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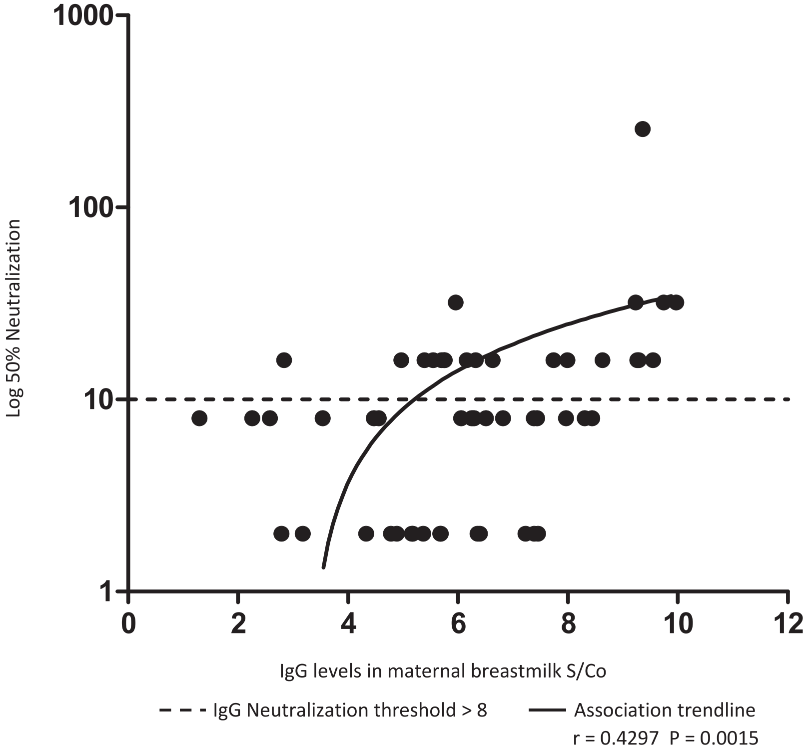
Presence of SARS-CoV-2 antibodies in lactating women and their infants following BNT162b2 messenger RNA vaccine

OBJECTIVE: Pregnant and lactating women were excluded from the initial clinical trials in which the safety and efficacy of the BNT162b2 messenger RNA vaccine were evaluated. Consequently, recommendations regarding vaccination of pregnant and lactating women were equivocal.[1] Therefore, our aim was to assess whether SARS-CoV-2 immunoglobulins (Igs) can be detected in breastmilk samples of lactating women following SARS-CoV-2 vaccination and whether it can be detected in the serum and oral mucosal secretions of their breastfed infants.

STUDY DESIGN: This was a longitudinal cohort study, conducted between December 2020 and April 2021. Samples were collected from lactating women who were vaccinated against COVID-19 after delivery and their breastfed infants. Blood samples and breastmilk were obtained from all study participants, and dried blood spot (DBS) samples from breastfed infants were collected on Guthrie cards. In addition, the saliva of infants was collected from oral mucosa immediately after breastfeeding and at 30, 90, and 150 minutes after breastfeeding. All serum samples were tested

FIGURE

Association between SARS-CoV-2 IgG levels in breast-milk of vaccinated women to neutralization capacity



IgG, immunoglobulin G; *S/Co*, sample cutoff.

Schwartz. SARS-CoV-2 antibodies in lactating women and their infants following BNT162b2 vaccine. Am J Obstet Gynecol 2021.

for the presence of SARS-CoV-2 IgG. DBS and milk samples were tested for SARS-CoV-2 IgG and IgA by a receptor-binding domain enzyme-linked immunosorbent assay, and a sample cutoff (S/Co) of $\geq$1.1 was considered a positive result. In addition, a neutralization assay was performed on milk samples using a green fluorescent protein reporter-based pseudotyped virus with a vesicular stomatitis virus backbone coated with SARS-CoV-2 spike protein. Sera, not capable of reducing viral replication by 50% at a dilution of 1 to 8, were considered nonneutralizing. Women who were diagnosed with COVID-19 infection and those who were vaccinated before birth were excluded.

RESULTS: Maternal sera and breastmilk samples were obtained from 61 participating women. All maternal serum and breastmilk samples were positive for SARS-CoV-2 IgG with median concentrations of 31.7 S/Co (interquartile range [IQR], 25.1−38.1) and 6.3 S/Co (IQR, 5.1−7.4), respectively. There was a significant positive correlation between the SARS-CoV-2 IgG levels in the maternal serum samples and those in breastmilk samples (r=0.514; *P*=.0001). Moreover, 18 of 47 milk samples (38.3%) were found to neutralize SARS-CoV-2 infectivity (Figure). SARS-CoV-2 IgG was detected in the oral mucosa of 3 of 5 (60%) breastfed infants. However, all of the DBS samples obtained from 21 infants were negative for these antibodies. SARS-CoV-2 IgA in secretory form was detected in 15% of the breastmilk samples with a median of 0.4 S/Co (IQR, 0.3−0.7).

CONCLUSION: In this longitudinal cohort study, lactating women vaccinated against COVID-19 were found to have SARS-CoV-2 IgG in their breastmilk samples, and nearly half of the samples enabled neutralization of SARS-CoV-2 infectivity. IgG antibodies were found in the oral mucosa of 3 (60%) of the infants' samples, but IgG antibodies were not found in their circulation. To date, there are 3 studies of vaccinated lactating women, which enrolled 5, 31, and 84 women, respectively. All of these studies found vaccine-generated IgG and IgA antibodies in breastmilk samples,[2–4] however, none evaluated the neutralizing capacity of breastmilk antibodies or the presence of antibodies in the infants' serum or oral mucosa. Our findings may suggest that breastfed infants acquire passive immunity against COVID-19. However, in view of our observation that SARS-CoV-2 IgG was not detected in the infants' serum, it seems that vaccination during pregnancy may provide better protection to the infants through transplacental passage of antibodies.[5] ■

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Copper intrauterine device and incident sexually transmitted infections

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OBJECTIVE: Our objective was to evaluate the association between copper intrauterine devices (IUDs) and the risk for incident sexually transmitted infections (STIs). Some reports have noted a decrease in the risk for infection associated with the copper IUD, such as pelvic inflammatory disease and human papilloma virus infections,[1,2] whereas other studies have not found any association.[3] We hypothesized that the copper IUD would be associated with a reduced risk for STIs when compared with the hormonal IUDs.

STUDY DESIGN: We conducted a secondary analysis of the Contraceptive CHOICE Project (CHOICE) data.[4] CHOICE

TABLE
Logistic regression model results of the association between patient characteristics, behavioral factors, contraceptive use, and the risk of STI

Crude	OR	95% CI	
Hormonal IUD (n=1266)	Ref		
Copper IUD (n=353)	0.34	0.14	0.86
Implant (n=483)	1.36	0.84	2.20
DMPA (n=159)	0.77	0.30	1.97
PPR (n=433)	0.39	0.18	0.87
Adjusted	**ORadj**	**95% CI**	
Hormonal IUD	Ref		
Copper IUD	0.50	0.19	1.27
Implant	1.03	0.61	1.75
DMPA	0.49	0.17	1.41
PPR	0.46	0.20	1.04
Age, 14–24 y	2.63[a]	1.54[a]	4.50[a]
Black	2.68[a]	1.57[a]	4.59[a]
Other	1.56	0.57	4.26
History of STI	1.27	0.81	1.99
Single	1.66	0.90	3.07
Separated or divorced or widowed	3.34[a]	1.26	8.80[a]
Always using condom	0.70	0.21	2.29
New sexual partner	2.20[a]	1.40[a]	3.44[a]

Data are presented as number.

Covariates were considered confounders and were included in the multivariable model if they altered the effect estimate by ≥10% when added to the model.

CI, confidence interval; *DMPA*, depot medroxyprogesterone acetate; *IUD*, intrauterine device; *OR*, odds ratio; *PPR*, pills, patch, or contraceptive ring; *Ref*, reference; *STI*, sexually transmitted infection.

[a] Statistical significance in the multivariable model.

Peipert. Copper intrauterine device and sexually transmitted infections. Am J Obstet Gynecol 2021.