimester?

First of all, there are changes in the immune system of pregnant women as described by Wadman et al.:

"Pregnancy does appear to make women's bodies more vulnerable to severe COVID-19, the disease caused by SARS-CoV-2. That is partly because of pregnant women's uniquely adjusted immune systems, and partly because the coronavirus' points of attack—the lungs and the cardiovascular system—are already stressed in pregnancy" (1).

Secondly, In the study by Ellington et al., SARS-CoV-2 infection in Pregnancy was associated with hospitalization and increased risk for intensive care unit admission and receipt of mechanical ventilation, but not with death (2). If a pregnant woman with SARS-CoV-2 is sick enough to be admitted to the hospital, she is considered high risk for developing severe SARS-CoV-2 disease.

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There is also a nationwide prospective cohort study, PRIORITY or **P**regnancy Co**R**onav**I**rus **O**utcomes **R**eg**I**s**T**r**Y,** organized by Afshar, Gaw, Flaherman, Jacoby, and co-investigators at the University of California San Francisco. This study collected clinical data from 736 pregnant or recently pregnant women with SARS-COV-2 positive (N= 594) or patients under investigation (PUIs = 142 who tested negative) from across the United States to describe the clinical presentation, symptomatology, and disease course of known or suspected COVID-19 disease in Pregnancy who were enrolled and followed up for one year (3). This paper was just published in December and is different from Ellington's study in that most of these women had mild illness and were seen as outpatients (3). These patients were collected between March 20, 2020, and July 10, 2020. The most prevalent symptoms in the first week after diagnosis were cough (46%), fatigue (38%), and headache (25%), with symptoms usually resolving within a

month (3). By week four after diagnosis, 60% were asymptomatic; however, 25% were still symptomatic at week eight post-diagnosis (3) in those patients who tested positive for SARS-CoV-2 (3).

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How about the rate of preterm birth and stillbirth during this pandemic? Concerning stillbirth, a study done by Stowe and colleagues in England comparing pre-pandemic and pandemic stillbirth rates revealed no increase in stillbirth rates (4). In Philadelphia, changes in preterm birth rates and stillbirth during the SARS-CoV-2 pandemic from March-June 2020 were examined, and no increase in preterm birth rate or increase in stillbirths was noted (5). This finding is in contrast to a study from a single London hospital by Khalil et al. that reported an increase in stillbirth rates (6).

Early reports of decreased preterm birth and subsequent admission to the NICU must be looked at in context as well. As many have been heeding the orders to shelter and avoid crowds, could the incidence of very early loss be under appreciated and under reported? Some of the symptomatology of CoV-2 infection may mask early spontaneous abortion.

There has been discussion about the differences in morbidity and mortality in Hispanic or black patients with SARS-CoV-2 infection. Here is a quote from the paper in the *Morbidity and Mortality Weekly Report (MMWR)* by Ellington and colleagues:

"Although data on race/ethnicity were missing for 20% of pregnant women in this study, these findings suggest that pregnant women who are Hispanic and black might be disproportionately affected by SARS-CoV-2 infection during pregnancy (2)."

"During the study period, among pregnant women with laboratory-confirmed SARS-CoV-2 infection who reported race/ethnicity, 46% were Hispanic, 22% were black, and 23% were white; these proportions differ from those among women with reported race/ethnicity who gave birth in 2019: 24% were Hispanic, 15% were black, and 51% were white.†† Although data on race/ethnicity were missing for 20% of pregnant women in this study, these findings suggest that pregnant women who are Hispanic and black might be disproportionately affected by SARS-CoV-2 infection during pregnancy" (2). In the PRIORITY study, an effort is ongoing to collect more patients of color to provide more clinical information about these women's course and provide ongoing follow up (3).

Disparity may play an important role in access to care and the circumstances that allow for CoV-2 disease to spread more rapidly. Crowded, shared living spaces in apartment complexes with common ventilation systems may ultimately be implicated, especially in expectant mothers experiencing poverty.

We will continue to closely follow the available literature to provide clinicians further perspective about the diagnosis, management, vaccination, and ongoing care of pregnant women with COVID-19 disease and their infants.

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Corresponding Author

Joseph R. Hageman, MD
Senior Clinician Educator
Pritzker School of Medicine
University of Chicago
MC6060
5841 S. Maryland Ave.
Chicago, IL 60637
Phone: 773-702-7794
Fax: 773-732-0764
jhageman@peds.bsd.uchicago.edu

Mitchell Goldstein, MD
Professor of Pediatrics
Loma Linda University School of Medicine
Division of Neonatology
Department of Pediatrics
mgoldstein@llu.edu

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