BREASTFEEDING MEDICINE
Volume 15, Number 8, 2020

DOI: 10.1089/bfm.2020.0183

Negative Transmission of SARS-CoV-2 to Hand-Expressed Colostrum from SARS-CoV-2–Positive Mothers

Miguel Ángel Marín Gabriel,[1,2] Ana María Malalana Martínez,[1]
María Eugenia Marín Martínez,[3] and Jorge Anel Pedroche[4]

Abstract

Aim: The objective of our study was to determine whether the SARS-CoV-2–positive mothers transmit the virus to their hand-expressed colostrum.
Methods: This is an observational prospective study that included pregnant women who tested positive for SARS-CoV-2 by PCR test on a nasopharyngeal swab at the moment of childbirth and who wanted to breastfeed their newborns. A colostrum sample was obtained from the mothers by manual self-extraction. To collect the samples, the mothers wore surgical masks, washed their hands with an 85% alcohol-based gel, and washed their breast with gauze that was saturated with soap and water.
Results: We obtained seven colostrum samples from different mothers in the first hours postdelivery. SARS-CoV-2 was not detected in any of the colostrum samples obtained in our study.
Conclusion: In our study, breast milk was not a source of SARS-CoV-2 transmission. Hand expression (assuring that a mask is used and that appropriate hygienic measures are used for the hands and the breast), when direct breastfeeding is not possible, appears to be a safe way of feeding newborns of mothers with COVID-19.

Keywords: SARS-CoV-2, colostrum, manual extraction, newborn, COVID-19

Introduction

Since the beginning of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, 8,018,963 cases and a total of 436,138 deaths have been reported, which implies a fatality rate of 5.4%. Respiratory droplets, secretions, and fomites that have been in direct contact with them, are known to be the primary modes of SARS-CoV-2 transmission.

There is insufficient evidence regarding the possibility of SARS-CoV-2 transmission through other bodily fluids such as, in the case of the mother–child dyad, breast milk. Even if transmission through breastfeeding were to occur, it would remain necessary to evaluate the long-term risks associated with discontinuing breastfeeding on the breastfeeding infant, considering that the majority of the SARS-CoV-2 cases reported in children run their course with mild symptoms. For this reason, under the current circumstances, the World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), European Pediatric Association/Union of National European Pediatric Societies and Associations (EPA/UNEPSA), and the Centers for Disease Control and Prevention (CDC) recommend breastfeeding, while adhering to basic hygienic guidelines, due to the demonstrated nutritional and immunological benefits that it provides.

The objective of our study was to determine whether the SARS-CoV-2 is excreted in colostrum. This was an observational prospective study that included a convenience sample of pregnant women who tested positive for SARS-CoV-2 by PCR test on a nasopharyngeal swab at the moment of childbirth and who wanted to breastfeed their newborns, once the newborns were found to be infection-free (by a negative SARS-CoV-2 PCR test on nasopharyngeal swab). After the signing of the informed consent forms, data regarding the medical history of the mothers, their pregnancies, the

[1]Department of Pediatrics, Neonatal Unit, Puerta de Hierro-Majadahonda University Hospital, Madrid, Spain.
[2]Department of Pediatrics, Autónoma University, Madrid, Spain.
Departments of [3]Obstetrics and Gynecology and [4]Microbiology, Puerta de Hierro-Majadahonda University Hospital, Madrid, Spain.

Table 1. Maternal, Neonatal, and Breast Milk Characteristics

	Patient 1	*Patient 2*	*Patient 3*	*Patient 4*	*Patient 5*	*Patient 6*	*Patient 7*
Maternal characteristics							
Age (years)	35	32	31	31	36	37	32
Symptoms before delivery (days)	0	0	60	0	0	0	0
Signs and symptoms							
Asymptomatic	Yes	Yes	No	Yes	Yes	Yes	Yes
Fever	No	No	Yes	No	No	No	No
Malaise	No	No	Yes	No	No	No	No
Myalgia	No	No	Yes	No	No	No	No
Headache	No	No	Yes	No	No	No	No
White blood cell count ($\times 10^3$ cells/μL)	9.25	12.92	5.02	10.78	10.57	10.02	9.47
Lymphocyte count ($\times 10^3$ cells/μL)	1.95	0.78	0.79	1.92	1.73	1.43	1.95
Hemoglobin (g/dL)	13.1	12.5	11.8	12.1	11.9	13.5	11.4
Platelets ($\times 10^3$ cells/μL)	250.00	245.00	243.00	390.00	254.00	215.00	256.00
C-reactive protein concentration (mg/L)	5.5	25.6	44.6	9.4	1	5.8	1.5
AST (U/L)	23	35	26	18	22	22	16
ALT (U/L)	11	12	35	11	17	17	13
D-Dimer (μg/mL)	1.39	6.16	0.73	3.09	NA	0.34	1.74
Nasopharyngeal swab on delivery	Positive	Positive	Positive	Positive	Positive	Positive	Positive
Delivery							
Method of delivery	Vaginal	Vaginal	Vaginal	Vaginal	Vaginal	C-section	Vaginal
Gestational age, (weeks+days)	40+4	40+4	40+4	41+2	41	41+1	38+3
Apgar score at 1 minute	7	9	9	3	9	9	9
Apgar score at 5 minutes	9	10	10	9	10	10	10
Immediately skin-to-skin contact	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Newborn characteristics							
Birth weight (g)	3674	2980	3358	2866	4574	3402	2788
Length (cm)	49	47	52	49	53	49.5	47.5
Gender	Female	Female	Male	Female	Female	Female	Female
Nasopharyngeal swab	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Breast milk characteristics							
Time since delivery (hours)	44	42	36	41	32	48	26
RT-PCR SARS-CoV-2	Negative	Negative	Negative	Negative	Negative	Negative	Negative

RT-PCR, Real Time PCR.

childbirth as well as the newborn were collected. The study was approved by ethical committee in our hospital (approval number PI 92/20).

During their maternity unit stay, a colostrum sample was obtained from the mothers by hand self-expression. To collect the samples, the mothers wore surgical masks, washed their hands with an 85% alcohol-based gel, and washed their breast with gauze that was saturated with soap and water. After hand expression, drops of colostrum were collected with a swab, avoiding any contact with the skin. The samples then were put into a viral transport medium and processed immediately to detect SARS-CoV-2 RNA, using molecular diagnostic techniques by real-time PCR.

Next, we will share our experience in the analysis of seven colostrum samples, obtained from different mothers in the first hours postdelivery. To the best of our knowledge, these are the first cases in our country in which colostrum has been analyzed for the presence of SARS-CoV-2. The most relevant clinical and analytical characteristics are described in Table 1.

SARS-CoV-2 was not detected in any of the colostrum samples obtained in our study. These results agree with those reported by Liu et al. in 10 breast milk samples obtained in the first hours postdelivery,[1] as well as the results reported by Chen et al., involving 6 breast milk samples.[2] Likewise, Salvatori et al.[3] did not find SARS-CoV-2 in two breast milk samples obtained more than a week postpartum from two mothers whose newborns were admitted to the hospital due to horizontal transmission of SARS-CoV-2. In contrast, Groß et al. identified SARS-CoV-2 in breast milk obtained more than a week after giving birth in one mother, although the sample was collected using an electric pump instead of hand expression.[4]

In our study, breast milk was not a source of SARS-CoV-2 transmission. Hand expression (assuring that a mask is used and that appropriate hygienic measures are used for the hands and the breast), when direct breastfeeding is not possible, appears to be a safe way of feeding newborns of mothers with COVID-19.

Disclosure Statement

The authors have no conflicts of interest to declare.

Funding Information

No external funding.

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Address correspondence to:
Miguel Ángel Marín Gabriel, MD, PhD
Department of Pediatrics
Neonatal Unit
Puerta de Hierro-Majadahonda University Hospital
1 Manuel de Falla Street
Majadahonda
Madrid 28221
Spain
E-mail: mangel.maringa@salud.madrid.org