

COVID-19 and Pregnancy

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Introduction

Concern regarding pregnant patients and healthcare providers during the COVID-19 pandemic is of paramount importance to all involved. Although knowledge is growing regarding the nature and impacts of the SARS-CoV2 virus, there is still little clarity regarding the possible impacts of this virus during pregnancy. Even less is known regarding any impacts on the developing fetus. Clearly infection of any sort during pregnancy raises concerns for both the mother and fetus. The SARS-CoV2 virus is a novel coronavirus that causes COVID-19 disease. This clinical syndrome ranges from asymptomatic to a mild influenza-like-illness (ILI) and occasionally severe acute respiratory infection (SARI). COVID-19 diseases may culminate in acute respiratory distress syndrome (ARDS) and death. The primary known risk factors for severe disease include older age, chronic medical conditions and immunosuppression ([WHO](#)). Pregnant women experience immunologic and physiologic changes that can occasionally make them more susceptible to viral respiratory infections ([Ramsey](#)). There is also some evidence from previous coronavirus outbreaks (SARS-CoV and MERS-CoV) that pregnant women might be at greater risk for severe illness, morbidity or mortality when compared with the general population ([Schwartz](#), [Hardy](#), [Mosby](#), [Ng](#), [Stockman](#), [Alserehi](#)).

COVID-19 Clinical Presentation in Pregnancy

The clinical presentation of COVID-19 is similar in pregnant women compared to non-pregnant women with the course ranging from mild to severe disease. All pregnant patients should be screened for COVID-19. Such screening should be included in the routine emergency department (ED) or obstetrical ED triage screening protocol. A multidisciplinary approach to the care of pregnant COVID-19 patients or person under investigation (PUI) is recommended including emergency medicine, OB/GYN, hospital medicine, neonatology, family medicine, infectious disease and anesthesiology (where indicated).

Currently Available Data for COVID-19 and Pregnancy

As noted, there is limited data available regarding the impact of SARS-CoV2 on the pregnant patient. However, a review of the available reports indicates the following. The median age of most reported patients is 30 years of age with COVID-19 disease being detected in the second and third trimester. The median gestational age was 36 weeks. In patients who were initially asymptomatic, the majority developed symptoms within two days of delivery (range 13 days prior to delivery to three days postpartum). There are inadequate data on COVID-19 disease to fully characterize the risk for miscarriage or congenital anomalies. However as of this writing, there are no reports of either of these problems. There is also no current evidence of vertical transmission, aside from a few anecdotal reports ([Zhang](#), [Zhu](#)). There have also been anecdotal reports of infants testing positive postpartum ([Chen](#)). However, a review of the larger unambiguous reports on this phenomenon demonstrates that none of the infants of COVID-19 positive mothers tested positive. In addition, there have been no demonstrable increases in maternal deaths, birth or neonatal complications ([Zhang](#)). Although information is limited, the risk of a pregnant woman contracting the SARS-CoV2 virus seems to be consistent with the general population ([Zhang](#), [WHO](#)). Pregnancy has not been listed as a risk factor for contracting COVID-19 or a higher rate of complications from the virus.

Information on Viral Pneumonia in Pregnancy

Viral pneumonia – of any type – is known to be a significant risk factor for adverse maternal and fetal outcomes during pregnancy ([Ramsey](#), [Schwartz](#)). In previous pandemics, the overall risk of viral pneumonia in pregnancy was significantly higher than for the rest of the population based on data from the 1957–1958 pandemics and the 2009 H1N1 influenza pandemic ([Hardy](#), [Mosby](#)). Data from the Report of the WHO-China Joint Mission on

Coronavirus Disease 2019 (COVID-19) indicates; “As opposed to Influenza A(H1N1), pregnant women do not appear to be at higher risk of severe disease. In an investigation of 147 pregnant women (64 confirmed, 82 suspected and 1 asymptomatic), 8% had severe disease and 1% were critical” (WHO). These numbers are consistent with the non-pregnant female population cohort. A retrospective comparison between women developing COVID-19 disease after 24 weeks gestation (#16) and a similar group without COVID-19 (#45) – all delivered by caesarian section –demonstrated no differences in neonatal scores or maternal/neonatal outcomes (Ng). None of these women had clinical evidence of viral pneumonia. None of the neonates from COVID-19 mothers tested positive.

Current Information on Fetal Risk

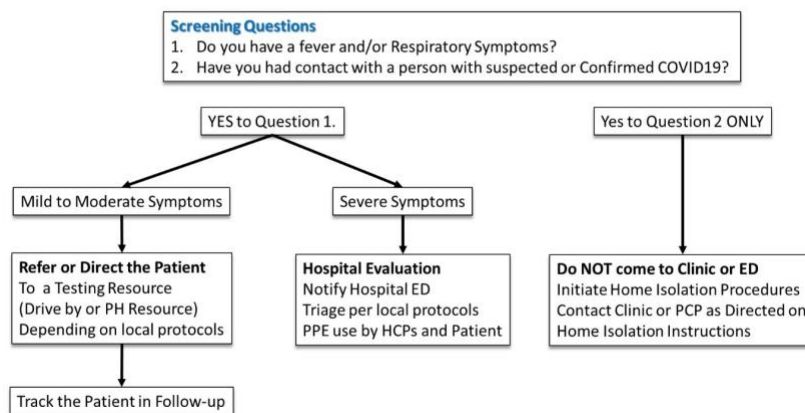
No strong evidence of mother to fetus transmission of SARS1, MERS-CoV, or SARS-Cov2 have been detected to date (Zhu, Ng, Stockman, Alserehi). This then likely limits any risk of direct viral impacts on the fetus. Most authorities are of the opinion that the fetal/maternal complications resulting from coronavirus and novel coronavirus infections are due to the maternal impacts of the disease and in some cases, the treatments of that disease (Schwartz). As such, the impacts are associated with the severity of the viral pneumonia. In addition, a number of antiviral and other medications (if used) may have detrimental impacts on the fetus (Alserehi).

COVID-19 and Pregnancy: Outpatient Management

During the COVID-19 pandemic, efforts should be made to avoid exposing pregnant patients to the virus. One method is to keep the patient out of the clinic when possible. Telemedicine may be appropriate for the management of some low-risk prenatal and postpartum visits. Visits between the initial intake evaluation and 20 weeks can often be completed via telemedicine. Further interim telehealth visits can be scheduled at the healthcare providers discretion (e.g. at 16, 24 and 34 weeks). To minimize other inpatient visits, all patients should be instructed to obtain automated blood pressure cuffs if feasible. Patients should also be instructed on the proper use of these devices. Additional visits including follow up for diabetes control, hypertension, mood disorder, etc., may be done remotely with telehealth if the patient is compliant and low risk.

Minimizing outpatient risk by minimizing outpatient contact: In addition to using telemedicine, clinicians should try to minimize or eliminate unnecessary contacts at the hospital or birth center. One method of minimizing physical clinic visits is through the use of appropriate telephone screening with trained triage nurses. Phone calls to labor and delivery should be triaged according to a consistent and vetted algorithm. An example is provided in the following figure.

PREGNANT PHONE TRIAGE



Scheduled Cesarean Sections (CS) and Inductions of Labor (IOL)

Patients with scheduled cesarean sections (CS) or labor induction (IOL) should be screened by phone the day prior. Any patient meeting the criteria for SARS-CoV2 testing should be rescheduled if possible, pending viral test results. It is preferable for the test results to return prior to the patient present to the hospital. However, if this is not possible and the patient is high risk, then enhanced provider protection may be indicated. For COVID-19 positive patients with mild or moderate symptoms not requiring immediate care, the severity of disease typically peaks in the second week of illness. Planning the delivery prior to that time is optimal if possible. Induction of labor for medical indications should not be postponed regardless of COVID-19 status. Allowance for elective IOL must take into consideration the potential resource impacts regionally and locally. Also, all preoperative blood draws should be done on the day of the procedure to limit healthcare facility exposure if at all possible.

Inpatient Management Considerations During the COVID-19 Pandemic

During the hospitalization, follow standard and droplet infection control precautions as recommended by the Centers for Disease Control and Prevention ([CDC Infection Control](#)). All personnel involved in the procedure should be correctly trained in infection control measures. The donning and doffing of personal protective equipment (PPE) represents the time of greatest risk for healthcare provider contamination. As such, healthcare providers should be monitored by trained observers during donning and doffing when possible to enhance compliance and safety with PPE. During the pandemic, visitor access, including essential support persons for women in labor such as a spouse or partners, must be controlled. Some facilities have eliminated visitation entirely. Most are severely restricting the numbers as a protective measure. Everyone understands the critical role played by essential support persons for women in labor. As such, during this pandemic, most authorities recommend limiting this to one support person throughout the entire labor and delivery process without trading places. Infants born to mothers with confirmed COVID-19 should be considered PUIs. As such, these infants should be isolated and tested.

Labor Management Considerations During the COVID-19 Pandemic

First stage of labor: Walking for women without an epidural should be encouraged, but they must remain in their labor room to reduce exposures. The routine use of an incentive spirometer is not recommended due to a potential risk for aerosol generation. Oxytocin augmentation and amniotomy is recommended to shorten the time in labor where appropriate. Cesarean section for arrest of labor in the first stage should not be performed unless labor has arrested for a minimum of four hours with adequate uterine activity or six hours with inadequate uterine activity in a woman with rupture of membranes, adequate oxytocin, and ≥ 6 cm dilated cervix.

Second stage of labor: The same considerations apply as in the first stage of labor. Pushing should not be deployed or encouraged.

Third stage of labor: Care should be taken to reduce the need for blood transfusion given the current blood shortage and rare risk of blood supply contamination with SARS-CoV2 ([Pagano](#)). Consider prophylactic Tranexamic Acid or misoprostol to reduce blood loss where indicated. Also consider the use of cell saver devices during CS delivery with and a review of postpartum hemorrhage risk stratification. If transfusion is indicated, consider starting with one unit of type and crossmatch blood if clinically appropriate and then reassess for the need of additional units.

Anesthesia considerations: Early epidurals are recommended to minimize the need of general anesthesia for emergency CS delivery. Neuraxial anesthesia is not contraindicated in COVID-19 positive patients. Avoid nitrous oxide due to a risk of local aerosolization.

Postpartum Care Considerations during the COVID-19 Pandemic

All vaginal deliveries performed should have a goal of discharge on postpartum day one or the same day if clinically appropriate. All CS deliveries should have a goal of discharge on post-op day two or post-op day one if clinically appropriate. Discharge supplies for blood pressure monitoring and follow up for patients with hypertensive disorders should be arranged. Postpartum visits, including wound checks, should be scheduled for telehealth if at all possible. Clinicians should consider using long-acting reversible contraception (LARC) placement or Depo-Provera prior to discharge home to reduce need for in-person visits.

Antepartum Considerations in COVID-19 Patients or PUIs

Anecdotal reports have suggested an increased risk of morbidity associated with non-steroidal anti-inflammatory use during COVID-19 disease. Although this claim has no supporting evidence, some clinicians may wish to consider nifedipine as a potential alternative to indomethacin. The current Food and Drug Administration (FDA) and World Health Organization (WHO) guidelines do not restrict the use of NSAIDs (FDA). Most organizations support continued use of NSAIDs and acetaminophen for pain control in order to reduce reliance on opioid-based analgesics.

The use of steroids and COVID-19 disease has been reported as either neutral or deleterious. The general recommendations are that corticosteroids should be used only if needed for another underlying condition in patients with COVID-19 disease (CDC FAQs). Severely ill COVID-19 patients should be managed according to the Surviving Sepsis Campaign guidelines (HERE). Given the possibility of risk with their use, steroids for fetal lung maturity should be used judiciously. Magnesium sulfate has the potential to cause respiratory depression and hypotension. The current recommendation is for cautious use in patients with severe COVID-19 symptoms.

Care of Critically Ill COVID-19 Pregnant Patients

Specific protocols for the management of severely ill COVID-19 patients in the intensive care unit (ICU) is beyond the scope of this document. This information may be found in other locations on the COVID-19 channel or among the references provided.

Fetal Considerations: For patients > 24 weeks include electronic fetal monitoring for antenatal surveillance. This should be performed at least daily and with any change in maternal status. The fetus can be a “sixth” vital sign reflecting early deterioration in maternal status. Maternal oxygen saturations should be maintained >95%.

Maternal Considerations: Pregnancy induces a natural respiratory alkalosis with a normal PCO₂ of 28-32mmHg. Therapy for ARDS involves low tidal volumes and permissive hypercapnia (PCO₂>60) and perhaps permissive hypoxia (PO₂>90mmHg). Data in pregnancy are limited but these measures do not appear to have adverse fetal impacts. Increased positive end expiratory pressures (PEEP) is likely required during the third trimester and in seriously ill patients. The goal for maternal blood pressure management is <160/110. Patients should be maintained in left lateral recumbent position if possible, to better decompress the inferior vena cava. Ensure that an emergency CS and hemorrhage kit is at the bedside. Consider immediate delivery if patient is > 34 weeks and requires PEEP to maintain adequate maternal pulmonary function. An assisted second stage of labor may be required. If an emergent CS delivery is needed, it should best be performed at the bedside in the ICU. A neonatal ICU team should be present at delivery.

Postpartum and Breastfeeding Considerations in COVID-19 Patients or PUIs

Consider separating mother and baby into isolation until the mother is cleared as negative for viral shedding. SARS-CoV2 has not been demonstrated in the breastmilk of positive mothers (Panahi). Breastfeeding should be encouraged, especially given the potential antibody protection for the baby. To avoid exposure of the newborn to mother, the mother can express milk using a dedicated pump and infant fed by a healthy caregiver. A dedicated pump should be used and all parts should be washed thoroughly. The decision to discontinue temporary separation of the mother from her baby should be made on a case-by-case basis in consultation

with infection control professionals and public health. If “rooming in” is unavoidable due to space constraints, precautions should be taken to limit exposure to the baby. This may be done using physical barriers or by keeping the baby more than six feet from mother. The mother should maintain a surgical mask and practice good hand hygiene before each feeding or close contact with her newborn.

PPE Considerations

The current American College of Obstetrics and Gynecology (ACOG) recommendations are that every patient and every provider should wear a surgical mask for every encounter ([ACOG](#)). This may not be feasible given shortages of PPE. Patients with respiratory symptoms and an unknown COVID-19 status should be managed with droplet precautions. This includes gown, gloves and a surgical mask/face shield. An N95 (or greater) respirator should be worn during encounters with COVID-19 positive patients and PUIs during aerosolizing procedures. It’s important to note that the second stage of labor is considered by most authorities to be an aerosolizing procedure. In addition, clinicians should avoid using high flow oxygen therapy, nebulizers or noninvasive positive pressure pulmonary treatments without assuming that these procedures may produce aerosols. This is *not* to say that these procedures should not be used when medically indicated. However, appropriate aerosol protection should be taken by all healthcare personnel as indicated.

Closing

The impact of COVID-19 on both maternal and neonatal health is largely unknown at this time due to a lack of quality data. As such, healthcare providers involved in the evaluation and management of these individuals should use appropriate droplet precautions and aerosol precautions where indicated. Care of pregnant COVID-19 patients, as with most medical complications, initially focuses on the mother. It is critical however that the clinician use a low threshold to initiate electronic fetal monitoring when indicated. Clinicians should also be vigilant of changing recommendations as new data are collected.

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