Clinical Pearl: The COVID-19 Vaccine and Viral Variants

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Once the vaccine is available, our lives, professional and private, will go back to "normal'. The vaccine will be available to pregnant women and children for this SINGLE, UNIQUE virus, and they will be protected. The pregnant women will produce antibodies that will be transferred transplacentally to their fetuses, right? Will it be just like the flu vaccine that is given during pregnancy, where the immune response by the mother helps protect the newborn infant (1)? Here is information from the Center for Disease Control and Prevention (CDC): "Pregnant women who get a flu vaccine also are helping to protect their babies from flu illness for the first several months after their birth, when they are too young to get vaccinated. A list of recent studies on the benefits of flu vaccination for pregnant women is available" (2). Of course, we all are aware that: "only small amounts of maternal IgG are transferred in the first trimester, with an estimated transplacental transfer of approximately 10% of maternal IgG concentrations by 17–22 weeks' gestation. The concentration of maternal IgG in infant cord blood reaches approximately 50% of the maternal IgG levels by 30 weeks' gestation, and by 37–40 weeks of gestation, infant cord blood concentrations of maternal IgG often exceed that of maternal serum by the delivery time point in full-term, healthy pregnancies. Thus, while maternal IgG is transferred across the placenta throughout pregnancy, the majority of the transfer occurs in the last trimester of gestation" (3).

"Thus, while maternal IgG is transferred across the placenta throughout pregnancy, the majority of the transfer occurs in the last trimester of gestation" (3)."

However, there is a problem. First of all, the vaccine testing has not included pregnant women and children (4), although Heath and colleagues and Malhotra et al. support their inclusion using very carefully designed studies (5). Lurie, Sharfstein, and Goodman also encourage the involvement of pregnant women, including those who risk exposure as health care workers, and young children, who are at risk for the development of multi-system inflammatory syndrome (MIS-C) (7).

There is another important issue that all of us as providers may be aware of, and that is the fact that there is an amino acid variant of the original SARS-CoV-2 (D614 Spike protein) that is now causing COVID-19 infection/disease around the world: SARS-CoV-2 D614G Spike protein) and may have a "fitness advantage" (8). In infected individuals, G614 is associated with lower RT-PCR cycle thresholds, which is suggestive of higher upper respiratory tract viral loads, but not increased disease severity (8). The fact that this variant is associated with less severe disease is reassuring; however, the question that comes to mind is, are the vaccines being developed taking this new variant, and the possibility that there may be other variants or mutations of the virus into account? If the vaccine involves components of the spike protein, which we realize is the major mechanism involved in the ability of the virus to enter the cell in the human respiratory tract, then the immune response of the patient to the vaccine or other immune-based interventions may be different or attenuated (8). OCallaghan, Glatz, and Offit discuss the five core candidate vaccines in development, all of which are aimed at inducing antibodies directed against the receptor-binding domain of the surface spike (S) protein of SARS-CoV-2 (9).

Finally, for this pearl, Lurie et al. note that investigators should be aware of and look for more severe illness in vaccinated individuals who nevertheless develop COVID-19 (7).

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The authors has no conflicts to disclose

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