We describe the emergency measures taken in response to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in an obstetrics ward in Japan. In April 2020, two midwives in our obstetric ward were diagnosed with SARS-CoV-2 infection. We immediately closed the ward and performed polymerase chain reaction (PCR) testing for 25 patients and 42 staff members who had possible contact with the midwives. Pregnant women at or near term were referred to nearby obstetric facilities. One patient, who delivered before the midwives were diagnosed, and her neonate tested positive for SARS-CoV-2. All other tested patients and staff had negative PCR test results. In total, 14 pregnant women at term and 15 at 34–36 weeks gestation were referred to other facilities. Of these, 13 delivered in transfer destinations and 16 delivered in our hospital after a 14-day temporary closure of the ward. Our prompt measures successfully prevented the nosocomial spread of coronavirus disease.

Introduction

Coronavirus disease (COVID-19) is an emerging infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was first reported in Wuhan, China, in December 2019. Older adults and individuals with chronic medical conditions are at a higher risk of death from the disease.1) According to a report in early 2020, pregnant women with SARS-CoV-2 infection might present with mild or no symptoms2) and appear to be at no greater risk than other adults with infection;3) however, some still require hospitalization.4,5)

To avoid maternal hypoxia during labor, some studies suggest that pregnant women with symptomatic COVID-19 may require emergency cesarean section in a dedicated negative pressure operating room.6) After delivery, the neonate must be isolated to prevent nosocomial infection.7) Perinatal medical centers account for only 40% of delivery facilities in Japan,8) and most hospitals are unable to provide this level of care. In obstetric facilities, there is a potential for large nosocomial outbreaks of SARS-CoV-2 infection that could affect patients and medical staff in the obstetrics, neonatology, and anesthesiology departments. This can lead to a demand for hospital beds for infected individuals that exceeds the supply, with a possible collapse of obstetric and neonatal medical services due to the rapid spread of SARS-CoV-2.9)

In April 2020, we experienced the first case of nosocomial SARS-CoV-2 infection in the obstetric ward of Warabi Municipal Hospital in Saitama during the first peak of the SARS-CoV-2 epidemic in Japan. Through rapid implementation of control measures, a nosocomial outbreak was averted, and obstetric services resumed after 14 days. In this report, we describe the emergency measures taken to prevent the spread of SARS-CoV-2 infection in the obstetric ward and the outcomes of this event.

Case report

The IRB of Warabi Municipal Hospital approved the publication of this report and waived the requirement...
for informed consent because the report describes an outbreak response and is not a research study. Warabi Municipal Hospital is a small hospital with 130 beds and is the only labor facility in Warabi City, a small town in Saitama Prefecture near Tokyo with a population of 75,000 and approximately 500 deliveries per year. By April 8, 2020, 264 cases of COVID-19 were confirmed in Saitama Prefecture.10 At that time, medical staff in our hospital were wearing only surgical masks and washing their hands after providing treatment, as these were the only available precautionary measures.

At the beginning of April 2020, two midwives at the hospital were diagnosed with SARS-CoV-2 infection. One midwife working in the labor ward developed a fever on April 5, and she had been working in the ward the previous day. Another member of her family experienced similar symptoms. A polymerase chain reaction (PCR) test for SARS-CoV-2 was performed after 4 days of continuous fever, and positive test results were confirmed on April 9. Another midwife who worked in the same labor ward presented with fever on April 9, and also received a positive PCR test result for SARS-CoV-2 on April 10.

Considering the possibility of a nosocomial outbreak after the detection of these two cases, we temporarily closed down the obstetric antenatal ward and labor ward on April 11 (Day 3 from the initial positive test result). Based on previous experiences with Middle East respiratory syndrome (MERS), a respiratory illness caused by MERS-CoV that has a mean incubation period of 5.2 days (range: 2–13 days),11 the wards were closed for 14 days. Staff who had been in close contact with either of the two midwives were instructed to self-isolate. On April 12 (Day 4), one patient who had undergone a cesarean section on April 3 complained of a fever and cough at home after discharge, although the neonate did not display any symptoms of COVID-19. Both the mother and neonate visited the hospital again and tested positive for SARS-CoV-2 by PCR. They were both admitted to a hospital with services for neonates with COVID-19.

We performed PCR tests for SARS-CoV-2 on 67 individuals, including 16 hospitalized obstetric patients, 9 neonates, and 42 medical staff members (6 obstetricians, 14 midwives, 7 outpatient nurses, 2 neonatologists, 1 anesthesiologist, and 12 medical clerks/childminders) to identify additional cases of infection (Table 1). Medical staff who may have had contact with any of the infected individuals during the infectious phase were screened. Staff in the other medical departments were not tested. Information regarding SARS-CoV-2 infection in the labor ward was immediately disclosed on the hospital website. Other medical departments and emergency medical services also temporarily closed their medical services to new patients due to the potential for a nosocomial outbreak of SARS-CoV-2.

Pregnant women who were over 37 weeks of gestation and had been visiting the obstetric ward as outpatients were immediately referred to nearby institutions with labor facilities. Pregnant women between 34 and 36 weeks of gestation who were considered to have a higher risk of preterm delivery were also referred to nearby labor facilities. A total of 32 pregnant women voluntarily agreed to transfer to neighboring labor facilities. None of the pregnant women, including the transferred patients and referred outpatients, were considered candidates for the PCR test based on the public health policy in early 2020.

The 67 tested patients had negative results, and none of them developed clinical symptoms of COVID-19. Among the 14 pregnant women at ≥ 37 weeks gestation at the time of ward closure, 9 delivered in other facilities. Another 4 women at high risk of preterm labor who were at 34–36 weeks gestation at the time of ward closure also delivered in other facilities. There were no further cases of infection detected among patients who were using the obstetric services at the time of the lockdown. The labor ward was reopened on April 22, 14 days after the onset of symptoms in the last infected staff member. Five pregnant women who were at ≥ 37 weeks gestation at the time of ward closure completed 14 days of self-isolation at home and delivered in our hospital after the labor ward reopened. All 11 women who were at 34–36 weeks gestation at the time of ward closure and considered to be at low risk of preterm birth completed 14 days of home self-isolation and delivered in our hospital within a month after the labor ward reopened. The effect of the lockdown was limited, as reflected in the proportion of women who were referred to other hospitals (45%). Over a 6-month period after the labor ward reopened, there were no cases of SARS-CoV-2 infection among any of the obstetric patients or staff.

Table 1. Emergency SARS-CoV-2 polymerase chain reaction tests conducted to control the spread of infection in the obstetric ward

| Category                          | Number tested† (Total = 67) |
|----------------------------------|-----------------------------|
| Hospitalized obstetric patients  | 16                          |
| Neonates                         | 9                           |
| Obstetric department staff       |                             |
| Obstetricians                    | 6                           |
| Midwives                         | 14‡                         |
| Outpatient nurses                | 7                           |
| Neonatologists                   | 2                           |
| Anesthesiologist                 | 1                           |
| Medical clerks/childminders      | 12                          |

† All test results were negative. ‡ The total excludes 2 midwives with confirmed SARS-CoV-2 infection.
Conclusion

We experienced a potential nosocomial outbreak of SARS-CoV-2 infection in an obstetric ward in Japan, which necessitated an emergency response. By promptly closing the obstetrics ward, performing PCR tests on medical staff and patients with symptoms or a possible history of contact with an infected case, and transferring pregnant women at or near term to neighboring facilities, we averted the possibility of a nosocomial outbreak and resumed obstetric services after a 2-week break. In December 2020, PCR screening tests have been widely performed with the aim of preventing SARS-CoV-2 nosocomial outbreaks in most obstetric clinics in Japan. We believe that early widespread testing and rapid isolation can mitigate the risk of SARS-CoV-2 outbreaks in obstetric settings. Our report is expected to provide useful information for individuals working in obstetric institutions that are at risk of SARS-CoV-2 outbreaks.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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