The Journal of Maternal-Fetal & Neonatal Medicine

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ijmf20

Study of amniotic fluid in pregnant women infected with SARS-CoV-2 in first and second trimester. Is there evidence of vertical transmission?

Ana M. Rubio Lorente , Maria Pola Guillén , Nuria López Jimenez , Maria Moreno-Cid Garcia-Suelto , Eduardo Rodriguez Rodriguez & Ana Pascual Pedreño

To cite this article: Ana M. Rubio Lorente , Maria Pola Guillén , Nuria López Jimenez , Maria Moreno-Cid Garcia-Suelto , Eduardo Rodriguez Rodriguez & Ana Pascual Pedreño (2020): Study of amniotic fluid in pregnant women infected with SARS-CoV-2 in first and second trimester. Is there evidence of vertical transmission?, The Journal of Maternal-Fetal & Neonatal Medicine, DOI: 10.1080/14767058.2020.1811669

To link to this article: https://doi.org/10.1080/14767058.2020.1811669

Published online: 30 Aug 2020.

THE JOURNAL OF MATERNAL-FETAL & NEONATAL MEDICINE
https://doi.org/10.1080/14767058.2020.1811669

Taylor & Francis
Taylor & Francis Group

SHORT REPORT

Study of amniotic fluid in pregnant women infected with SARS-CoV-2 in first and second trimester. Is there evidence of vertical transmission?

Ana M. Rubio Lorente, Maria Pola Guillén, Nuria López Jimenez, Maria Moreno-Cid Garcia-Suelto, Eduardo Rodriguez Rodriguez and Ana Pascual Pedreño

Complejo Hospitalario La Mancha Centro, Alcázar de San Juan, España

ABSTRACT

COVID-19 is a respiratory disease caused by Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The effects of this infection on fetal development and whether there is vertical transmission are currently unknown. We present two cases of pregnant women with COVID-19 infection during the first and second trimester of gestation in which a PCR study of SARS-CoV-2 in amniotic fluid extracted by amniocentesis is performed to try to determine if there is vertical transmission. In both cases, the PCR result was negative. This fact could support the absence of vertical transmission when the infection occurs in these quarters. It would be advisable to carry out more extensive studies to be able to make this statement safely.

ARTICLE HISTORY
Received 11 July 2020
Revised 13 August 2020
Accepted 14 August 2020

KEYWORDS
COVID-19; pregnancy; vertical transmission; amniocentesis; amniotic fluid

Case reports

Case 1

A 26-year-old woman, nullipara, pregnant for 20 weeks and 3 days, with no personal history of interest, who attended the performance of a morphological ultrasound on 14 February 2020 according to the low-risk pregnancy monitoring protocol of our center. The clinical screening for coronavirus disease 2019 (COVID-19) that is carried out on all pregnant women since the beginning of the pandemic was positive for having a low fever (37.5 °C) in the previous 4 days with rhinorrhea and cough, therefore it was performed a SARS CoV-2 serology, with a negative IgG and IgM result and a Polymerase Chain Reaction (PCR) for SARS CoV-2 in nasopharyngeal exudate, which turned out to be positive. Ultrasound revealed unilateral talipes equinovarus as the only finding. The pregnant woman is informed that 7% of the cases diagnosed as prenatally isolated have anomalies associated at birth and that 3.6% of the fetuses had an abnormal karyotype [1] requesting an invasive prenatal diagnosis, so it is carried out an amniocentesis. The karyotype was normal. The presence of the SARS CoV-2 virus in the amniotic fluid was also studied using PCR, with a negative result. The patient remained asymptomatic. 15 days later, the disease was negativized by means of a new nasopharyngeal exudate PCR. Currently the pregnancy progresses without complications.

Case 2

A 31-year-old woman, nullipara, 12-week pregnant woman with a diagnosis of delayed abortion was admitted to the Gynecology service on March 7th, 2020 for medical treatment of abortion with the vaginal administration of 800 mcg of misoprostol for not meeting treatment criteria according to the protocol of our center (CRL $>$ 30 mm). 13 days before, he had a low fever (37.7 °C) in a 3-day evolution home. The serology for SARS-CoV-2 (IgM and IgG) was positive and the PCR test for nasopharyngeal exudate negative on 2 occasions. The patient accepted the performance of amniocentesis to study amniotic fluid after being informed of the current lack of knowledge about the possible role of SARS Cov-2 in gestational losses. PCR in amniotic fluid did not detect the presence of SARS CoV-2. A karyotype study reported as normal was performed. Fetal and placental remains were sent for histological study. As findings signs of decidual inflamation were found, a very common finding in first trimester abortions unrelated to COVID-19 infection.

CONTACTO Ana M. Rubio Lorente arubiolorente@gmail.com Complejo Hospitalario La Mancha Centro, Avda de la Constitución n ° 3, Alcázar de San Juan, 13600 Ciudad Real, España

Due to the urgent and developing nature of the topic, this paper was accepted after an expedited peer review process. For more information about the process, please refer to the Instructions for Authors.

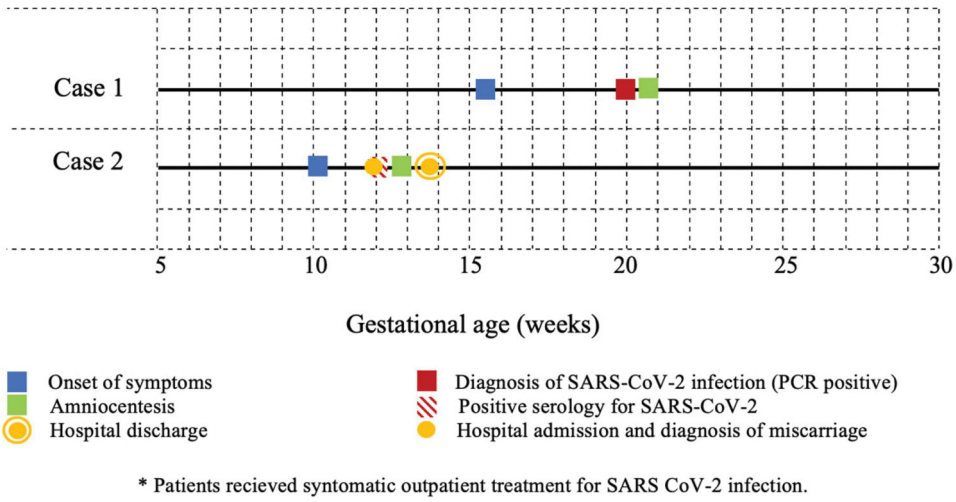

Figure 1. Timeline of exposure to SARS-CoV-2 and amniocentesis.

The timelime of exposure to SARS-CoV-2 in both cases are illustrated in Figure 1.

Discussion

COVID-19 is a respiratory disease caused by Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and first described in Wuhan China in December 2019.

From its appearance to the present day it has become a global pandemic. 5% of patients diagnosed with this pathology require admission to the intensive care unit (ICU) [2].

Currently, for obstetricians, the treatment and management of pregnant women with this disease is a great challenge. According to current data, Pregnancy does not appear to increase susceptibility to infection, and most infected mothers recover without having to give birth. However, pregnant women may be at increased risk of severe disease, which requires admission to the maternal intensive care unit and mechanical ventilation due to respiratory infection than other adults [3,4]. Infected women, especially those who develop pneumonia, appear to have an increased frequency of preterm birth and cesarean delivery [3]. There is no evidence of vertical transmission delivered vaginally [3].

The effects of this infection on fetal development and whether there is vertical transmission are unknown.

The management of the pregnant woman with coronavirus during the first and second trimester of pregnancy constitutes a great unknown in both fetal development and proper follow-up of these patients.

No standards have been developed for neonatal evaluation at delivery of an infected mother and criteria for vertical transmission. Different techniques have been suggested: immunoglobulin M (IgM) level for the virus in the blood of the umbilical cord, taking samples from the neonatal nasopharynx or the placenta or amnion using an aseptic technique immediately after delivery and the amniotic fluid obtained in Cesarean section [4].

To date, the limited data available suggest that vertical transmission is unlikely in women infected during the third trimester [3,5–7] since maternal viremia rates appear to be low (1%) [8]. Some cases of clinical and/or laboratory neonatal involvement have been documented, but the examination of nasopharyngeal and throat swab, fetal blood, amniotic fluid, and placenta were negative for SARS-CoV-2 in 76 neonates [3,9–11]. Nasopharyngeal cultures positive for SARS-CoV-2 were obtained in 3 of them on days 2 and 4 of life associated with pneumonia [9] and 2 presented positive results for IgM for SARS-CoV-2 [9]. However, these findings are not definitive evidence of that there is vertical transmission in pregnant women with COVID-19 since in many of these cases early childhood infection may be due to postnatal contact with infected parents or caregivers and the elevation of Ig M may be due to cross-reactions with other congenital infections [12].

Regarding the perinatal results of maternal infection during the first and second trimesters of pregnancy, very few data are known.

In published studies, it seems that there are no data on abortion when the infection occurs during the first trimester of pregnancy [5]. There are no published data on perinatal outcomes after performing invasive techniques in patients with COVID-19. In our case, the study by PCR of SARS-CoV-2 of amniotic fluid obtained by amniocentesis in both cases was negative.

A case of a confirmed COVID-19 patient who had a miscarriage in the second trimester in which the samples taken from a placental cotyledon and a submembrane were positive for SARS-CoV-2 has been described; all the fetal, amniotic fluid, umbilical cord blood and maternal and vaginal blood samples were negative [6].

The negative PCR result for SARS-CoV-2 in amniotic fluid in our cases could support the data from the literature that suggests that there is no vertical transmission even when maternal infection occurs during the first or second trimester. It would be advisable to carry out more studies to be able to determine with certainty that the infection is not related to abortions in the first trimester and there is no vertical transmission.

Disclosure statement

The authors of this manuscript declare no conflicts of interest that may affect the objectivity of their work, including any financial, personal or other influences.

References

[1] Di Mascio D, Buca D, Khalil A, et al. Outcome of isolated fetal talipes: a systematic review and meta-analysis. Acta Obstet Gynecol Scand. 2019;98(11):1367–1377.

[2] The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. Zhonghua Liu Xing Bing Xue Za Zhi. 2020;41(2):145–151.

[3] Thomas P, Alexander PE, Ahmed U, et al. Vertical transmission risk of SARS-CoV-2 infection in the third trimester: a systematic scoping review. J Matern Neonatal Med. 2020. DOI:10.1080/14767058.2020.1786055

[4] Berghella V. Coronavirus disease 2019 (COVID-19): pregnancy issues [Internet]. Uptodate. 2020; Available from: www.uptodate.com

[5] Di Mascio D, Khalil A, Saccone G, et al. Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: a systematic review and meta-analysis. Am J Obstet Gynecol MFM. 2020;2(2):100107.

[6] Baud D, Greub G, Favre G, et al. Second-trimester miscarriage in a pregnant woman with SARS-CoV-2 Infection. JAMA. 2020;323(21):2198–2193.

[7] Schwartz D. An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: maternal coronavirus infections and pregnancy outcomes. Arch Pathol Lab Med. 2020;144(7):799–805.

[8] Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens. JAMA. 2020; 323(18):1843–1844.

[9] Zeng H, Xu C, Fan J, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. JAMA. 2020; 323(18):1848–1849.

[10] Zeng L, Xia S, Yuan W, et al. Neonatal early-onset infection with SARS-CoV-2 in 33 neonates born to mothers with COVID-19 in Wuhan, China. JAMA Pediatr. 2020;174(7):722–724.

[11] Alzamora MC, Paredes T, Caceres D, et al. Severe COVID-19 during pregnancy and possible vertical transmission.Soy J Perinatol. 2020; 37(08):861–865.

[12] Kimberlin DW, Stagno S. Can SARS-CoV-2 infection be acquired in utero? More definitive evidence is needed. JAMA. 2020;323(18):1788–1789.