پیامدهای تعالی

بیمارستان فوق تخصصی خاتم الانبیاء (ص) و بیمارستان فوق تخصصی تا پیشگیری از پیشگیری ۱۹ از بیماران بیشتر (در ابعاد مختلف مراقبتی)

تاثیر کووید ۱۹ بر سلامت مادر و جنین، مدیریت در درمان مادران مبتلا به کووید

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تابستاتان ۱۴۰۰
INTRODUCTION

- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the virus that causes coronavirus disease 2019 (COVID-19).
Signs and symptoms

All pregnant persons should be monitored for development of symptoms and signs of COVID-19.

- Cough – Pregnant 50.3 percent (nonpregnant 51.3 percent)
- Headache – Pregnant 42.7 percent (nonpregnant 54.9 percent)
- Muscle aches – Pregnant 36.7 percent (nonpregnant 45.2 percent)
- Fever – Pregnant 32 percent (nonpregnant 39.3 percent)
- Sore throat – Pregnant 28.4 percent (nonpregnant 34.6 percent)
- Shortness of breath – Pregnant 25.9 percent (nonpregnant 24.8 percent)
- New loss of taste or smell – Pregnant 21.5 percent (nonpregnant 24.8 percent)
- Other symptoms that occurred in >10 percent of each group included nausea, vomiting, fatigue, diarrhea, and rhinorrhea.
PRENATAL CARE
Are pregnant women more susceptible to COVID-19 or at higher risk for complications of COVID-19?

- Pregnancy and childbirth generally do not increase the risk for SARS-CoV-2 infection.

- Worsen the clinical course of COVID-19 compared with nonpregnant individuals of the same age.

- Infected persons recover without undergoing delivery, >90 percent.
Does COVID-19 increase the risk for pregnancy complications?

- Infected women, especially those who develop pneumonia, appear to have an increased frequency of preterm birth and possibly cesarean delivery, which is likely related to severe maternal illness.

- Most preterm births are iatrogenic (ie, induced labor or scheduled cesarean delivery).
How can prenatal care be modified to decrease risk of contracting COVID-19?

- Modifying traditional protocols for prenatal visits.
- Modifications for low- versus high-risk pregnancies (eg, multiple gestation, hypertension, diabetes).
- Telehealth in areas of active infection transmission
- Reducing the number of in-person visits, timing of visits, grouping tests (eg, aneuploidy, diabetes, infection screening) to minimize maternal contact with others
- Restricting visitors during visits and tests
- Timing of indicated obstetric ultrasound examinations
- Timing and frequency of use of nonstress tests and biophysical profiles.
Does SARS-CoV-2 cross the placenta?

- There is no definite evidence that SARS-CoV-2 crosses the placenta and infects the fetus.
- A few cases of placental tissue or membranes positive for SARS-CoV-2 and a few cases of possible in utero infection have been reported.
- Some of the neonatal cases may have been false-positive test results or due to acquisition of infection soon after birth.
- Reports of COVID-19 infection in the neonate have generally described mild disease.
Should glucocorticoids be avoided in pregnant women with COVID-19?

- Pregnant women who meet criteria for use of glucocorticoids for maternal treatment of COVID-19 can receive standard doses of dexamethasone.
- For fetal lung maturity, administer the usual doses of dexamethasone to induce fetal pulmonary maturation.
- Continue dexamethasone to complete the usual course of treatment for maternal COVID-19.
Are SARS-CoV-2 vaccines safe for pregnant women and women planning pregnancy?

- We recommend COVID-19 vaccination for pregnant women.
- Safety and efficacy of COVID-19 vaccines during pregnancy.
- Pregnancy itself is associated with an increased risk of severe infection.
- The SARS-CoV-2 vaccines that are clinically available do not contain virus that replicates.
- Vaccination can occur at the same time as administration of a routinely administered vaccine, such as the Tdap and influenza; a separation period is unnecessary.
- Vaccination is not thought to affect fertility, and it is not necessary to delay pregnancy after vaccination.
LABOR AND DELIVERY
Should planned induction of labor or cesarean delivery of asymptomatic women be postponed during the pandemic?

- In asymptomatic women, inductions of labor and cesarean deliveries with appropriate medical indications should not be postponed or rescheduled. This includes 39-week inductions or cesarean deliveries after patient counseling.
- For those who require cervical ripening, outpatient mechanical ripening with a balloon catheter is an option.
- For inpatient cervical ripening, using two methods may decrease the time from induction to birth, compared with using one agent only.
Is maternal COVID-19 an indication for cesarean delivery?

- COVID-19 is not an indication to alter the route of delivery.
- Even if vertical transmission is confirmed, this would not be an indication for cesarean delivery.
- It would increase maternal risk and would be unlikely to improve newborn outcome.
How should labor pain be managed in women with COVID-19?

- A neuraxial anesthetic is generally preferred to other options for management of labor pain.
- It provides good analgesia and thus reduces cardiopulmonary stress from pain and anxiety.
- It is available in case an emergency cesarean is required.
- Suspending use of nitrous oxide for labor analgesia in patients with confirmed or suspected COVID-19.
Use of magnesium sulfate in patients with respiratory compromise

- In nonintubated patients with respiratory compromise due to COVID-19, those receiving magnesium sulfate for seizure prophylaxis and/or neonatal neuroprotection should be monitored especially carefully (magnesium levels, frequent respiratory rates, pulse oximetry) since high magnesium levels can cause respiratory paralysis.

- Dose-adjusting magnesium sulfate, in patients who also have COVID-19-related acute renal injury.

- In intubated, mechanically ventilated patients, signs of magnesium-related respiratory toxicity will not be observed; thus, cardiac arrhythmias or arrest can be the first sign of serious toxicity.
Maternal and fetal monitoring and procedures

- In laboring patients with COVID-19 who are not severely ill, maternal and fetal monitoring and procedures are generally routine, with the following exceptions:
  - Continuous electronic fetal monitoring is recommended
  - As intrapartum oxygen supplementation in the absence of maternal hypoxemia has no proven fetal benefit.
  - Handling of nasal cannula and face mask increases contamination/exposure between patient and provider.
- SARS-CoV-2 has rarely been detected in vaginal secretions or amniotic fluid.
- Labor, and particularly pushing, causes loss of feces, which can contain the virus.
- Not delaying pushing in the second stage.
Delivery considerations

- Delayed umbilical cord clamping.
- Some institutions have chosen to prohibit this practice in term infants, in whom the benefits are modest, to minimize newborn exposure to any virus in the immediate environment and reduce the chances that the newborn will require phototherapy for jaundice.
- Skin-to-skin contact between all mothers and newborns in the birthing room. It appears that mothers with COVID infection can safely practice skin-to-skin care and breastfeed in the birthing room if they wear a surgical mask and use proper hand hygiene.
Umbilical cord blood banking can be performed.

Management of the third stage of labor is not affected by COVID-19.

Patients who develop postpartum hemorrhage can be managed according to standard protocols.

Avoiding tranexamic acid in COVID-19 patients.

Avoiding methylergometrine.
In patients who develop intrapartum fever, COVID-19 infection should be part of the differential diagnosis, particularly when accompanied by respiratory symptoms and hypoxemia.

Such patients should be tested for SARS-CoV-2 (or retested), along with evaluation for common causes of intrapartum fever (e.g., chorioamnionitis, epidural fever).
Can an asymptomatic partner/support person attend labor and delivery?

- the support person should be screened in accordance with hospital policies, and those with any symptoms consistent with COVID-19, exposure to a confirmed case within 14 days, or a positive test for COVID-19 within 14 days should not be allowed to attend the labor and birth.
- Permit one support person who must remain with the laboring woman (may not leave the room and then return).
- Additional support persons may be allowed or can be a part of the patient's labor and delivery via video.
POSTPARTUM
Venous thromboembolism prophylaxis

- Prophylactic-dose anticoagulation is recommended for postpartum patients with severe/critical COVID-19, if there are no contraindications to its use, and generally discontinued when the patient is discharged to home.
- Postpartum patients with COVID-19 who are asymptomatic or mildly symptomatic and hospitalized for reasons other than COVID-19 do not require postpartum anticoagulation unless they have other thrombotic risk factors, such as prior venous thromboembolism (VTE).
If the mother has known COVID-19, the infant is a COVID-19 suspect and should be tested, isolated from other healthy infants, and cared for according to infection control precautions for patients with confirmed or suspected COVID-19.
Should mothers with COVID-19 be separated from their baby?

- The newborn's risk for acquiring SARS-CoV-2 from the mother is low.
- Mothers should wear a mask and practice hand hygiene during contact with their infants.
- Physical distancing >6 feet between the mother and neonate or placing the neonate in an incubator is desirable when feasible.
The criteria for discontinuing isolation and precautions

- At least 10 days have passed since their symptoms first appeared (up to 20 days if they have more severe to critical illness or are severely immunocompromised).
- At least 24 hours have passed since their last fever without the use of antipyretics.
- Their other symptoms have improved.
- For asymptomatic mothers identified only by obstetric screening tests, at least 10 days should have passed since the positive test.
Can breast milk transmit SARS-CoV-2?

- There is general consensus that breastfeeding should be encouraged because of its many maternal and infant benefits.
- It is unknown whether SARS-CoV-2 can be transmitted through breast milk because very few breast milk samples have been tested.
- In a World Health Organization (WHO) study, breast milk samples from 43 mothers were negative for SARS-CoV-2 by reverse transcription polymerase chain reaction (RT-PCR) and samples from three mothers tested positive, but specific testing for viable and infective virus was not performed.
What precautions should mothers with confirmed or suspected COVID-19 take when breastfeeding?

- Droplet transmission from infected mothers to their baby could occur through close contact during breastfeeding. Mothers can take precautions to prevent this by performing hand and breast hygiene and using a face mask.

- Alternatively, the infant can be fed expressed breastmilk by a healthy caregiver following hygiene precautions until the mother has recovered or is proven uninfected. In such cases, the mother should use strict handwashing before pumping and wear a face mask during pumping.
Can pregnant and postpartum women with COVID-19 take NSAIDs and acetaminophen?

- NSAIDs and acetaminophen can be used for treatment of fever and pain during pregnancy and postpartum.
- Low-dose aspirin for prevention of preeclampsia is safe throughout pregnancy.
- A potential concern of acetaminophen use is hepatic toxicity; however, doses less than 2 grams per day are likely safe in the absence of severe or decompensated hepatic disease.
Are SARS-CoV-2 vaccines safe for breastfeeding women?

- We recommend COVID-19 vaccination for breastfeeding women.

- Maternal COVID-19 antibodies induced by maternal vaccination can pass into breast milk and may have protective effects for the infant.

- If any vaccine crosses into breast milk and is then ingested by the infant, it is likely to be inactivated by the infant’s digestive system.
Safety of antiviral drug therapy

- Several agents are being used and evaluated for treatment of COVID-19.
- Although some of these agents are clinically available for other indications, their use for COVID-19 remains investigational.
- Very few trials of drugs for treatment of COVID-19 include pregnant people.
Remdesivir

- For pregnant patients who would otherwise qualify for remdesivir (and for whom it is available), remdesivir is recommended.
- Remdesivir is a novel nucleotide analog that has activity against SARS-CoV-2 in vitro and related coronaviruses SARS and MERS-CoV both in vitro and in animal studies.
- It has been used without reported fetal toxicity in some pregnant people with Ebola and Marburg virus disease and is being used to treat pregnant patients with severe COVID-19.
Other drugs

- Several other drugs are being used in research studies (e.g., monoclonal antibodies, hyperimmune globulin).

- Ribavirin is an investigational drug for COVID-19 that is known to be teratogenic and should be avoided.
Drugs that may be considered for use in pregnant patients include:

- Baricitinib
- Ribavirin
- Tocilizumab and sarilumab are interleukin-6 antagonists
- As humanized monoclonal antibodies (IgG₁), they cross the placenta beginning as early as 13 weeks of gestation, with increasing transport as the pregnancy progresses and the largest amount transferred in the third trimester
Convalescent plasma
SUMMARY AND RECOMMENDATIONS

- **Prevention**
  - Pregnant people should follow the same recommendations as nonpregnant people for avoiding exposure to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19).
  - We recommend COVID-19 vaccination for all pregnant people rather than deferring vaccination until after delivery or after breastfeeding.
  - Patients who are at higher risk of exposure to SARS-CoV-2 or at highest risk of having severe disease if infected (eg, patients with diabetes, obesity, or hypertension) may benefit most.
  - For nonpregnant persons, the vaccines are not thought to affect fertility, and it is not necessary to delay pregnancy after vaccination.
  - Postnatal contamination could not be excluded conclusively.
Clinical course and outcome

- Clinical manifestations of COVID-19 in pregnant people are generally similar to those in nonpregnant individuals.
- Testing is the same as in nonpregnant people: A positive test for SARS-CoV-2 generally confirms the diagnosis of COVID-19.
- Pregnancy does not appear to increase susceptibility to acquiring SARS-CoV-2 infection, and most infected mothers recover without undergoing delivery.
Pregnant people with the infection appear to be at increased risk for developing severe disease necessitating maternal intensive care unit admission and mechanical ventilation, and in rare cases, extracorporeal membrane oxygenation may be needed.

- Risk factors for severe disease include age $\geq 35$ years, obesity, hypertension, and preexisting diabetes. Maternal deaths are in excess of those in nonpregnant females of reproductive age with COVID-19.

- Infected pregnant people, especially those who develop pneumonia, also appear to have a small increase in frequency of preterm birth and possibly cesarean birth. These complications are likely related to severe maternal illness.

- Whether intrauterine infection occurs is still under investigation. A few early newborn SARS-CoV-2 infections and placental infections have been reported, suggesting possible but uncommon vertical transmission.
Management

- Modifying traditional protocols for prenatal and postnatal visits and hospital discharge.
- Administering the usual doses of dexamethasone.
- Prophylactic-dose anticoagulation is recommended.
- For most pregnant patients with preterm COVID-19 and nonsevere illness who have no medical/obstetric indications for prompt delivery, early delivery is not indicated and ideally will occur sometime after a negative testing result is obtained or isolation status is lifted, thereby minimizing the risk of postnatal transmission to the neonate.
Severely ill patients with COVID-19 pneumonia at least 32 to 34 weeks of gestation may benefit from early delivery.

- Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used for treatment of fever and pain. Acetaminophen is the preferred antipyretic and analgesic agent.

- If NSAIDs are needed, the lowest effective dose is used and, in undelivered patients, guided by gestational age-related potential toxicity for the fetus.

- Several agents are being evaluated for treatment of COVID-19, with minimal or no information on safety in pregnancy.