

BRIEF REPORT

MATERNAL-PERINATAL OUTCOMES IN PREGNANT WOMEN WITH COVID-19 IN A LEVEL III HOSPITAL IN PERU

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ABSTRACT

The present study aimed to describe the perinatal outcomes of newborns of mothers with 2019 coronavirus infection identified before delivery in a level III hospital in Peru. Sociodemographic variables, obstetric complications, and neonatal morbidities were evaluated in the births that occurred between April 1 and June 30, 2020, at the National Maternal Perinatal Institute of Peru. 43 newborns were registered: 93% came from asymptomatic mothers, the most frequent obstetric complications were premature rupture of membranes (18.6%) and pre-eclampsia (11.6%), 65.1% of the births were vaginally, only one of the newborns had a positive result to RT-PCR for COVID-19, the comorbidities of the newborns were prematurity (11.3%) and low birth weight (9.3%); four were admitted to intermediate care and two to intensive care. It is concluded that 2.4% of newborns born to mothers with COVID-19 presented positive molecular test of RT-PCR, 14% of newborns presented morbidity as prematurity, low birth weight, sepsis and pneumonia that required ventilation. Neonatal morbidity was found in newborns whose RT-PCR test was negative for COVID-19.

Keywords: Covid-19; Pandemics; Coronavirus-2019-nCoV; Coronavirus infection; Pregnancy; Newborn; Infants (Source: MeSH NLM)

INTRODUCTION

In 2020, COVID-19 disease rapidly progressed to a pandemic and spread throughout Peru, despite initial containment measures ⁽¹⁾. The mother-child binomial is particularly susceptible to respiratory illness due to beta corona virus infections ⁽²⁾ and SARS-CoV-2 infection ⁽³⁾. In the current pandemic, there are studies that have reported different results in mortality and perinatal morbidity ^(4,5). Likewise, there is the possibility of vertical transmission due to the biological plausibility of transplacental transmission, SARS-CoV-2 detection in placenta and umbilical cord has been reported in case reports ^(6,7); however, other studies have shown negative results from nasopharyngeal samples of newborns from mothers with COVID-19, but there may be limitations for SARS-CoV-2 detection in the upper respiratory tract ⁽⁸⁾. It is possible that perinatal detection and complications of SARS-CoV-2 in the mother and her newborn could be conditioned by gestational age, time of infection and viral load ⁽⁹⁾.

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The aim of this study was to describe the maternal and perinatal outcomes of patients with SARS-CoV-2 infection identified before delivery in a level III hospital in Peru.

THE STUDY

We conducted a descriptive study. The study population was the newborns of mothers with COVID-19, treated at the Instituto Nacional Materno Perinatal (INMP) of Peru, between April 1 and June 30, 2020. Newborns whose mothers could not be diagnosed with COVID-19 before delivery were excluded. All newborns born to mothers who tested positive for SARS-CoV-2 by reverse transcriptase polymerase chain reaction (RT-PCR) from pharyngeal or nasal swabbing samples processed at the Instituto Nacional de Salud del Perú were entered into the study.

The study was conducted at the INMP of Peru and due to the COVID-19 pandemic, all pregnant women attended in the emergency department underwent serological testing for SARS-CoV-2 infection. According to medical criteria, some of them underwent pharyngeal and nasal swabbing for RT-PCR, either because of epidemiological history or because of a negative serological test with suspicious clinical symptoms before vaginal or cesarean delivery. Likewise, the RT-PCR test was performed within the first 12 hours of life to all newborns of pregnant women with COVID-19.

At the INMP, differentiated care areas were implemented for newborns born to infected mothers, such as the intermediate care room and the neonatal intensive care room; asymptomatic newborns were transferred to the isolation sector, to which the mother was also transferred, but they were kept separate until the sample was taken for RT-PCR; then breastfeeding and isolation were allowed together with biosafety measures.

One of the investigators reviewed the RT-PCR test results of the mother, a different investigator reviewed the RT-PCR test results of the newborn; both from the RT-PCR test result cards in the Epidemiology and Environmental Health office of the INMP. Once all newborns meeting the selection criteria were identified, two investigators reviewed the mother's medical records and three other investigators reviewed the newborns' medical records. Medical records were accessed one month after the patients' discharge, during which time the medical records were kept in isolation as a measure to avoid the risk of transmissibility.

Maternal age prior to pregnancy was registered (16-18, 19-34 and 35 and over); parity was reported as nulliparous

KEY MESSAGES

Motivation for the study: Given the context of COVID-19 in Peru, we report the maternal-perinatal outcomes of pregnant women with COVID-19 attended at a level III hospital in Peru.

Main findings: Of 43 newborns born to mothers with COVID-19, 21 were from pregnant women who had obstetric complications, mainly premature rupture of membranes and preeclampsia. Only one newborn had COVID-19, five were preterm and four had low birth weight. There were no maternal or neonatal deaths.

Implications: We report one of the first perinatal outcomes of newborns born to mothers with COVID-19 as well as a possible case of vertical transmission in Peru.

(no previous birth), primiparous (first previous birth) and multiparous (more than 2 previous births); prenatal control was considered adequate if the patient had more than six controls; maternal respiratory symptoms (such as cough, sore throat, headache, fever, chills and/or nasal congestion) present at hospital admission and/or at the time of delivery were registered. We also registered the type of pregnancy complication; route of delivery, by cesarean section or vaginal delivery; gestational age at delivery according to the date of the last reliable menstrual period or ultrasound of the first trimester, specifying prematurity (less than 37 weeks), and at term (greater than 37 weeks); weight of the newborn measured in grams, as low birth weight (less than 2500 g), normal weight (2500 g to less than 4000 g) and macrosomic (greater than 4000 g); newborn sex; distress at birth (Apgar score less than or equal to five) indicated at one minute and five minutes of life; type of admission corresponding to isolation unit, intermediate care, intensive care, days of hospitalization; and condition at hospital discharge as dead or alive.

The data were entered and processed in Microsoft Excel 2013. Descriptive statistical analysis was performed using frequency distribution. The data were coded to ensure confidentiality and anonymity; only the researchers had access to them.

The study was approved by the INMP Institutional Research Ethics Committee (No. 21-2020-CIEI/ INMP) and had the respective authorization from the institution.

FINDINGS

We identified 43 live newborns from mothers with COVID-19; the RT-PCR test results of the mother and the newborn were available at the time of the study. Of the newborns, 60.5% were from pregnant women aged between 19 and 34 years; inadequate prenatal control was found in 95.3%; nulliparous pregnant women accounted for 44.2% and primiparous women for 30.2% (Table 1).

Obstetric complications occurred in 48.8% of pregnant women, mainly premature rupture of membranes (18.6%) and preeclampsia (11.6%). Ninety-three percent of newborns came from mothers with asymptomatic COVID-19 (Table 2). There were no maternal deaths.

Table 1. Sociodemographic and obstetric characteristics of mothers with COVID-19 of newborns attended at a level III hospital in Lima, Peru.

Characteristic	n	%
Maternal age (years)		
16-18	5	11.6
19-34	26	60.5
35 or more	12	27.9
Prenatal control		
Not adequate	41	95.3
Adequate	2	4.7
Parity		
Nulliparous	19	44.2
Primiparous	13	30.2
Multiparous	11	25.6
Marital status		
Married	6	14.0
Live-in partner	24	55.8
Single	13	30.2
Educational level		
Primary school	2	4.7
Secondary school	32	74.4
Higher education	9	20.9
Employment		
Housewife	40	93.0
Independent	2	4.7
Housemaid	1	2.3

Vaginal delivery occurred in 65.1% of the pregnancies, 16% of the newborns had some morbidity, 11.3% of the newborns were premature, 9.3% had low birth weight, four newborns were admitted to intermediate care and two to intensive care. Most of the newborns were discharged within two to four days of birth. Only one neonate had a positive RT-PCR result in the first 12 hours of life (Table 3).

The case of the neonate with positive RT-PCR was from an asymptomatic adolescent mother, born vaginally at 39 weeks gestational age, with an Apgar score of eight at one minute and nine at five minutes, weighted 3,450 g, was admitted to isolation, didn't have any comorbidity or complications and was discharged three days after birth.

Of the 42 neonates with negative RT-PCR, 6 had a morbidity that required hospitalization (Table 3), 4 in intermediate care and 2 in intensive care. Of the 4 admitted to intermediate care, 2 were preterm infants with congenital syphilis, jaundice and anemia; the other 2 cases were term neonates admitted for chemical gastritis and poor oral tolerance. Of the 2 neonates admitted to intensive care, one was 37 weeks gestational age, had an Apgar score of 3 at one minute and 5 at five minutes, weighted 1,978 g, had pneumonia, sepsis, encephalopathy, metabolic acidosis and anemia; he required mechanical ventilation for five days, continuous positive airway pressure

Table 2. Clinical characteristics and obstetric complications of mothers with COVID-19 of newborns attended at a level III hospital in Lima, Peru.

Characteristic	n	%
Symptoms		
No	40	93.0
Yes	3	7.0
Complications during pregnancy		
Obstetric complications	21	48.8
No complications	22	51.2
Type of complication		
Threatened abortion	1	2.3
Dysfunctional labor	4	9.3
Preeclampsia	5	11.6
Fetal distress	2	4.7
Premature rupture of membranes	8	18.6
IUGR	1	2.3
No complications	22	51.2

IUGR: intrauterine growth restriction.

Table 3. Perinatal outcomes in newborns born to mothers with COVID-19 attended at a level III hospital in Lima, Peru.

Characteristic	n	%
Delivery route		
Cesarean section	15	34.9
Vaginal	28	65.1
Sex		
Female	19	44.2
Male	24	55.8
Apgar at 1 min		
Distress (≤ 5 points)	2	4.7
No distress (≥ 6 points)	41	95.3
Apgar at 5 min		
Distress (≤ 5 points)	1	2.3
No distress (≥ 6 points)	42	97.7
Weight		
Low weight	4	9.3
Normal weight	35	81.4
Macrosomia	4	9.3
Gestational age		
Premature	5	11.6
At term	38	88.4
RT-PCR in newborns		
Positive	1	2.38
Negative	42	97.7
Neonatal morbidity		
Yes	6	13.95
No	37	86.05
Pneumonia in newborn		
Yes	2	4.7
No	41	95.3
Days of hospitalization		
In isolation (days)		
1 to 2	26	60.45
3 to 4	11	25.56
In intermediate care (days)		
3	1	2.3
8	1	2.3
9	1	2.3
16	1	2.3
In intensive care		
13	1	2.3
19	1	2.3

(CPAP) for four days and was discharged 19 days after birth. The second case admitted to the intensive care unit was a pre-term infant of 34 weeks gestational age, with an Apgar score of 8 at one minute and 9 at five minutes, weighted 2,450 g, had pneumonia, sepsis, septic shock, disseminated intravascular coagulation, metabolic acidosis and jaundice; he required mechanical ventilation for four days, CPAP for three days and binasal cannula for two days and was discharged at 13 days of life. There were no neonatal deaths.

DISCUSSION

The study showed that of the 43 newborns born to mothers with COVID-19, only one had a positive RT-PCR result from a nasopharyngeal sample. The newborns in the study most frequently came from mothers with asymptomatic COVID-19. Obstetric complications included premature rupture of membranes (18.6%) and preeclampsia (11.6%) while newborn comorbidities included prematurity (11.3%), low birth weight (9.3%) and sepsis with pneumonia requiring mechanical ventilation (4.7%).

Routine screening in New York City for SARS-CoV-2 by RT-PCR before delivery identified 88% of asymptomatic pregnant women, and symptomatic cases were mild⁽¹⁰⁾. Similar results were reported in a study conducted at the INMP in Peru that applied routine serology testing for SARS-CoV-2⁽¹¹⁾. A multicenter study in Latin America found 68% of infected mothers to be asymptomatic, 89% of symptomatic mothers had mild or moderate symptomatology and 2.3% were admitted to intensive care⁽¹²⁾. These percentage differences may be due to the type of study, type of test and differences in the populations, however, they suggest a high frequency of asymptomatic pregnant women and are consistent with the finding of mild respiratory symptoms. However, there is clinical variability in the mothers, which should be considered when assessing the condition of the newborn.

The main obstetric complications observed were premature rupture of membranes and preeclampsia, similar to those found in previous studies that used the RT-PCR test for the detection of SARS-CoV-2⁽³⁾ as well as in studies that used serological tests in pregnant women⁽¹¹⁾. The frequency of preeclampsia observed in our study (11.6%) is within the range of those reported in studies prior to the COVID-19 pandemic, which ranged from 2% to 12%⁽¹³⁾. However, the frequency of premature rupture of membranes (18.6%) is higher than the findings in the pre-COVID-19 pandemic

population, which ranged from 8% to 10%⁽¹⁴⁾. Nevertheless, the observed variability in complications may be related to the viral load during pregnancy⁽¹⁵⁾. However, these studies are descriptive and, therefore, do not have a causal analysis to support a risk associated with SARS-CoV-2 infection.

We observed that 11.3% of the newborns were preterm and 9.3% had low birth weight. In a historical series in this same hospital during the years prior to the COVID-19 pandemic, it was found that the prevalence of preterm births and newborns with low birth weight was around 8.5% and 2.2%, respectively⁽¹⁶⁾. On the other hand, in Peru, the national preterm birth rate for 2019 was 7%⁽¹⁷⁾. These differences may be due to the specialized care of the institution, which is a national referral center for specialized maternal-perinatal care. Higher figures such as 41.1% of prematurity were reported in a systematic review of retrospective studies, which included case reports of COVID-19 infection⁽²⁾. However, iatrogenic preterm deliveries should be considered, which reach up to 80% of deliveries, where 48% were due to maternal SARS-CoV-2 infection, only 14% due to fetal compromise and 18% due to other obstetric causes⁽¹⁸⁾. In our study, delivery care was according to the obstetric condition and not only to the detection of SARS-CoV-2 infection.

No neonatal deaths were found in the study; however, two neonates were admitted to intensive care and four to intermediate care due to perinatal comorbidities, with negative RT-PCR test. A systematic review found a perinatal death rate of 7%⁽²⁾, another study reported one death among 108 cases and low morbidity⁽⁴⁾. Cases admitted to intensive or intermediate care required the longest hospital stay due to prematurity, two cases of pneumonia, sepsis, jaundice, metabolic acidosis and one case of encephalopathy. However, most of the newborns had a normal weight, including the case of a newborn with positive RT-PCR, and were discharged within three days of birth without complications.

Only one case of a newborn with positive RT-PCR for SARS-CoV-2 within 12 hours of life was observed, which could suggest vertical transmission. Previous studies have described that placental viral transmission could occur via the hematog-

enous route⁽¹⁹⁾. To confirm vertical transmission, viral RNA should be detected in the umbilical cord, neonatal blood within the first 12 hours, and placenta or amniotic fluid before rupture of membranes⁽²⁰⁾. There are reports of cases of placental transmission through the study of biological samples, in which the mother and the newborn presented some type of complication^(6,7). Despite the limited evidence on vertical transmission, it has been reported that there is a 4% incidence of infection in the postpartum period and newborns with positive RT-PCR are often asymptomatic, according to the findings of a systematic review based on case reports⁽¹⁵⁾.

Regarding the limitations of the study, the retrospective information could represent a threat to validity; to reduce this, the collection of information from the mother and her newborn was performed independently, as well as the availability of the laboratory results of the RT-PCR test; the sample size was small; and at the time of the study, the time of SARS-CoV-2 infection up to the time of delivery was unknown, as well as the viral load in the mother prior to delivery.

It is concluded that the mothers with COVID-19 of the newborns included in the study were mostly asymptomatic and presented premature rupture of membranes and preeclampsia as complications. Most of the newborns had negative RT-PCR results, and the most frequent morbidities were prematurity, low birth weight, sepsis and pneumonia, which required mechanical ventilation. Only one of the newborns had a RT-PCR result positive to COVID-19 and did not present comorbidities. However, the evidence is limited and short- and long-term perinatal studies are required.

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