

Review Articles

Obstetric Concern, Management and Considerations in the Context of COVID-19 Pandemic

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Abstract:

Coronavirus disease (COVID-19) has emerged as a global threat. The disease largely attacks adults with higher mortality among the aged and compromised people. Although previous coronavirus havocs caused significant number of maternal and neonatal demise, most pregnant cases with COVID-19 infection are either asymptomatic or with mild symptoms only. This pandemic brought significant disruption of essential antenatal and intranatal care worldwide. The health resources became diverted to focus on general population needs rather than the specified needs of pregnant women. Limited information is known about the effect of COVID-19 disease on pregnancy. Recent evidence indicates that pregnant women are not vulnerable group for severe COVID-19 illness. However, immunological and physiological alterations during pregnancy expose women more vulnerable to SARS-CoV-2 infection in comparison to general population. Covid-19 pandemic has created a global crisis causing great challenges for pregnant women and their obstetricians. Although the due course of pregnancy is not strained by the disease itself but complications can happen in absence of proper care and caution. Both the pregnant mother and care-giver should be vigilant and the obstetric management should be implemented following evidence based standard protocol.

Key Words: COVID-19, Pregnancy, Antenatal care, Intranatal care

Introduction :

In December, 2019 Coronavirus disease (COVID-19) emerged as an outbreak in Wuhan, China. Due to global logarithmic expansion of the highly transmissible cases, the World Health Organization (WHO) declared this outbreak as pandemic on 11th March, 2020. The disease largely attacks adults with higher mortality rate in aged and compromised people. Although pregnancy is generally considered a normal physiological and developmental milestone, COVID-19 pandemic brought significant disruption

of essential antenatal and intranatal care of pregnant women worldwide. Previous human coronaviruses (e.g. pandemic influenza and SARS) caused increased number of maternal and neonatal demise¹. During this public emergency, the health resources became diverted to focus on general population needs rather than the specified needs of pregnant women. So limited information is known about the effect of COVID-19 disease on pregnancy. Recent evidence indicates that pregnant women are not vulnerable group for severe COVID-19 illness². Till

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now, most pregnant cases with COVID-19 infection are either asymptomatic or self-limiting pneumonia³. However, immunological and physiological alterations during pregnancy expose women more vulnerable to SARS-CoV-2 infection in comparison to general population⁴. So, it is necessary to innovate strategies to restrain the deterioration of pregnancy outcome. In this review we aimed to discuss evidence based protocol and address considerations for maternal-fetal management and childbirth in obstetric setting based on qualitative review of existing data.

The objective of this review paper is to find out the available information related to changes in obstetric care during COVID pandemic. Collection and compilation of information from various sources would help build better understanding of the management strategy of obstetric care during COVID pandemic days. This would be useful for the obstetricians engaged in the treatment of patients suffering from this dreadful disease.

Methods:

COVID-19 SARS COV-2 has devastated the whole world for more than a year now. Research activities are proceeding in an unprecedented way. This review article focuses on the obstetric management strategy adopted during this COVID crisis. The researchers searched several articles on COVID-19 and obstetric care which were published in PUBMED and they also gathered information from obstetricians involved in the treatment of the COVID patients. These Information has been collected and compiled.

Impact of COVID-19 on antenatal care :

COVID-19 pandemic has resulted in lockdowns, curfews and containment of public activities all around the world. These measures were adopted to promote social distancing, to prevent the community spread of virus and to prepare the healthcare institutions for addressing the pandemic. This unprecedented situation caused decreased number of antenatal attendances, immunizations and hospital deliveries with increased number of still births [5]. Telemedicine facilities played a promising role to tackle this inconvenient situation. Moreover, due to fear of contracting COVID-19 many expecting mothers have not come for antenatal checkups, which might cause skipping of high-risk factors in due course of pregnancy. It is essential to organize health care facilities for providing proper care to the pregnant mothers.

Transmission :

This viral infection can be transmitted from person to person by respiratory droplets, fomites and fecal-oral methods. The possibility of vertical transmission from mother to fetus (during antenatal or intra natal period) is highly unexpected in the COVID-19 outbreak⁶. Several studies have been conducted where sampling of genital fluid, amniotic fluid, placental membranes, umbilical cord swabs, cord blood, urine and breast-milk samples have been tested negative in most cases⁷. Reported cases of neonatal infection probably appear from horizontal transmission during bonding and breastfeeding and not through trans placental transmission. The newborn baby acquired the infection by droplet or close contact transmission^{3,8}. However, a few studies have mentioned vertical transmission of the virus from mother to fetus^{9,10}. A Chinese study was done in pregnant women in third trimester of pregnancy where amniotic fluid sampling was done during labor and all the samples were tested negative⁷. Until now, no case has been reported where prenatal invasive testing like amniocentesis or chorionic villus sampling were needed for detection of covid-19. However, Genetic counseling should be considered for any fetal and neonatal complications when the infection is acquired in early trimester.

Effect of COVID-19 on mother:

The majority of pregnant women have developed mild or moderate flu like symptoms^{3,6} and around 20% developed severe disease. The frequent symptoms include: fever, cough, myalgia, fatigue, shortness of breath, sore throat and diarrhea, vomiting, loss of appetite. The classic laboratory tests in early stages of the disease include leucopenia, lymphopenia with elevation transaminase, lactate dehydrogenase, C-reactive protein levels¹¹. About 50% of symptomatic patients have developed pneumonia with bilateral infiltrates or consolidation¹². Approximately 25% cases might be asymptomatic and about 5–7% women need ICU admission for severe symptoms^{3,6,12}. Pregnant patients who have associated co-morbidities like diabetes, cardio-pulmonary disease, kidney disease⁶ have shown increased morbidity. A Study conducted in UK shows a small proportion of COVID positive pregnant women (6%) needed hospital admission which was similar to that of general population and COVID positive pregnancy had no association with increased

mortality¹³. Pregnancy virtually is a hypercoagulable state and hospitalized pregnant patient with Covid-19 infection shows hypercoagulable state. RCOG guideline (May 2020) recommends thromboprophylaxis in the form of low molecular weight heparin (LMWH)¹⁴ in women who have one or more risk factors for venous thromboembolism (VTE). Pregnancy and delivery in these pandemic days will psychosocially affect wellbeing of women and their families¹⁴.

Effects on fetus :

Current evidences do not reflect any increased risk of miscarriage, still birth or birth defect in pregnancies with COVID-19⁶. The virus has no congenital effect on fetal development. However, preterm delivery and fetal growth restrictions have been documented in women with COVID-19 infection¹⁴.

Management during antenatal period:

Several guidelines suggest to continue emergency obstetric care. At least four antenatal visits are recommended for pregnant women at 12 weeks, 20 weeks, 28 weeks and 36 weeks. Beside these scheduled visits, women may visit her obstetrician when any emergency need arises. During these routine visits history taking, detailed physical examination and baseline investigations are to be done for assessing the pregnancy status and for identifying high risk factor, if any. Most pregnant women who are healthy, should be advised to attend their obstetrician or maternity center by maintaining stringent social distance¹⁵. If any family member of a pregnant woman has possible symptoms of COVID-19, then her routine antenatal visit should be deferred for 14 days, provided there is no emergency. Pregnant women having COVID related symptoms or having contact with COVID positive persons, should report to her obstetrician over telephone. Unless there is any need for urgent hospital admission, she should self-isolate herself for 14 days. Self-isolation means she should be confined herself in an isolated well ventilated room, not share her utensils, dishes with other family members. When a suspected or COVID-19 positive pregnant woman presents to the obstetrical triage or hospital emergency department, she should be assessed in an isolation room¹⁴, evaluated for COVID related symptoms and associated comorbidities. Her vital signs should be checked and for suspected cases screening test for COVID-19 is to be considered. The

patient should be requested to wear a face mask and should keep physical contacts minimum with the objects and persons around. The health care team should take the standard contact precautions by wearing full personal protective equipment (PPE) which include, N95 or triple layer surgical face mask, face shield, eye goggles, sterile gloves and body gown.

The recommendations for COVID-19 testing are standardized and likewise follow national or international guidelines [16]. Indian council of Medical Research (ICMR) has provided a recommendation for COVID-19 testing of pregnant women, who show symptoms like acute respiratory illness, have travel history within last 14 days or have contact with COVID positive persons.

Pregnant women should be offered a test for COVID-19 upon arrival at hospital with any one of the following: ¹⁷

1. Clinical/radiological evidence of pneumonia,
2. Acute Respiratory Distress Syndrome (ARDS),
3. Fever $\geq 37.8^{\circ}$ C and acute persistent cough or nasal discharge/congestion or shortness of breath, sore throat, wheezing or sneezing.

Management according to severity classification :

A) Management of Mild Infection :

Women who have mild symptoms and no risk factors for severe disease, may be allowed for home confinement¹⁴. The approach is to maintain hydration, symptomatic treatment e.g temperature control by cold sponging of body. Paracetamol can be taken 500mg to 1 gm 6-8 hourly. Additionally they may take Vitamin C, steam inhalation and do breathing exercise regularly. Prolonged bed rest should be avoided as there is risk of thrombosis associated with pregnancy as well as COVID-19 infection. Routine pregnancy visits, tests, and screening ultrasounds should be delayed until the isolation period is over or following negative PCR test after 2-3 weeks from the presence of symptoms.

B) Management of moderate and severe infection :

Women, who have moderate disease and other comorbidities or risk factors for severe COVID 19 infection should be hospitalized in a high dependency isolated unit (Ideally in a negative pressure room).

Complete assessment of the patients should be done. Physical examination should include measurement of blood pressure, heart rate, respiratory rate, SPO₂, fetal heart rate and CTG when the gestational age is beyond the limit of viability. Recommended laboratory investigations should cover hematology, biochemistry, coagulation and severity markers including complete blood count, renal and liver function tests, C-reactive protein, ferritin, D-dimer, procalcitonin¹⁸. If there is clinical indication, Chest X-ray and CT scan of chest should be done with abdominal shielding. When patient complaints of respiratory distress or respiratory rate is greater than 30 breathes/ minute or resting SPO₂ is below 90% or there is radiological evidence of bilateral infiltrates, patient should be given oxygen support to keep SPO₂ above 94%. For this, including a nasal cannula or Venturi mask may be applied followed by continuous positive airway pressure masks. In severe pneumonia aggressive treatment is needed. Women who have severe symptoms should be treated by a multidisciplinary team including obstetricians, maternal–fetal specialists, obstetric anesthetists, intensivists, internal medicine or respiratory physicians, neonatologists, virologists and microbiologists. Critically ill patients would need intensive care unit monitoring.

Pharmacological treatment:

There is no effective FDA approved medication for treating COVID-19. Moreover, maximum clinical trials have excluded pregnant and breast feeding women.

1. The authors found that the application of antibiotic was significantly higher in the United states, Asia and Europe which may be related to local treatment guidelines as well as to combat secondary bacterial pneumonia, potential iatrogenic infections and the difficulties in distinguishing viral from bacterial infection in a short time^{19,20}
2. Paracetamol is the analgesic of choice in comparison to NSAIDs such as Ibuprofen (It seems to cause rapid disease progression in young adults).
3. All pregnant women admitted with COVID-19 infection should be given prophylactic low molecular weight heparin (LMWH) in a dose of 4000 IU per day unless birth is expected within 12 h^{18,21,22}. If the pregnant woman is near to

delivery, it is generally preferred to use unfractionated heparin rather than LMWH due to its readily reversible properties²³. Prophylactically LMWH (e.g., enoxaparin 40 mg daily subcutaneously) should be continued to all pregnant women with COVID-19 infection at least 10 days of after hospital discharge. Patients with Heparin therapy should be regularly monitored by doing coagulometry like INR/PTT/ D-Dimer and Fibrin Degradation Products²⁴.

4. No data is available regarding the effects of antivirals Lopinavir/Ritonavir (LPV/r) in the treatment of pregnant women with COVID-19 [25]. Remdesivir should be considered in pregnant patient after careful risk benefit analysis as their safety in pregnancy need further research²⁵.
5. There is no available data regarding the use of convalescent plasma for pregnant women suffering from COVID-19²⁶.
6. Other therapies which can be considered in critical patients, such as methylprednisolone (which has proven benefits in the treatment of acute respiratory distress syndrome), tocilizumab (an anti-inflammatory humanized monoclonal antibody with IL-6-inhibitory effect). Safety concerns regarding their use during pregnancy must be considered before prescribing¹⁸.
7. RCOG suggested that there is no potential harms related to steroids administration for COVID-19 during pregnancy^{14,26}. Although there is controversy that the use of corticosteroids may alter the clearance of the virus, in the context of a COVID-19 infection recent evidence recommends administration of corticosteroids for fetal lung maturation without any maternal harmful effect¹⁸.
8. Recent evidence does not support the use of Ivermectin during pregnancy.
9. Although hydroxy chloroquine has not been associated with adverse pregnancy outcome, but its use in combination with azithromycin warrants careful monitoring as their combined use may cause prolong QT on ECG¹⁸.

COVID-19 vaccine during pregnancy :

Many guidelines recommend COVID-19 vaccines for pregnant women²⁷. As the vaccine have shown

similar effective function for pregnant women²⁸, therefore, at present, worldwide COVID-19 vaccines are widely used in pregnant women for attaining the benefits of vaccines²⁹. Some vaccine studies reveal the protection rate of pregnant women and non-pregnant women is similar^{30,31}.

Intrapartum care :

When pregnant women with COVID-19 infection have no clinical complication, then premature induction of labor or aggressive decision for caesarean section should be postponed until the microbiological diagnostic test (PCR) becomes negative.

Labor should be conducted in a dedicated isolated room, preferably with negative pressure. The patient should wear a surgical mask throughout labor.

Obstetric team should use PPE and follow all appropriate precautions.

Minimum number of staff should be present at labor room to reduce the risk of health care professional.

The onset of labor should be confirmed by appropriate measure.

Neuraxial analgesia can be administered to provide good analgesia. It can minimize cardiopulmonary stress from pain and anxiety. Some societies suggest avoiding use of nitrous oxide due to the risk of aerosol generation³².

Careful monitoring should be done to observe temperature, respiratory rate, oxygen saturation, uterine contractions and progress of labor according to standard protocol. The fetal monitoring should be conducted by electronic cardiocotograph (CTG)¹⁷.

Under normal labor progression, vaginal examinations should be minimized.

As it is a difficult experience for women to actively push while wearing surgical mask, second stage of labor is considered to be cut short according to obstetric criteria.

Although there is no evidence of presence of virus in vaginal secretion³², it is considerable to avoid fetal scalp pH testing or internal fetal heart rate monitoring and all generated material e.g placenta should be treated as contaminated and disposed properly.

The neonatal team should be informed at proper time to allow them to attend and wear PPE before entering the laborroom/operation theatre.

Although delayed cord clamping and skin-to-skin bonding between mothers and newborns are not encouraged³³, delayed umbilical cord clamping (not earlier than 1 minute after birth) is still considered for better outcome in context of maternal and baby's health. However, no evidence shows that delaying cord clamping increases the possibility of viral transmission from the mother to the newborn³⁴.

Mode of delivery

There is no point to favor vaginal or caesarean delivery due to presence of COVID-19 infection. It should be done according to obstetric indications, maternal and fetal condition. Discussion should be done with patient to consider her preferences.

The possible risk of vertical transmission is not an indication for caesarean section.

Maternal indications when cesarean sections are needed : In women with respiratory compromise, labor may accentuate the stress and maternal hypoxia also causes fetal complication. In this context caesarean section can be considered in women with severe illness after 34 weeks to avoid the risks of prematurity. If termination of pregnancy is needed before 32 weeks, multidisciplinary team approach should be needed to balance maternal and neonatal risks, especially in intubated patients or those who need maternal prone position due to acute respiratory distress syndrome^{34,35}.

Elective obstetric procedures should be planned at the end of the operation list.

Epidural or general anesthesia can be administered during cesarean section for pregnant women with COVID-19³⁶. Most anesthesiologists prefer epidural anesthesia as because it can avoid infection caused by endotracheal intubation, as well as avoid the respiratory depression caused by general anesthesia. Moreover, Aerosol generating procedures should be avoided as far as possible.

Neonatal care:

New born babies from COVID-19-positive women should be tested, isolated, and cared in accordance to droplet and contact preventive measures³⁵. According to WHO rooming in can be considered in mothers with COVID-19 infection with their babies^{34,35}. During breast feeding and close contact mother should wear a surgical mask and practice hand hygiene.

Post partum care:

During postpartum and post anesthetic recovery period following cesarean section patient should be kept isolated.

Prophylactic LMWH (i.e. enoxaparin as 1 mg/kg subcutaneously once daily) should be continued to women up to 10 days after delivery, provided there is no postpartum hemorrhage or regional anesthesia¹⁴.

Breastfeeding :

No evidence showed the presence of SARS-CoV-2 in breast milk of infected women³⁸. Breast milk provides passive immunity by antibodies and other protective factors. Most international obstetric organizations^{39,40} recommend breastfeeding if maternal and neonatal conditions are favorable. Breastfeeding must be ensured under contact and droplet precautions (using surgical mask, hand hygiene before and after contact, cleaning breast and skin surfaces that could be in contact)

Expressed breast milk can be another alternative following strict hygiene measures.

Conclusion :

Covid-19 pandemic has created a global crisis causing great challenges for pregnant women and their obstetricians. Although the due course of pregnancy is not strained by the disease itself but complications can happen in absence of proper care and caution. Both the pregnant mother and care-giver should be vigilant and the obstetric management should be implemented following evidence based standard protocol.

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