
SPECIAL ARTICLE

Coronavirus Disease-19 and Pregnancy

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ABSTRACT

Coronavirus disease-19 (COVID-19) is the name of the disease caused by a 2019 novel coronavirus that has been identified as the cause of the outbreak of respiratory disease that began on 31 December 2019. It was first detected in Wuhan, Hubei Province, China. The symptoms include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. A confirm diagnosis of COVID-19 is made by collecting specimens for SARS-CoV-2 testing by reverse transcription polymerase chain reaction. There is no current evidence from randomized controlled trials to recommend any specific anti-novel-coronavirus treatment for patients with suspected or confirmed COVID-19. Prevention is the best way to COVID-19. The prevention methods for COVID-19 are the same as for other coronavirus infections. The standard recommendations for the prevention of infection spread include regular hand washing, covering the mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs, and avoiding close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing. Regarding COVID-19 in pregnancy, the clinical characteristics of COVID-19 in pregnant women are the same as those of non-pregnant adults in the general population. Two studies with a small number of cases indicated that there is currently no evidence of vertical transmission in women who had COVID-19 in late pregnancy.

Keywords: COVID-19, corona virus, infection, pregnancy, SARS-Co-V2, Wuhan.

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Coronavirus disease-19 (COVID-19) is the name of the disease caused by a 2019 novel coronavirus (2019-nCoV) that has been identified as the cause of the outbreak of respiratory disease that began on 31 December 2019. It was first detected in Wuhan, Hubei Province, China. The virus is also known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a new strain of coronavirus that is pathogenic to humans. COVID-19

is a highly infectious disease. Thus, the World Health Organization (WHO) has declared the COVID-19 outbreak a public health emergency of international concern, after an emergency meeting on Thursday January 30, 2020. The WHO announced the official name: coronavirus disease 2019 (abbreviated "COVID-19") on February 11, 2020. The WHO has made the assessment that COVID-19 can be "characterized as a pandemic" on 11 March 2020⁽¹⁾.

2019-nCoV is one type of coronavirus. Coronavirus is one of the main pathogens that causes respiratory infection in humans. Two other highly pathogenic viruses, severe acute respiratory syndrome coronavirus (SARS-CoV) and middle east respiratory syndrome coronavirus (MERS-CoV), cause severe respiratory syndrome in humans, and four other human coronaviruses (HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-HKU1) cause mild upper respiratory disease⁽²⁾. The sequence of 2019-nCoV is relatively different from the six other coronavirus subtypes, but it can be classified as a betacoronavirus. SARS-CoV and MERS-CoV can be transmitted directly to humans from civets and dromedary camels, respectively. Both viruses originate in bats, but the

origin of 2019-nCoV needs further investigation⁽²⁾.

Many patients in the outbreak in Wuhan, China reported that they had some link to a local Huanan seafood and animal market, suggesting animal-to-person spread. However, many patients reported that they had not been exposed to animal markets, indicating that person-to-person spread occurs^(1,2). As of March 13, 2020, the cumulative number of confirmed cases in mainland China has reached 80,981 cases, with 3,173 (3.9%) deaths. The cumulative number of confirmed cases in the world (from 123 countries) has reached 136,895 cases, with 5,077 (3.7%) deaths. However, the cumulative number of confirmed cases in Thailand has reached 75 cases, with 1 (1.3%) death⁽³⁾.

Table 1. Clinical manifestation of coronavirus disease-19 in the general population and in pregnant women^(2, 5, 6).

	General population (n = 99)	Pregnant women (n = 18)
Age (years)	55.5 ± 13.1	30.4 ± 4.0
Male: female	67 : 32	0 : 18
Underlying chronic diseases	50 (51%)	0
Clinical manifestation		
Fever	82 (83%)	15 (83.3%)
Cough	81 (32%)	8 (44.4%)
Shortness of breath	31 (31%)	0
Muscle aches	11 (11%)	3 (33.3%)
Confusion	9 (9%)	0
Headache	8 (8%)	0
Sore throat	5 (5%)	3 (16.7%)
Rhinorrhea	4 (4%)	0
Chest pain	2 (2%)	0
Diarrhea	2 (2%)	1 (5.6%)
Nausea and vomiting	1 (1%)	0
Malaise	0	2 (11.1%)
Complications		
Acute respiratory distress syndrome	17 (17%)	0
Death	11 (11%)	0

Symptoms and signs

The incubation period for COVID-19 is 2-14 days⁽⁴⁾. 2019-nCoV has been found to infect more

males than females, similar to the pattern observed for MERS-CoV and SARS-CoV⁽²⁾. 2019-nCoV is also more likely to infect older adult males with chronic

comorbidities (such as cardiovascular and cerebrovascular diseases and diabetes) as a result of the weaker immune functions of these patients⁽²⁾.

Common signs of infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, renal failure and even death⁽⁴⁾. The reported clinical manifestations are shown in Table 1.

Diagnosis

Suspected COVID-19 cases include⁽⁷⁾:

A. Patients with severe acute respiratory infection (having fever and cough and requiring admission to the hospital), with no other etiology that fully explains the clinical presentation, and at least one of the following:

- a history of travel to or residence in the city of Wuhan, Hubei Province, China in the 14 days prior to symptom onset, or
- the patient is a health care worker who has been working in an environment where severe acute respiratory infections of unknown etiology are being cared for.

B. Patients with any acute respiratory illness and at least one of the following:

- close contact with a confirmed or probable case of COVID-19 in the 14 days prior to illness onset, or
- visit to or worked in a live animal market in Wuhan, Hubei Province, China in the 14 days prior to symptom onset, or
- worked at or attended a health care facility in the 14 days prior to onset of symptoms where patients with hospital-associated COVID-19 infections have been reported.

Specimens from both the upper respiratory tract (nasopharyngeal and oropharyngeal) and lower respiratory tract (expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage) are obtained for SARS-CoV-2 testing by reverse transcription polymerase chain reaction (RT-PCR) to confirm the diagnosis of COVID-19⁽⁷⁾. The Centers for Disease Control and Prevention (CDC) has developed a new laboratory test kit for use in testing patient specimens

for SARS-CoV-2, the virus that causes COVID-19. The test kit is called the “Centers for Disease Control and Prevention (CDC) 2019-Novel Coronavirus (2019-nCoV) Real-Time Reverse Transcriptase (RT)-PCR Diagnostic Panel”⁽⁸⁾.

Treatment

There is no current evidence from randomized control trials to recommend any specific anti-2019-nCoV treatment for patients with suspected or confirmed COVID-19⁽⁷⁾. Cases with COVID-19 should have early supportive therapy and monitoring⁽⁷⁾.

Prevention

Prevention of COVID-19 is the same for other coronavirus infections. The standard recommendations for the prevention of infection spread include regular hand washing, covering the mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs, and avoiding close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing⁽⁹⁾.

COVID-19 and pregnancy

Previous studies found that SARS-CoV-2 has a similar receptor binding domain structure to that of SARS-CoV-1. This suggested that COVID-19 might have a similar pathogenesis to SARS-CoV-1 infection. Thus, the risk of vertical transmission might be as low as that of SARS-CoV-1^(10, 11). There has been two studies from China regarding COVID-19 infection in eighteen pregnant women^(5, 6). They found that pregnant women with COVID-19 infection had few adverse maternal and neonatal outcomes. All cases tested positive for SARS-CoV-2 by using quantitative RT-PCR. Fifteen cases had a cesarean section and two cases had normal delivery in the third trimester. The symptoms and signs among these women included fever (83.3%), cough (44.4%), myalgia (16.7%), sore throat (16.7%), malaise (11.1%), lymphopenia (27.8%), and increased aminotransferase (16.7%). None of the pregnant women had severe pneumonia or died. Fetal distress was found in 8 (44.4%) cases, and 19 (100%) live births were

delivered. There was no neonatal asphyxia. From one study⁽⁵⁾, amniotic fluid, cord blood, neonatal throat swab, and breast milk samples from six women were tested for SARS-CoV-2. The results were negative for the virus. While neonatal pharyngeal swab for 2019-nCoV test in 9 neonates were negative from one study⁽⁶⁾. These studies demonstrated that the clinical characteristics of COVID-19 in pregnant women were the same as those of non-pregnant adults in the general population (Table 1). There is no evidence of vertical transmission in women who had COVID-19 in late pregnancy from these small studies.

Regarding SARS and MER-Co-V infection in pregnant women from previous studies^(12, 13), these viruses were associated with a high incidence of maternal and neonatal complications such as spontaneous abortion, preterm delivery, intrauterine growth restriction (IUGR), need for endotracheal intubation, intensive care unit admission, renal failure and disseminated intravascular coagulopathy. It seems that COVID-19 in pregnant women has fewer adverse maternal and neonatal complications than SARS-CoV-1 infection in pregnant women. A summary of SARS-CoV-1, MERS-Co-V and COVID-19 infection during pregnancy is shown in Table 2.

Table 2. Summary of SARS-CoV-1, MERS-Co-V and COVID-19 infection during pregnancy^(5, 6, 12-18).

	COVID-19 (n = 18)	SARS-CoV-1 (n = 12)	MERS-CoV (n = 11)
Country	China	Hong Kong	Saudi Arabia, Jordan, United Arab Emirates, South Korea
Age (years)	25-40	22-44	27-39
GA (weeks)	31-39 ⁴	3-32	6-38
Maternal complications			
DIC	0	3 (25%)	0
Renal failure	0	3 (25%)	1 (9.1%)
ARDS	0	4 (33.3%)	5 (45.5%)
Sepsis	0	2 (16.7%)	1 (9.1%)
Spontaneous abortion	0	4 (33.3%)	0
Preterm labor	4 (22.2%)	4 (33.3%)	0
IUGR	0	2 (16.7%)	0
Fetal distress	8 (44.4%)	2 (16.7%)	0
PROM	5 (27.8%)	0	0
Placental abruption	0	0	1 (9.1%)
Maternal death	0	3 (25%)	3 (27.3%)
Neonatal complications	(n = 19)	(n = 12)	(n = 11)
Fetal death	0	0	3 (27.3%)
Live births	19 (100%)	5 (41.7%)	8 (72.7%)
Neonatal viral infection	0	0	0

SARS-CoV: severe acute respiratory syndrome coronavirus, MERS-CoV: Middle East respiratory syndrome coronavirus, COVID-19: coronavirus disease-19, GA: gestational age, DIC: disseminated intravascular coagulopathy, ARDS: acute respiratory distress syndrome, IUGR: intrauterine growth restriction, PROM: prelabor rupture of membranes.

SARS-CoV-1 infection during pregnancy was associated with high maternal morbidity and mortality, high incidence of spontaneous abortion, preterm delivery, and IUGR. MERS-CoV infection during pregnancy was associated with maternal mortality and a high incidence of fetal death. COVID-19 during late pregnancy had more favorable maternal and fetal outcomes than SARS-CoV-1 and MERS-CoV infection except fetal distress. The risk of vertical transmission was low with both SARS-CoV-1 and COVID-19 infection during pregnancy. There was no vertical transmission from SARS-CoV-1 and COVID-19.

Conclusions

The clinical characteristics of COVID-19 in pregnant women were the same as those of non-pregnant adults in the general population. COVID-19 during late pregnancy had more favorable maternal and fetal outcomes than SARS-CoV-1 and MERS-CoV infection in pregnancy except fetal distress. There is currently no evidence of vertical transmission in women who had COVID-19 in late pregnancy from two studies with small cases. There is no current evidence from randomized controlled trials to recommend any specific anti-2019-nCoV treatment for patients with suspected or confirmed COVID-19. Prevention is the best way for avoiding COVID-19. Prevention of COVID-19 is the same as for other coronavirus infection.

Potential conflicts of interest

The author declares no conflict of interest.

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