



Vertical Transmission of Covid-19 Antibodies and Neonate Immunity

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Introduction

Due to the novelty of the Covid-19 virus, there is limited information about the Covid-19 vaccines available to help direct doctors and individuals on making informed decisions about their bodies and overall health. This is especially true in regards to the effects of the Covid-19 vaccine for pregnant women and their children.

Due to Covid-19 being a relatively new virus, there have been limited studies in this regard, especially since the initial clinical trials performed for the approved vaccines from Pfizer and Moderna did not include pregnant populations. Since there is a lack of infant formulated covid vaccines, we need to know the best way to protect infants until one is procured.

Generally, antibodies from a mother's breastmilk have been proven to protect their baby for the short term while the infant's immune system is developing. Physicians were hopeful that covid antibodies found in breastmilk could offer passive immunity to neonates.

The two main types of antibodies found in breast milk that were thought to offer passive immunity were IgA and IgG. IgA is the primary type of antibody that offers immunity to infants, mainly by coating the infant's mucosa and preventing pathogens such as viruses or bacteria to be able to adhere and gain entry into cell surfaces.

IgM is a sign of acute infection while development of IgG in adults and infants is an indication of long-term immunity.

There are many published studies that have proven that covid antibodies are abundant in the breast milk of a vaccinated mother, especially IgA and IgG, but the research has proven that these antibodies do little to offer any protection to their infants.. Other studies have alternatively shown that Covid-19 antibodies can be transferred vertically from mother to baby through the placenta from mothers who were vaccinated during their pregnancy. This literature review discusses a study that supports long term immunity being achieved through placental transmission of antibodies.

Methods

The participants of the study consisted of 122 pregnant mothers who received one or two Covid vaccines. Maternal blood samples were tested in weekly intervals after receiving both doses and antibody measurements were plotted. Placental blood samples were also taken in weekly increments post vaccine and tested for antibodies. To ensure that the results were not a result of a prior covid infection, only mothers who tested negative for the Covid nucleocapsid protein antigen were included in the study. This ensured that the antibodies present in the samples were due to a response to the vaccine and not to a prior acute respiratory coronavirus infection. They studied the maternal antibody response over time to see if the antibodies produced were passively passed to the infant.

Results

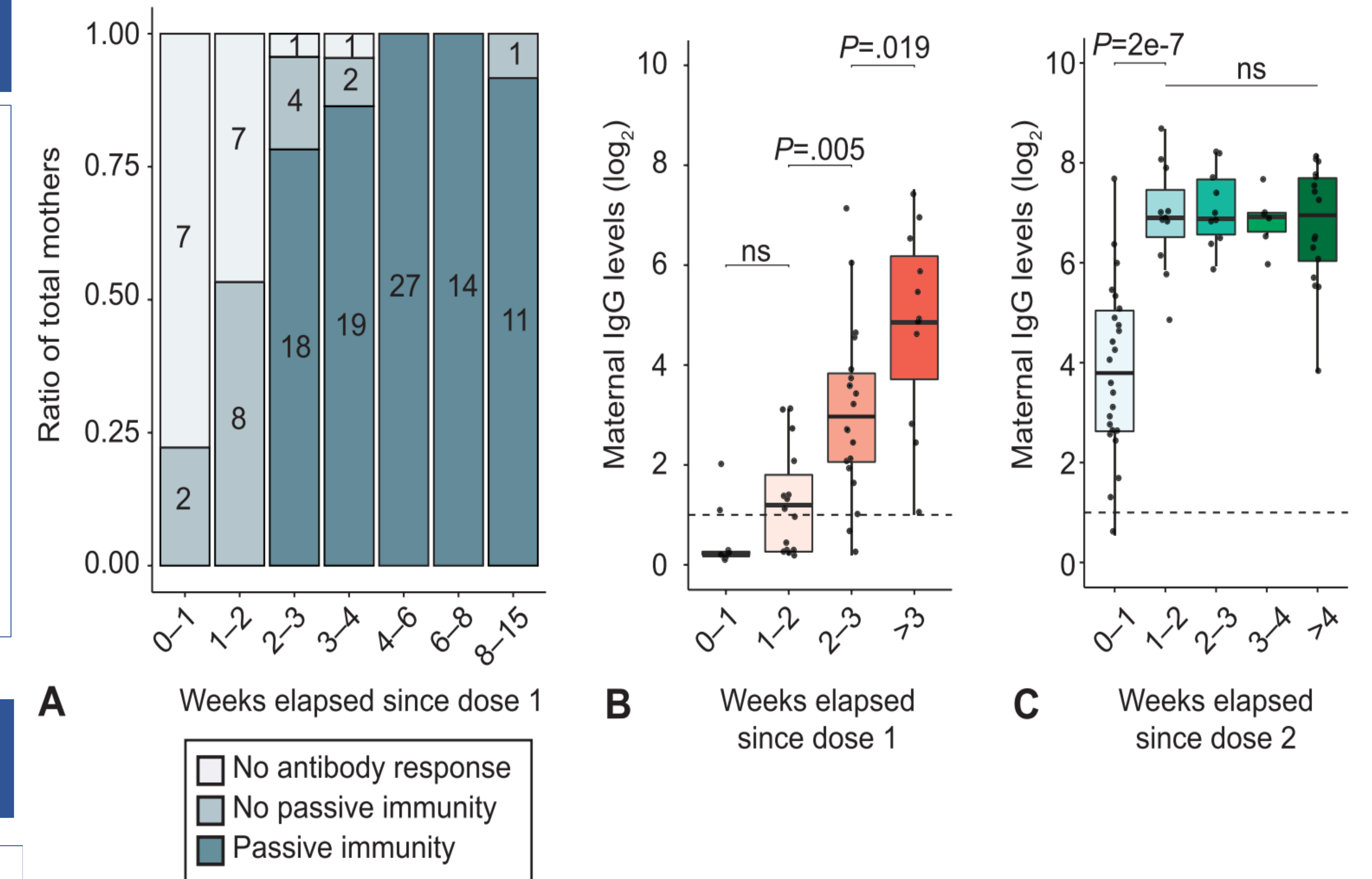
This study found that there was a positive correlation between time elapsed from vaccination and achieving passive immunity. As time increased from when they were vaccinated, passive immunity also increased. Higher levels of maternal antibody response also correlated with a higher ratio of passive immunity to the infant. By week 4 post-vaccine, all women and cord blood samples were positive for IgG. The earliest detection of IgG antibodies in the cord blood was day 16 post vaccine dose one.

They found that one dyad did not achieve passive immunity when the mother was 10 weeks post dose one and six weeks post vaccine dose two.

This study also showed that the amount of passive immunity increased with mothers that received two doses of the vaccine. Forty-four percent of cord blood samples were positive for IgG from mothers who had one vaccine, however ninety-nine percent of cord blood samples were positive for IgG from mothers who received two doses of vaccine.

References

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Conclusions

The results of the study show that it is possible for a mother to provide passive immunity to their infant through placental transmission.

A positive relationship between the number of weeks after getting vaccinated and a higher ratio of passive immunity to the infants was demonstrated which can help guide mothers on timelines to consider getting vaccinated before delivery.

Until a vaccine is approved for infant or child use, knowledge on how to best protect children during the Covid-19 pandemic is crucial to help families make better, informed decisions about their health. Further studies are needed to help guide vaccination strategies for pregnant mothers.

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