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Research Letter

A safe delivery system to prevent COVID-19 transmission without negative-pressure isolation delivery rooms: Experience from a hospital with nosocomial outbreak

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Dear Editor,

The novel coronavirus disease (COVID-19) has spread worldwide. Our tertiary care hospital, located in the central area of Tokyo, experienced an outbreak of COVID-19 in March 2020. In that event, we carried out pre-admission PCR tests and the resulting positive rate was 6% between April 13–19, 2020 among asymptomatic individuals, including obstetric patients (<http://www.hosp.keio.ac.jp/en/oshirase/detail/40174/>) [1]. To prevent nosocomial infections, pregnant women with COVID-19 are recommended to deliver vaginally in a negative-pressure isolation room assisted by medical staff wearing complete personal protective equipment [2]. However, in Japan, hospitals with negative-pressure isolation rooms for delivery are rare. Therefore, in the absence of these delivery rooms, we decided to manage L&D for women with planned vaginal delivery using the following criteria after consultation with anesthesiologists, neonatologists, and infectious disease physicians:

1. After 37 gestational weeks, PCR universal testing was conducted within five days of hospitalization for all pregnant women scheduled for delivery.
2. For PCR-negative patients, labor induction would be performed.
3. For PCR-positive patients or those with exposure history to confirmed COVID-19 cases within 14 days, emergency cesarean sections (CS) would be performed.

4. If patients presented with onset of labor before PCR testing and with any symptoms (i.e. fever, cough, dyspnea, anosmia/dysgeusia, and diarrhea), an emergency CS would be performed, for the possibility of being symptomatic carriers.

Data on pregnancies who delivered term singleton babies at our hospital between April 8th and May 31st, 2020, were retrospectively reviewed and compared to those who delivered within the same period from 2013 to 2019 (control group). In the 2020 group, gestational weeks at delivery, birth weight, and Apgar score (1/5 min) were significantly lower than those in the control group ($p < 0.05$). However, there were no significant differences in umbilical cord blood pH and incidence of emergency CS between the two groups. Of the 19 cases with emergency CSs in 2020, two were SARS-CoV-2 positive patients, one had a close contact with her husband who had developed COVID-19, and one presented with onset of labor before PCR testing. None contracted COVID-19 and that included mothers, neonates, and medical staff who were admitted or had worked in the obstetric ward during the study period (see Table 1).

Although the incidence of emergency CS in the 2020 group tended to be higher than that before the COVID-19 pandemic, our system, absent of negative-pressure isolation rooms, prevented nosocomial infections. According to the previous review, the incidence of nosocomial infections in patients developing COVID-19 was 44% in the early outbreak [3]. Furthermore, the International Council of Nurses was concerned that at least 90,000 healthcare workers had been infected by May 6th (<https://www.icn.ch/news/icn-calls-data-healthcare-worker-infection-rates-and-deaths>). Therefore, control deliveries remain crucial to prevent nosocomial infections. While, in the hospital which has an isolation room, another safe delivery system was reported [4], our system may be a safe and useful proposal in settings without negative-pressure isolation rooms during the pandemic. Nevertheless, it is important to consider the benefits and harms of all measures when adapting them to the facilities of each country.

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Table 1
Comparison of maternal and neonatal characteristics between the 2020 group and the control group.

		2020 group (n = 74)	Control (n = 465)	p-value
Maternal age at delivery	(years)	34 (23–48)	36 (22–62)	0.0068
Nulliparity		52 (70)	286 (62)	0.16
Pre-pregnancy BMI	(kg/m ²)	19.8 (16.2–30.8)	20.2 (14.9–46.5)	0.39
Gestational weight gain	(kg)	9.9 (0–27.6)	9.9 (–4–31)	0.49
Smoking during pregnancy		1 (1)	0 (0)	<0.0001
Positive PCR for SARS-CoV-2		2 (3)	– (–)	–
Gestational diabetes		8 (11)	70 (15)	0.38
Gestational weeks at delivery	(weeks)	38 (37–40)	39 (37–41)	<0.0001
Vaginal delivery		29 (39)	273 (59)	0.0023
Elective cesarean section		26 (35)	114 (25)	0.12
Emergency cesarean section		19 (26)	78 (17)	0.07
Birthweight	(g)	2857 (2140–3715)	3004 (1694–4284)	0.0003
Fetal sex (female)		37 (50)	210 (46)	0.45
Apgar score (1 min)		8 (2–9)	8 (0–10)	0.0081
Apgar score (5 min)		9 (4–10)	9 (4–10)	0.039
Umbilical artery blood pH		7.31 (7.20–7.44)	7.31 (6.90–7.47)	0.52

BMI: body mass index, PCR: Polymerase chain reaction test, NICU: Neonatal intensive care unit. Data are presented as median (range) or n (%). Continuous data were compared between groups using Mann–Whitney U test. Categorical variables were analyzed using Fisher's exact test. In all tests, $P < 0.05$ was considered significant.

Declaration of competing interest

There are no conflicts of interest to declare.

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