First neonate born to mother with COVID-19 pneumonia in the Social Security Mexican Institute

Primer neonato nacido de madre con neumonía COVID-19 en el Instituto Mexicano del Seguro Social

COVID-19 pneumonia duen amarengandik jaiotako lehen jaioberria Gizarte Aseguruaren Mexikoko Institutuan

Presentation of the case

Newborn male, 34 weeks of gestational age, with a birth weight of 2,440 g, obtained by abdominal caesarean section. 37 years old mother, with a history of Diabetes mellitus and severe acute respiratory syndrome laboratory-confirmed COVID-19 pneumonia (with maternal swab specimens that tested positive for SARS-CoV-2. There was no history of recent travel to a foreign country, but she was in close contact with a confirmed case. The medical team (intensivists, obstetricians, internists, anesthesiologists, pediatricians and neonatologists) decided to end the pregnancy and perform a caesarean section, due to the severity of the lung damage and to enable the baby to survive.

The newborn was born in secondary apnea due to a pharmacological depression from the drugs used in the mother. He required mechanical ventilatory support, and was admitted to the Neonatal Intensive Care Unit (NICU) of the General Hospital of Zone 2 of the Social Security Mexican Institute (IMSS) in Saltillo, Coahuila in Northeast Mexico.

The baby was separated from his mother immediately after birth without skin-to-skin contact. No breastfeeding was indicated due to the severity of the mother's pneumonia and the need to transfer the newborn to a support hospital with a NICU. Therefore, samples of breast milk were not collected and analyzed.

General management required a strict continuous monitoring (heart rate, respiratory rate, oxygen saturation, temperature, blood pressure, blood glucose and gastrointestinal symptoms), blood examinations and chest X-ray. He needed respiratory support with mechanical ventilation for three days. Supplemental oxygen was administered due to signs of mild respiratory distress that presented after extubation. Enteral feeding was continued with an orogastric tube while suction improved.

On the fifth day of life, he started with antibiotics for probable pneumonia. On day nine he had a fever of 38°C. The laboratory results showed: white blood cells 38.71 x 109 cells/L, neutrophils 24 x 109 cells/L, lymphocyte 5.42 x 109 cells/L, platelets 444 x 109 cells/L, C-reactive protein 0.60mg/L, procalcitonin 0.211 ng/L. Therefore, the antibiotic regimen was changed for Cefotaxime and Vancomycin. Blood culture was negative. Normal cerebral ultrasound was reported. In this report, only throat swab samples were taken and the virus was not searched in other samples (cerebrospinal fluid, blood, gastric juice, feces).

The first sample, taken two hours after birth, as well as the second test that was taken at 48 hours of life were negative for SARS-CoV-2.

The newborn was discharged on his 18th day of life with follow-up at the hospital and in his Family Medicine Unit (UMF). 7 days after hospital discharge he was taken by his father to start the vaccination schedule, and a neonatal screening test.

On his 39th day of life, the newborn came back for the outpatient control. The newborn was healthy; his weight was 2,950 g, with a normal clinical examination.

Discussion

The Coronavirus is an RNA virus and falls into the virus family Coronaviridae, order Nidovirales. It is widely found in humans, mammals, and birds and can cause infections of the respiratory tract, gastrointestinal system, and nervous system. The virus SARS-CoV-2 is transmitted mainly via respiratory droplets and/or close contact, and human-to-human transmission and family clustering have been reported. In december 2019, a novel coronavirus, tentatively named as 2019 novel coronavirus (2019-nCoV), was identified in patients with new viral pneumonia as the disease broke out in Wuhan. The emerging SARS-CoV-2, a beta coronavirus, can cause COVID-19, officially named by the World Health Organization on February 11, 2020[1]. The clinical symptoms caused by the infection are extremely similar to those of severe acute respiratory syndrome[2].

The pregnant women are at a particularly high risk of SARS-CoV-2 infection because they are in a special state of immune tolerance. Reports of pregnant women with severe clinical conditions requiring ICU admission and mechanical ventilation are significantly less common compared to the previous two CoV infections (MERS and SARS) which caused a mortality rate in pregnant women that ranged from 25% to 30%[3-15].

The case reported in this article had not recently travelled, but was in close contact with a confirmed case. Evidence of vertical intrauterine transmission was evaluated by testing for the presence of SARS-CoV-2 in two swab samples. Both the maternal and newborn swab samples were collected and analyzed for SARS-CoV-2 following WHO guidelines for quantitative Real-time quantitative polymerase chain reaction (RT-PCR)[16, 17].

Infected or suspected mothers should be carefully monitored before and after delivery. They should avoid breastfeeding until it is confirmed that they are not infected with COVID-19. Also, mothers and their neonates should be taken care of in different, isolated rooms in order to prevent neonatal transmission[18].

More importantly, it should be emphasized that there are no known neonatal symptoms and therefore no clinical evidence suggestive for vertical transmission, particularly when COVID-19 infection occurs later in pregnancy. Previously published studies have demonstrated that pregnant women with SARS were associated with a higher prevalence of harmful maternal and neonatal side effects including disseminated intravascular coagulopathy, spontaneous abortion, preterm birth, intrauterine growth restriction, and the need of the newborn to be admitted to the NICU[19, 20]. Some studies, evaluating both caesarean and normal vaginal delivery in mothers with COVID-19, showed that neither type of delivery affected their newborns and all of the studied newborns were negative for COVID-19 infection[21, 22].

Based on the limited information from this report, COVID-19 cannot be considered as an indication for caesarean delivery and therefore the timing and mode of delivery should be individualized according to clinical maternal conditions or obstetric factors, as usual, and not on COVID-19 infection alone, and the decision should involve a multidisciplinary team including maternal-fetal doctors, neonatologists, anesthesiologists and infectious disease specialists. It is recommended that all laboratory confirmed neonatal SARS-CoV-2 infections are admitted to the NICU. The efficacy of antiviral drugs in neonatal age is uncertain at the moment; antimicrobial agents are only useful if bacterial infections are suspected or confirmed. If newborns have respiratory distress syndrome, high doses of surfactant agent should be administered; nitric oxide inhalation and high-frequency oscillatory ventilation should be considered. In critically ill newborns, intravenous administration of glucocorticoids or immunoglobulins may also be considered[23, 24].

Mother-to-child transmission of respiratory viruses mainly occurs through close contact, transmission via droplets (among caregivers, family members, and family visitors), hospital-acquired infections, and exposure to sources of infection in public places. There is a report of a newborn infected with SARS-CoV-2. However, it was possible to document that the transmission occurred horizontally[25].

The term "vertical transmission" refers to the spread of a pathogen from mother to baby during the period before and after birth. Specifically, it includes transmission via germ cells or placental blood during pregnancy, via the birth canal during labor and delivery.

Shek and Wong found no evidence of perinatal infection among infants born to mothers who developed SARS infection during pregnancy[26].

There is no evidence that the SARS-CoV-2 virus is transmitted intrauterine or transplacentally from infected pregnant women to their fetuses. To date no article has reported whether the newly discovered SARS-CoV-2 can be transmitted vertically. The vertical infection was excluded by two tests on the newborn. Since evidences are still insufficient regarding the optimal perinatal care and no definitive guidelines are available, the following risk-benefit analyses must be shared with the family: the mode of delivery, the impact and need of mother-newborn separation, the benefits of breastfeeding and its role in protecting newborns from infection, and risk factors for infection after discharge[27]. The clinical characteristics of COVID-19 pneumonia in this pregnant woman were similar to the reported cases of non-pregnant women who developed COVID-19 pneumonia. Good clinical outcomes have been reported for COVID-19 infection in pregnant women compared with SARS-CoV-1 infection[28, 29]. It is necessary to have the analysis of more cases to determine if this fact is still true. This report reflects the current knowledge on neonatal COVID-19 infection, but as the outbreak and information are changing rapidly, continuing to watch for updates is highly recommended.

break of COVID-19 in Coahuila State and other areas of Mexico.

We also recognize and thank all the health personnel who work in the Neonatal Intensive Care Unit and the Pediatric Service of the General Hospital of Zone N.º 1 Saltillo, Coahuila where this child was treated.

In memorian
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References
1 World Health Organization. Naming the coronavirus disease (COVID-2019) and the virus that causes it. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus_2019/technical guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it (accessed 03 May 2020).

2 World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected. Interim guidance. Jan 12, 2020. https://www.who.int/docs/default-source/coronaviruse/clinicalmanagement-of-novel-cov.pdf (accessed May 4, 2020).

3 Alfaraj SH, Al-Tawfiq JA, Memish ZA. Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection during pregnancy: Report of two cases & review of the literature. J Microbiol Immunol Infect. 2019;52(3):501-503.

4 Jeong SY, Sung SI, Sung JH, Ahn SY, Kang ES, Chang YS; et al. MERS-CoV Infection in a Pregnant Woman in Korea. J Korean Med Sci. 2017;32(10):1717-1720.

5 Alserehi H, Wali G, Alshukairi A, Alraddadi B. Impact of Middle East Respiratory Syndrome coronavirus (MERS-CoV) on pregnancy and perinatal outcome. BMC Infect Dis 2016;16:105.

6 Assiri A, Abedi GR, Al Masri M, Bin SA, Gerber SI, Watson JT. Middle East Respiratory Syndrome Coronavirus Infection During Pregnancy: A Report of 5 Cases From Saudi Arabia. Clin Infect Dis. 2016;63:951-953.

7 Malik A, El Masry KM, Ravi M, Sayed F. Middle East Respiratory Syndrome Coronavirus during Pregnancy, Abu Dhabi, United Arab Emirates, 2013. Emerg Infect Dis. 2016;22:515-517.

8 Park MH, Kim HR, Choi DH, Sung JH, Kim JH. Emergency cesarean section in an epidemic of the Middle East respiratory syndrome: a case report. Korean J Anesthesiol. 2016;69:287-291.

9 Payne DC, Iblan I, Alqasrawi S, Nsour MA, Rha B, Tohme RA; et al. Stillbirth during infection with Middle East respiratory syndrome coronavirus. J Infect Dis. 2014;209(12):1870-1872.

10 Yudin MH, Steele DM, Sgro MD, Read SE, Kopplin P, Gough KA. Severe acute respiratory syndrome in pregnancy. Obstet Gynecol. 2005;105(1):124-127.

11 Wong SF, Chow KM, Leung TN, Ng WF, Ng TK, Shec CC; et al. Pregnancy and perinatal outcomes of women with severe acute respiratory syndrome. Am J Obstet Gynecol. 2004;191(1):292-297.

12 Lam CM, Wong SF, Leung TN, Chow KM, Yu WC, Wong TY; et al. A case-controlled study comparing clinical course and outcomes of pregnant and non-pregnant women with severe acute respiratory syndrome. BJOG. 2004;111(8):771-774.

13 Robertson CA, Lowther SA, Birch T, Corwin A, Tan C, Sorhage F; et al. SARS and pregnancy: a case report. Emerg Infect Dis. 2004;10(2):345-348.

14 Schneider E, Duncan D, Reiken M. SARS in pregnancy: this case study explores the first documented infection in the U.S.A. WHONN Lifelines 2004;8:122-128.

15 Stockman LJ, Lowther SA, Coy K, Saw J, Parashar UD. SARS during pregnancy, United States. Emerg Infect Dis.2004;10:1689-1690.

16 1WHO. Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases. Interim guidance. Jan 17, 2020. https://www.who.int/publications-detail/laboratory-testing-for-2019-novel-coronavirus-in-suspected-human-cases-20200117 (accessed May 4, 2020).

17 Corman VM, Landt O, Kaiser M, Molenkamp R, Meijer A, Chu DK; et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. Euro Surveill 2020;25(3):2000045.

18 Chua MSQ, Lee JCS, Sulaiman S, Tan HK. From the frontlines of COVID-19–How prepared are we as obstetricians: a commentary. BJOG: An International Journal of Obstetrics & Gynaecology. 2020;127(7): 786-788.

19 Liu D, Li L, Wu X, Zheng D, Wang J, Liang B; et al. Pregnancy and Perinatal Outcomes of Women with COVID-19 Pneumonia: A Preliminary Analysis. AJR 2020; 215:1-6.

20 Lam CM, Wong SF, Leung TN, Chow KM, Yu WC, Wong TY; et al. A case-controlled study comparing clinical course and outcomes of pregnant and non-pregnant women with severe acute respiratory syndrome. BJOG. 2004;111:771-774.

21 Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W; et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. Lancet. 2020;395 (10226):809-815.

22 Panahi L, Amiri M, Pouy S. Risks of Novel Coronavirus Disease (COVID-19) in Pregnancy; a Narrative Review. Arch Acad Emerg Mede. 2020;.8(1):e34

23 Wang J, Qi H, Bao L, Li F, Shi Y. National Clinical Research Center for Child Health and 6 Disorders and Pediatric Committee of Medical Association of Chinese People's Liberation Army. A contingency plan for the management of the 2019 novel coronavirus outbreak in neonatal intensive care units. Lancet Child Adolesc Health 2020;4(4): 258-259.

24 Caballero Noguéz B, Méndez-Duran A, Caballero-Flores JD. Un caso de infección neonatal por virus de varicelazóster (chickenpox). Gaceta Médica de Bilbao. 2016; 113(1):28-31.

25 Alonso DC, López MM, Moral PM, Flores AB, Pallás AC. Primer caso de infección neonatal por SARS-CoV-2 en España. An Pediatr. 2020;92(4):237-238.

26   26.- Shek CC, Ng PC, Fung GP, Cheng FW, Chang PK, Peiris MJ; et al. Infants born to mothers with severe acute respiratory syndrome. Pediatrics 2003;112:e254.

27   27.- Chandrasekharan P, Vento M, Trevisanuto D, et al. Neonatal resuscitation and postresuscitation care of infants born to mothers with suspected or confirmed SARS-CoV-2 infection. Am J Perinatol. 2020 Apr 8. doi: 10.1055/s-0040-1709688.

28   28.- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y; et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. The Lancet. 2020; 395(10223):507-513.

29   29.- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong ; et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020; 382:1199-1207.

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