Obstetric Management in Maternal with Covid-19

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ABSTRACT
Coronavirus disease-19 (COVID-19) is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Covid-19 pandemic began in the end of 2019 and spread all over the world in a short duration of time. Like two other notable beta coronaviruses, severe acute respiratory syndrome coronavirus-1 (SARS-CoV-1) and Middle East respiratory syndrome coronavirus (MERS-CoV), SARS-CoV-2 can lead to severe contagious respiratory disease. Due to impaired cellular immunity and physiological changes, pregnant women are susceptible to respiratory disease and are more likely to develop severe pneumonia.

Introduction
The COVID-19 outbreak emerged in 2019. The causative pathogen for COVID-19 was identified as a novel beta coronavirus, SARS-CoV-2, which is genetically related to severe acute respiratory syndrome coronavirus-1 (SARS-CoV-1) and Middle East respiratory syndrome coronavirus (MERS-CoV).¹

The physiologic and immunologic changes during pregnancy may result in systemic effects that predispose women towards complications from respiratory infections leading to maternal and fetal mortality and morbidity.²³ Both SARS-CoV and MERS CoV were known to be associated with adverse outcomes in pregnant women with greater mortality rates than the general population.⁴⁵ With SARS-CoV-2 rapidly spreading, it is reasonable to contemplate that pregnant woman are likely to get infected. Worldwide concerns have been raised about the risk of intra-uterine transmission of this virus from the mother to the fetus. The clinical characteristics and possibility of transmission of COVID-19 in pregnant woman vertically or during delivery are still unclear.

The questions that require immediate attention include the fol-low-ing: whether the symptoms of the disease in pregnant women with COVID-19 differ from symptoms in non-pregnant women; whether complications of the disease and mortality rate are higher in pregnant women than in non-pregnant women; and whether there is a chance of premature delivery or fetal mortality, or even vertical transmission of the disease. Finding answers to these questions are crucial for planning effective obstetrical management for pregnant women with COVID19.

Pregnancy and Covid-19
Pregnancy causes physiological changes in the respiratory and circulatory systems as well as alterations in immunological reactions. These are the
primary factors that are likely to make pregnant women more vulnerable to viral infections. The common changes in the respiratory system that are likely to increase the susceptibility of a pregnant woman to respiratory infections include reduced functional residual volumes, elevation of the diaphragm, relaxation of ligaments in the ribs, increased pulmonary hypertension resulting in hyperventilation, and even hypoxic respiratory failure. Altered cell immunity increases pregnant women’s risk of an immunocompromised state, thereby making them more prone to develop worst outcomes. Moreover, viral infection in pregnancy can result in modification of the cardiovascular system, increased metabolic rate and consumption of oxygen, higher pulmonary vascular resistance, and even heart failure. Additionally, during the third trimester of pregnancy, the probability of physical dyspnea is high (due to increased maternal oxygen demands, gestational anemia, and consumption of fetal oxygen) leading to further worsening of breathing difficulties.

It is important to note that pregnant women are susceptible to SARS-CoV-2 infection. In general, the unique immunologic changes of pregnancy are thought to suppress the virulence of the virus.

**Effect on Covid-19 on mother**

Although it was presumed that COVID-19 would severely affect pregnancy and symptoms will be worse. But majority of the studies indicate that most women have mild or moderate flu like symptoms. The most common symptom is fever (50.9%), followed by cough (28.4%), fatigue (12.9%), shortness of breath (7.8%) and sore throat in (8%); about one-fourth cases might be asymptomatic and almost 5.7% women require ICU admission for severe symptoms. A Study from UK has shown that proportion of pregnant women hospitalised (6%) was similar to that of general population, and pregnancy was not associated with increased mortality. The largest study is reported from UKOSS which shows that women may require hospital admission because of severe symptoms of COVID-19 or due to other reasons (labour or delivery) but having less COVID-19 symptoms. This study showed a case fatality rate for UK pregnant women hospitalised with COVID-19 of 1.2% and a SARS-CoV-2-associated maternal mortality rate of 5.6 per 100,000 maternities.

Pregnancy itself is a hypercoagulable state and isolation will increase the risk due to reduced physical activity. Hospitalised individuals with COVID-19 infection shows hypercoagulable state so COVID-19 infection is likely to be associated with increased risk of venous thromboembolism during pregnancy. RCOG guideline (May 2020) suggests thromboprophylaxis can be considered and prescribed on a case-to-case basis in the form of low molecular weight heparin [LMWH]. These are women who have one or more risk factors for venous thromboembolism (VTE) like anti-phospholipid antibody syndrome (APLAS), previous history of VTE, prolonged immobilisation and ICU admission. They should receive enoxaparin 1 mg/kg subcutaneous injection once daily for period of hospitalisation or 10 days (whichever is longer). Patient need not be monitored while receiving prophylactic anticoagulation. Pregnancy and delivery during this pandemic will affect the psychosocial wellbeing of women and their family.

**Effect on fetus**

Till date, there is no data suggesting the effect of COVID-19 on rate of miscarriage, second trimester losses, preterm labour or still birth. There is no congenital effect of virus on fetal development either as there is no documented intrauterine fetal infection. Various guidelines recommend to continue providing basic and emergency obstetric care. There are minimum four antenatal visits required for expecting mother at 12 weeks, 20 weeks, 28 weeks and then 36 weeks.

Pregnant women should continue visiting their consulting physician or maternity centre if they are not in any containment zone. Most women attending
maternity services are healthy and are advised to maintain stringent social distancing. They should wear mask while attending the clinic and should keep physical contact with the objects and persons to a minimum. Any women coming for antenatal check-up or otherwise having suspicion or confirmation of COVID-19 should be examined by healthcare worker after wearing full personal protective equipment (PPE) which includes full body gown, N95/triple layer surgical face mask, face shield or eye cover/goggles and sterile gloves. Minimum person should examine the patient in isolation facility. Staff should adhere to PPE guidelines and make every effort to observe social distancing measures at work, even when not patient facing. This includes handwashing, eating in designated areas and maintaining a distance of 2 m between colleagues, where practical. Obstetric care should not be delayed in order to test for COVID-19. Women who are self-isolating because someone in their household had possible symptoms of COVID-19 should defer their routine antenatal visit for 14 days, provided there is no emergency. If urgent care is required, she should visit the hospital and obstetric treatment should not be delayed by the healthcare provider.\textsuperscript{14,16,17}

Pregnant women having suspicion of COVID-19 due to symptoms or travel to a high risk area or international travel and contact with positive person, then she should report to her clinician or hospital telephonically. She should travel by private transport to the hospital only for urgent consultation, otherwise she should self-isolate herself from others for 14 days. Self-isolation means she should stay at home, not mix her utensils, dishes with others, ventilate her accommodation properly, not to go out for work, school or any-where else for 14 days. Upon arrival in the hospital premises, suspect or COVID-19 positive woman should be examined and cared in the isolation room.\textsuperscript{14,17}

**Diagnosis and treatment of COVID-19 in pregnancy**

The diagnosis of COVID-19 in pregnancy is mainly based on epidemiological history, clinical manifestations, chest radiography, and etiological tests. This is similar to the evidence of diagnosis for SARS and MERS in pregnancy. Most pregnant women infected by the three coronaviruses had an epidemiological contact history. Fever, cough, myalgia, and dyspnea are the major symptoms.\textsuperscript{18}

Testing should be done as per regional guidelines. qRT-PCR (quantitative reverse transcriptase polymerase chain reaction) and IgM antibody testing are done for diagnosis of COVID-19 infection. Throat swabs and nasopharyngeal swabs are taken from the patient and are tested for RT-PCR, blood samples are also tested for anti-bodies.\textsuperscript{20,21}

Chest X-ray and CT scan should not be withheld in pregnant women if indicated clinically for management. It can be done with abdominal shielding. These tests are done to detect the extent of COVID-19 pneumonia and follow-up. It is definitely indicated in women with severe respiratory illness, X-ray chest showing opacities, or ARDS, pleural effusion, or if there is risk of pulmonary thromboembolism. It is mainly required in women who require ICU care or ventilator support for acute severe respiratory illness.\textsuperscript{20}

According to the seventh guidelines published by the National Health Commission of China, the treatment of COVID-19 mainly involves oxygen therapy, antiviral therapy, and supportive treatment. At present, there is no antiviral drug for the treatment of COVID-19; therefore, identifying an antiviral drug against COVID-19 in pregnancy is imperative.\textsuperscript{18}

In brief, interferon-alpha, lopinavir/ritonavir, and chloroquine could be administered to pregnant women with COVID-19 after patients were fully informed of these drugs’ benefits and risks. Remdesivir and arbidol are promising antiviral drugs against COVID-19; however, their safety in pregnancy requires further research. In addition, antibiotics and corticosteroids are recommended in pregnancy with COVID-19 if necessary. However, antibiotics should not be used without indication,
and high doses of glucocorticoids should be avoided as much as possible.\textsuperscript{18}

**Conclusion**

There is currently limited knowledge about SARS-CoV-2 infections in pregnancy. Based on the available data, the clinical characteristics of pregnant women with COVID-19 seem to resemble those of non-pregnant women. It cannot be conclusively said that SARS-CoV-2 infection increases the risk of maternal, fetal, and neonatal complications. Increased risks of maternal, fetal, and neonatal complications are noted in pregnant women positive for COVID-19 with comorbidities. There are regional variations in the rates of adverse outcomes reported. Though vertical transmission is noted in very few cases, the review shows that it is possible. Additionally, the third trimester seems to be the most vulnerable period of infection and this aspect needs to be researched further to activate surveillance programs at the end of the second trimester. Further studies are warranted to assess whether the higher rates of adverse outcomes reported in mothers with COVID-19 with comorbidities are due to the comorbidities or whether the SARS-CoV-2 infection worsens the disease course in these mothers.

**References**


