Recommended measures to a new type of coronavirus infection in newborn infants

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The following points have been revised in this edition.
1. At this moment, the prevalence of intrauterine infection to newborn infants is very low or negligible.
2. Since asymptomatic newborn infants infected with the coronavirus have been reported and the indication of the viral test has been changed accordingly. All newborn infants should be subject to virus detection tests regardless of their symptoms.
3. Q&A section consisting of 6 items was added.
4. Some parts of the context and references were updated.

A new type of coronavirus infection was reported in Wuhan City, Hubei Province, China in December 2019 and now a major epidemic of the infection was noted worldwide. The number of patients reported in Japan has also been increasing. As of March 23, 2020, there have been no reports in Japan yet on newborn infants born from mothers infected with the coronavirus. However, it would be needed to prepare for those infants. Based on current knowledge, we have created a plan to respond to newborn infants under a current condition.

As of February 2020, no newborn infants infected intrauterine has been reported among 9 infants born from mothers with the coronavirus infection1). However, the other newborn infants born from mothers with the coronavirus pneumonia without obvious intrauterine infection have shown fetal distress, preterm delivery, respiratory disorder, thrombocytopenia, DIC, etc. including a neonatal death, although the causal relationship has not been clarified2,3). However, no further reports have supported the intrauterine infection positively3-6). These conditions are similar to newborn infants

born from mothers with MARS7). At the moment, the detailed information on perinatal and neonatal care to cope with the coronavirus infection is limited8). Therefore, this recommendation is tentative based on current knowledge and may be revised according to new scientific evidence.
Please also refer to a Q&A section added in this edition.

<Management of newborn infants immediately after birth>
It is still unclear whether newborn infants could show severe illness when contracted with the coronavirus compare to other age populations. However, it is mandatory recommended to prevent coronavirus transmission to newborn infants with all available precautions including isolation of the infants to prevent droplet and contact transmissions4, 9-11).

1. If an infant was born from the mother who developed symptoms with the coronavirus infection during labor or who became asymptomatic just before delivery.
・ To prevent droplet and contact transmissions from the mother to the newborn infant, they should be temporarily separated from each other. The mother should be isolated in a private room. The newborn infant should be isolated in an incubator or preferably in a negative pressure room. If not available, the infants should be under cohort isolation using partitions with enough space between infants. All healthcare workers should provide care or treatment to the infants wearing a face mask and taking adequate precautions to prevent droplet and contact transmissions.
・If the mother wishes to share a room with the infant, caregivers can consider it through an appropriate and sufficient explanation to the mother and her family.
・Close observation of the infant is mandatory by monitoring the infant's symptoms and vital signs. At the same time, an attending neonatologist should contact an infectious control team inside a hospital and contact a health center of the jurisdiction to consider virologic tests. If necessary, symptomatic treatment should be also started (comments on respiratory disorder among newborn infants reported in reference12), and symptoms, examinations, and treatment for children described in reference 13)).

2. If an infant was born from the mother who developed symptoms with the coronavirus infection between delivery and hospital discharge and the dyad was in close contact through kangaroo care, breastfeeding, etc.
・The infant and mother should be isolated in the same single room, preferably a negative pressure room, with precautions to prevent droplet and contact transmissions.

Furthermore, it is also preferable to put the infant inside an incubator.to prevent direct contact between the infant and the mother.

・If the close contact between the infant and the mother exists for a sufficient period and the possibility of the coronavirus transmission is considered high, it is recommended to transfer the infant to a facility that can provide close observation and intensive care for the infant considering the infection established.

(Comments on respiratory disorder among newborn infants reported in reference12), and symptoms, examinations, and treatment for children described in reference 13)).

・Where the infant transferred, isolation using incubator or cohorts with 2m distance from other infants should be in place. Alternatively, an isolation inside a negative pressure room is more desirable. Furthermore, an attending neonatologist should contact an infectious control team inside a hospital and contact a health center of the jurisdiction to consider virologic tests. If necessary, symptomatic treatment should be also started. All healthcare workers should provide care or treatment to the infants wearing a face mask and taking adequate precautions to prevent droplet and contact transmissions.

3. If a preterm infant was born from the mother who developed symptoms with the coronavirus infection during labor or who became asymptomatic just before delivery.

・The infant should be isolated in a negative pressure room inside NICU as most preterm infants are already admitted to NICU. If a negative pressure room is not available, the infant should be isolated in an incubator with a distance of 2m from other infants. If even an incubator is not available, a cohorting with a distance of 2m from other infants can be applicable.

・Close observation of the infant is mandatory by monitoring the infant's symptoms and vital signs. At the same time, an attending neonatologist should contact an infectious control team inside a hospital and contact a health center of the jurisdiction to consider virologic tests. If necessary, symptomatic treatment should be also started. All healthcare workers should provide care or treatment to the infants wearing a face mask and taking adequate precautions to prevent droplet and contact transmissions.

・In principle, the mother should not be allowed to enter the NICU until the risk of infection from herself reduced. Once the entering is permitted, the mother needs sufficient precautions to prevent droplet and contact transmission to other infants and staff in NICU.

The length of isolation or hospitalization should be determined considering risks of

infection from family members after discharging home.

4. Breastfeeding

During the active infection of the mother, there is a risk of droplet and contact transmissions of the coronavirus. Therefore, breastfeeding is not recommended. However, expressed breast milk feeding is encouraged.

The Japan Society of Pediatrics has stated that if the mother already alleviated a fever and clinical conditions are stable, breast milk can be expressed manually after washing her hands carefully and can be fed to the infant14). CDC has recommended the expressed milk feeding or breastfeeding with adequate precautions to prevent droplet and contact transmissions11). Chinese expert consensus statement has recommended that breast or expressed breast milk feedings could be started after the PCR test in a breast milk sample was proved negative15). However, there is currently very little information on viral transmission through breastfeeding. Therefore, accurate information should be provided based on future knowledge.

At this time, it is difficult to determine when the mother can start breastfeeding. However, at least it is acceptable when the mother's symptoms are disappeared and the risk of infection to the infant seems to be reduced.

Questions and Answers (as of March 23, 2020)

Q1 How long should the infants born from the symptomatic mother infected with the coronavirus be isolated?

A1 An average incubation period of the coronavirus has been reported between 3 and 7 days with the shortest of 1 day and the longest of 14 days15). Giving this information, the isolation of 14 days should be applied currently. However, this could be changed if symptoms of infected newborn infants clarified and the accuracy of tests became more reliable through studies of enough cases of newborn infants born from the positive mothers16).

Q2 What are the necessary precautions for caregivers involving neonatal care to the infants born from the positive mother and isolated inside an incubator?

A2 They need only a surgical face mask, gown, gloves if the infants isolated inside an incubator. In case of procedures such as tracheal intubation and mechanical ventilation, a full set of protective gears should be used to prevent aerosol transmission.

Q3 How long should the positive mother be considered as infectious after her symptoms disappeared before delivery?
A3 Chinese expert consensus statement has defined it should be at least 14 days15).

Q4 It is reasonable that the positive mother cannot enter the NICU until the risk of transmission reduced. However, can the father visit the NICU? How to inform the infant's condition and to get informed consent? Should the infant be kept in NICU during the quarantine of parents at home?
A4 All family members including the father living with the mother should be considered as a close contact person. Therefore, all of them should not be allowed to visit the NICU after the last exposure to the contracted person. Caregivers may inform the parents about the infant's condition and get informed consent from them through telephone calls. Alternatively, it could be performed with other family members on behalf of parents such as ground parents who are not living together and being exposed to any patients recently. It is mandatory to keep the infant in NICU until all risks of infection cleared. If not available, the only option is that other family members such as ground parents who are not living together and being exposed to any patients recently care about the infant at their home.

Q5 Should the protective measures to the infant be changed based on delivery modes?
A5 Regardless of delivery modes (vaginal or Cesarean delivery), all infants born from the positive mother should be considered as close contact to the coronavirus.

Q6 Should all caregivers to touch the infant born from the positive mothers with symptoms avoid contacting with other infants? Should they avoid contacting with other healthcare providers?
A6 If the precaution with appropriate protective gear is secured, they do not need to avoid contacting with others. Once incomplete procedures recognized, it should be mandatory to take all necessary measures under the direction from the infectious control team in a hospital.

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