

Clinical Pearl:

What about Antibody Response and Transfer in Pregnant Women Who Have Had SARS-CoV-2 Infection Compared to those Receiving the Vaccine?

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“Dr. Borders summarized that pregnant women who received the vaccine had comparable vaccine-related side effects compared with non-pregnant women who were vaccinated. There were no untoward effects on the fetus in this group of pregnant women who received the COVID-19 vaccine as per the American College of Gynecology Practice Advisory (1).”

Our daughter and her family have had SARS-CoV-2 infection and have recovered. She is now 31 weeks pregnant, and it has been over 90 days since they were symptomatic. She and her husband have received the Moderna COVID-19 vaccine is being offered at a local pharmacy after she called her obstetrician, who gave her a note stating that it is safe for her to get the vaccine. She had a sore arm and some nausea, fatigue, body aches, and a mild headache after her first vaccine. After the second vaccine, she had fatigue and mild nausea intermittently for about 24 hours (personal communication, K. Jakobs, 04/13/2021). What are the data? In a recent Illinois Perinatal Quality Collaborative COVID-19 informational update coordinated by Dr. Ann Borders, Maternal-Fetal Medicine (MFM) obstetrician from the NorthShore University HealthSystem, data on over 77,960 pregnant women who received either the Pfizer or Moderna vaccine were presented from the vSafe website (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/vsafe.html>). Dr. Borders summarized that pregnant women who received the vaccine had comparable vaccine-related side effects compared with non-pregnant women who were vaccinated. There were no untoward effects on the fetus in this group of pregnant women who received the COVID-19 vaccine as per the American College of Gynecology Practice Advisory (1). A summary of studies in animals receiving a [Moderna, Pfizer-BioNTech](#) COVID-19 vaccine before or during pregnancy found no safety concerns (2).

However, what data are available for pregnant women who have had clinical COVID-19 infection, then recover and receive the vaccine? To my knowledge, I have not seen any follow-up data re antibody responses in pregnant women who have had SARS-CoV-2 infection, recovered, and then received the COVID-19 vaccine. One small study by Saadat and colleagues followed health care workers who have had COVID-19 infection, then received the COVID-19 vaccine; 70-88% of workers were women (3). Health care workers who were previously infected with SARS-CoV-2 had higher antibody titers that started peaking at seven days post vaccine and achieved higher titers and neutralization in 14 days compared with antibody-negative volunteers (3). The workers received ei-

ther the Pfizer-BioNTech or Moderna vaccine (3).

In a study by Flannery and colleagues, maternal IgM and IgG were measured in pregnant women with SARS-CoV-2 infection. Cord blood was also collected from the newborn infants, and IgM and IgG were also assayed. Cord IgG was detected in 72 of 83 babies (87%) born to mothers who had and recovered from SARS-CoV-2 infection (5). The placental transfer ratio of maternal IgG exceeds 1.0 in this study (5). Also, in this group of mothers, 50 of 83 (60%) were clinically asymptomatic during their SARS-CoV-2 infections (5).

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Gilbert and Rudnick described a term infant born to a COVID-19 naïve mother who had received a single dose of Moderna mRNA vaccine for SARS-CoV-2 three weeks prior to delivery. Antibodies (IgG) to the S-protein of SARS-CoV-2 were detected in the cord blood from this infant (4).

“The vaccine-induced immune responses were equivalent in pregnant and lactating vs. non-pregnant women (6). The responses were higher than that in pregnant women with SARS-CoV-2 infection as well (6).”

Finally, in a cohort study, Gray and co-investigators measured IgG, IgA, IgM in a group of 84 pregnant, 31 lactating, and 16 non-pregnant women following Pfizer-BioNTech or Moderna mRNA vaccination and compared the titers with pregnant women with native infection (6). They also measured IgG in cord blood in 10 babies, breastmilk at baseline, second vaccine dose, 2-6 weeks post second vaccine, and delivery (6). The vaccine-induced immune responses were equivalent in pregnant and lactating vs. non-pregnant women (6). The responses were higher than that in pregnant women with SARS-CoV-2 infection as well (6).

ACOG and SMFM recommend pregnant women talk with their obstetrician and make an informed decision on whether to receive one of the vaccines. However, their recommendation is to receive the vaccine. It appears that transplacental antibody transfer (IgG) following maternal SARS-CoV-2 infection or following mRNA vaccination is significant for their infants in the studies thus far. In an editorial by Munoz, what is not clear is whether this IgG transplacental transfer is clinically protective if the newborn becomes clinically ill with SARS-CoV-2 infection (7).

“Although most neonatal patients and younger pediatric patients have mild disease, as the virus mutates, the extent to which younger patients are affected or develop MIS-C may increase dramatically. Only by decreasing the spread in those eligible for vaccination can we hope to decrease the likelihood of a more virulent strain developing.”

Regardless of whether the transplacental transfer is sufficient to prevent neonatal disease, the window of opportunity is perhaps closing. With different variants of SARS-CoV-2 evolving and the

specter of spike protein configuration changes decreasing the effectiveness of the present vaccination options, increasing the rate of vaccination of those at most risk now appears logical. Although most neonatal patients and younger pediatric patients have mild disease, as the virus mutates, the extent to which younger patients are affected or develop MIS-C may increase dramatically. Only by decreasing the spread in those eligible for vaccination can we hope to decrease the likelihood of a more virulent strain developing.

References:

1. ACOG Clinical Practice Advisory. Vaccinating pregnant and lactating patients against COVID-19. Updated March 4, 2021.
2. https://www.cdc.gov/coronavirus/2019_ncov/vaccines/recommendations/pregnancy.html.
3. Saadat S, Tehrani ZR, Logue J et al. Binding and neutralization antibody titers after a single vaccine dose in health care workers previously infected with SARS-CoV-2. JAMA Published on line March 1, 2021. Doi:10.1001/jama.2021.3341.
4. Gilbert P, Rudnick C. Newborn antibodies to SARS-CoV-2 detected in cord blood after maternal vaccination. <https://www.medrxiv.org/content/10.1101/2021.02.03.21250579v1>.
5. Flannery DD, Gouma S, Dhudasia MB et al. Assessment of maternal and neonatal cord blood SARS-CoV-2 antibodies and placental transfer ratios. JAMA Pediatr. Doi:10.1001/jamapediatrics.2021.0038.
6. Gray KJ, Bordt EA, Atyeo EA et al. COVID-19 vaccine response in pregnant and lactating women: A cohort study. MedRxiv preprint doi: 10: <https://doi.org/10.1101/2021.03.07.21253094>. This version was published March 8, 2021.
7. Munoz FM. Can we protect pregnant women and young infants from COVID-19 immunization? JAMA Pediatr doi: 10.1001/jamapediatrics.2021.0043. Published January 29, 2021.

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