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Letter to the Editor

Vertical transmission and materno-fetal outcomes in 13 patients with coronavirus disease 2019

S. Masmajan¹, L. Pomar¹, G. Favre¹, A. Panchaud^{4,5}, E. Giannoni², G. Greub³, D. Baud^{1,*}¹ Materno-Fetal and Obstetrics Research Unit, Department 'Woman–Mother–Child', Lausanne University Hospital, Lausanne, Switzerland² Neonatology Service, Department 'Woman–Mother–Child', Lausanne University Hospital, Lausanne, Switzerland³ Centre for Research on Intracellular Bacteria, Institute of Microbiology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland⁴ Service of Pharmacy, Lausanne University Hospital and University of Lausanne, Lausanne, Switzerland⁵ Institute of Primary Health Care (BIHAM), University of Bern, Switzerland

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To the Editor,

The novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has caused a worldwide pandemic, and concerns about possible maternal, foetal and neonatal adverse outcomes have been raised. Recently, possible vertical transmission of SARS-CoV-2 has been suspected in four cases with positive placental swabs and in two cases with elevated IgM in the neonate [1–4]. The primary aim of this letter is to report the rate of vertical transmission in a series of women infected during the third trimester of pregnancy.

We performed a retrospective case series of all women with SARS-CoV-2 infection during pregnancy admitted to the University Hospital of Lausanne for delivery between 1 April and 6 May 2020. We included all pregnant women who delivered after 24 weeks of gestation with a positive RT-PCR nasopharyngeal swab or positive serology (IgG) for SARS-CoV-2 after contact with individuals who tested positive for SARS-CoV-2 via RT-PCR. Within minutes of placental expulsion, the fetal surface of the placenta was disinfected (octenidine dihydrochloride) and incised with a sterile scalpel; two swabs (close to the umbilical cord and peripheral margin) were obtained and tested for SARS-CoV-2 by RT-PCR. This study was approved by the local ethics committee (no2020-00548).

* Corresponding author: D. Baud.

E-mail address: david.baud@chuv.ch (D. Baud).

Thirteen women with SARS-CoV-2 infection during pregnancy were identified (12 with positive nasopharyngeal PCR and one who was symptomatic with positive serology but three negative PCRs). Baseline characteristics, medical history, course of the disease, maternal and neonatal outcomes, and results of the placental, cord blood and nasopharyngeal neonatal PCR swabs are summarized in Table 1.

None of the placenta, cord blood nor neonate nasopharyngeal swabs were positive for SARS-CoV-2. This is concordant with the other published case series, although Alzamora et al. reported one case of a positive SARS-CoV-2 PCR swab in a neonate born by caesarean section from a severely ill mother [5]. Hu et al. also reported one neonate positive for SARS-CoV-2, born by caesarean section from a woman with mild symptoms with a negative amniotic fluid SARS-CoV-2 PCR [6]. Two other case reports raise concerns about vertical transmission based on the presence of IgM and IgG antibodies in two neonates born from mothers with coronavirus disease 2019 (COVID-19) [1,2]. Penfield et al. suspected that the mode of delivery may also potentially increase the risk of vertical transmission [3]. Indeed, the placenta/neonate could be contaminated at delivery by maternal infected faeces. Maternal faecal samples were not tested in our series, although symptomatic individuals, especially those with digestive symptoms, excrete the virus in their stool. In our series, however, the absence of vertical transmission is observed even in the context of a high rate of vaginal births (11 out of 13).

These results and the high proportion of negative results among newborn infants from infected mothers could indicate that maternal–placental–foetal infection seems to be a rare event and that vertical transmission remains difficult to prove because of the possible clearance of viral RNA in both the placenta and the foetus, or the need for a longer incubation time to be detected after birth.

Out of 13 women, one had a critical course of COVID-19. She required 8 days of mechanical ventilation. The course of the disease was otherwise favourable in our series with no maternal deaths and only one critical case with acute respiratory distress

Table 1
Personal and medical history, pregnancy and neonatal outcomes, results of SARS-CoV-2 PCR swabs

N	G	P	Socio-economic status ^a	Age (years)	Co-morbidities	Pregnancy-related complications	COVID-19 course ^b / symptoms	Mode of delivery	Neonatal outcome					SARS-CoV-2 PCR			
									Weight (g)	%	Apgar score	pH	Days at discharge	Breastfeeding	Placenta	Cord blood	Neonate nasopharynx
1	3	2	—	33	None	Postnatal superficial venous thrombosis	Mild/Anosmia, dysgueusia	Vaginal	3280	30	9-10-10	7.21–7.37	2	Yes	Neg	Neg	Neg
2	1	0	Average	18	Obesity BMI 38 kg/m ²	None	Mild/Cough, dysphonia	Vaginal	3950	75	9-10-10	7.20–7.36	5	No	Neg	Neg	—
3	1	0	Low	33	Sickle cell disease, α -thalassaemia heterozygosity, previous tuberculosis and stroke	Five episodes of drepanocytic vaso-occlusive crisis times of which one was due to COVID-19	Mild/Cough	Vaginal	2820	25	Not done	7.16–7.27	8	No	Neg	—	Neg
4	1	0	—	39	None	None	Critical/Fever, cough, ARDS, headaches	CS	1800	40	6-6-7	7.28	45 (NICU for prematurity)	No	Neg	Neg	Neg
5	5	3	Low	35	s/p HBV infection, obesity	Diabetes mellitus	Severe/Dyspnoea, dysgueusia anosmia	Vaginal	3880	75	3-9-10	7.14–7.22	2	Yes	Neg	Neg	Neg
6	1	0	High	31	None	None	Mild/Dysgueusia, anosmia	Forceps	3100	15	9-9-10	7.21–7.26	3	Yes	—	Neg	Neg
7	1	0	High	31	None	None	Mild	Vaginal	2950	10	2-7-7	6.96–7.09	13 (NICU for neonatal asphyxia)	Yes	Neg	Neg	Neg
8	4	1	Low	23	None	None	Asymptomatic	Vaginal	2870	30	9-10-10	7.39	3	Yes	Neg	Neg	Neg
9	2	3	Average	37	Kawasaki disease with aneurysm of common left coronary artery	Suspected IUGR	Asymptomatic	Vaginal	3100	20	9-10-10	7.31–7.36	2	Yes	—	—	Neg
10	2	1	Average	26	Hypothyroidism	Pyelonephritis	Asymptomatic	Vaginal	3800	70	9-10-10	7.29–7.32	2	Yes	Neg	Neg	Neg
11	1	0	Low	26	None	Placentamegaly	Mild/Fever	Vaginal	2910	15	9-9-9	7.16–7.31	2	Yes	Neg	Neg	Neg
12	1	0	High	32	None	None	Asymptomatic	CS	3630	50	4-8-9	7.29–7.33	4	No	Neg	Neg	Neg
13	1	0	High	33	None	None	Asymptomatic	Forceps	3030	5	9-10-10	7.31	3	Yes	Neg	Neg	Neg

Abbreviations: N, patient number; G, gestation (in weeks); P, parity; COVID-19, coronavirus disease 2019; CS, caesarean section; NICU, neonatal intensive care unit; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

^a Socio-economic status was defined as follows: low, the individual has insufficient financial resources and benefits from social services aids; normal, the individual is independent with sufficient income; high, the individual has a higher education diploma (university).

^b COVID-19 course was defined as critical when the woman needed admission to intensive care, as severe when the patient needed inpatient care, as asymptomatic when the woman presented with no symptoms at all (diagnostic of COVID-19 at systematic screening of patients), and mild in all other cases.

syndrome. This rate is similar to that previously reported in the general population. It is important to note that 38% of SARS-CoV-2-positive mothers remained asymptomatic, which is much lower than in the general adult population. In our centre, all patients were tested upon admission. The rate of asymptomatic individuals is therefore unlikely to be underestimated.

Eleven of 13 (84%) women had a vaginal delivery and two had a caesarean section (one for acute respiratory distress syndrome related to COVID-19 and one for failure to progress). Among women who delivered vaginally, one underwent labour induction for placentalomegaly (placenta thickness >6 cm on prenatal ultrasound), which was possibly related to COVID-19. All other women had a spontaneous labour or induction for indications unrelated to COVID-19.

Regarding the neonates, rooming in (85%) and breastfeeding (69%) were encouraged. The median age at discharge (3 days) and the rate of hospitalization (15%) indicate an excellent neonatal outcome. The maternal and neonatal outcomes described in our series provide additional supportive evidence to limit caesarean sections to obstetric indications in cases of stable maternal and foetal condition.

In conclusion, we report no cases of vertical transmission and no detection of the presence of SARS-CoV-2 in placental swabs. Recent publications, however, indicate that larger series are needed to confirm these assessments. In addition, current data are limited to third-trimester infections. First-trimester and second-trimester infections still need to be characterized [4].

Transparency declaration

The authors have nothing to disclose.

Authors' contribution

DB was responsible for conceptualization, resources, supervision and project administration; SM was responsible for methodology and formal analysis, for data curation and for writing the original draft. All authors contributed to writing review and editing.

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