No SARS-CoV-2 detected in amniotic fluid in mid-pregnancy

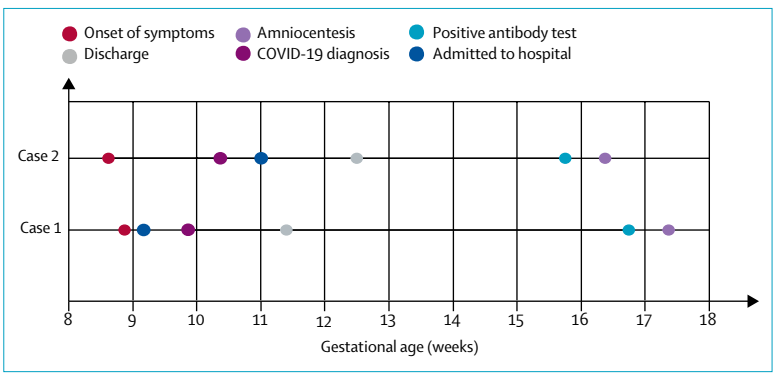

Figure: **Timeline of exposure to SARS-CoV-2 and amniocentesis**
COVID-19=coronavirus disease 2019. SARS-CoV-2=severe acute respiratory syndrome coronavirus 2.

Controversy exists regarding whether severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can be transmitted in utero from an infected mother to her infant.[1] To date, studies have mainly focused on women in late pregnancy.[2–4] We report SARS-CoV-2 negativity in amniotic fluid from two pregnant women who were diagnosed with coronavirus disease 2019 (COVID-19) in the early stage of pregnancy. The ethics committee of Tongji Hospital approved the study, and written informed consent was obtained from both patients.

Clinical records and laboratory results were retrospectively reviewed for two pregnant women with COVID-19 admitted to Wuhan Tongji Hospital (Wuhan, China) in the first trimester of pregnancy. The first patient (case 1; figure; appendix) was a 34-year-old primiparous woman who was admitted to hospital on Jan 30 after developing a cough on Jan 26 (8 weeks plus 5 days of gestation); her husband had previously had a fever and been diagnosed with COVID-19. On Feb 3, chest CT showed typical signs of viral infection of both lungs, and so a clinical diagnosis of COVID-19 was made. On Feb 13, the patient was observed as being in the recovery phase on CT, discharged from hospital, and isolated at home.

The second patient (case 2; figure; appendix) was a 27-year-old multiparous woman who attended an outpatient clinic on Feb 12 (10 weeks plus 1 day of gestation) after developing a fever, weakness, diarrhoea, and dyspnoea on Feb 1 (8 weeks plus 4 days of gestation). On Feb 12, she tested positive for SARS-CoV-2 in a nasopharyngeal swab, and her chest CT scan showed typical signs of viral infection of both lungs on Feb 14. After isolating at home, the patient was admitted to hospital on Feb 18 due to persistent fever. On Feb 28, the patient was discharged from the hospital following two consecutive negative nucleic acid tests and observation that she was in the recovery phase on CT; she went into isolation at home.

On March 23, the patients—both of whom were in the second trimester of pregnancy—tested positive for SARS-CoV-2 total antibodies in serum and were negative for SARS-CoV-2 RNA in throat swabs (appendix). On March 26, amniotic fluid samples were collected from the patients via percutaneous, ultrasound-monitored amniocentesis. The results of RT-PCR tests of the patients' amniotic fluid on March 26 were negative, and tests for SARS-CoV-2 IgM and IgG in amniotic fluid were also negative (normal IgM and IgG <10 AU/mL; figure; appendix). The patients' IgM and IgG concentrations in serum were also tested on March 26, with positive results for IgG in both cases; by contrast, only case 1 tested positive for IgM (appendix).

Although SARS-CoV-2 was not detected in the amniotic fluid of these two patients, the possibility of vertical transmission in early and middle pregnancy could not be ruled out for several reasons. First, RNA is much less stable in amniotic fluid than is DNA.[5] Second, the number of patients was insufficient to make a definite conclusion. Third, only transient positive results in amniocentesis have been reported for pregnant women infected with Zika virus, another RNA virus.[5] Finally, the virus might have been undetectable in amniotic fluid because of insufficient gestational age—the best time for amniocentesis is after 18–21 weeks' gestation.[6]

The study was limited by a small sample size and a lack of cord blood. However, we hope these findings will contribute to understanding of the potential for intrauterine vertical transmission of SARS-CoV-2 in early pregnancy. Larger, prospective studies and more data are needed.

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1 Qiao J. What are the risks of COVID-19 infection in pregnant women? *Lancet* 2020; **395:** 760–62.
2 Huijun C, Juanjuan G, Chen 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:** 809–15.

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See Online for appendix

3 Zeng H, Xu C, Fan J, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. *JAMA* 2020; published online March 26. DOI:10.1001/jama.2020.4861.

4 Dong L, Tian J, He S, et al. Possible vertical transmission of SARS-CoV-2 from an infected mother to her newborn. *JAMA* 2020; published online March 26. DOI:10.1001/jama.2020.4621.

5 Schaub B, Vouga M, Najioullah F, et al. Analysis of blood from Zika virus-infected fetuses: a prospective case series. *Lancet Infect Dis* 2017; **17:** 520–27.

6 Vouga M, Musso D, Van Mieghem T, Baud D. CDC guidelines for pregnant women during the Zika virus outbreak. *Lancet* 2016; **387:** 843–44.