

COVID in Pregnancy: Lessons Learnt

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Abstract

The COVID-19 infection, a global pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has taken a devastating toll on public health with the widespread transmission. To date, it has affected over 160 million people, with as many as 3 million deaths. We present to you the understanding we have about covid in pregnancy, its effects and management. The clinical features, mode of transmission, outcome and management protocols are constantly changing and still unclear. The second wave has impacted pregnant women quite adversely. Obstetricians have called for close monitoring of all pregnant women contracting COVID-19.

Keywords: COVID-19 and pregnancy, antenatal positive case, screening guidelines, PPE, labor room management

Introduction

The COVID-19 disease, caused by the Severe Acute Respiratory Syndrome CoronaVirus-2 (SARS-CoV-2) has plagued the world since late 2019, establishing itself as a pandemic since 2020; it needs no introduction. Volumes of information are available in the public domain, and this information is increasing and changing every day. To date, the virus has affected over 160 million people with as many as 3 million deaths, and estimates predict further waves. In this context, it is important to understand the magnitude of the impact of the SARS-CoV 2 on maternal and neonatal outcomes, so as to ensure the best outcomes for pregnant women. This article sheds some light on the available information on COVID-19 in pregnancy, focusing on the lessons learnt and the way forward.^[1]

Current Scenario: What is Different Between the First and Second Wave?

After a trough in January/ February 2021, a second

wave occurred starting in early April 2021. There were many noticeable differences between the two waves.^[2]

Overall, though the clinical presentation was less intense, the proportion of cases with breathlessness as the initial symptom increased. Symptomatology also involved other systems such as the gastrointestinal tract. The second wave affected a younger population and did not spare those without comorbidities.

There was greater knowledge about the disease, the fear of acquiring infection reduced, and overall, pandemic-appropriate behavior was sub-optimum. There were improvements in the provision of manpower and infrastructure: more trained healthcare workers, enhanced RT-PCR testing facilities, incremental availability of drugs, the introduction of vaccination for healthcare workers, better personal protective equipment and incremental enhancement of bed capacity. However, in many places, this fell short of the mark.

However, all these preparatory measures were

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overshadowed by a higher rate of transmission, a much higher “positivity rate”, a much higher proportion of patients with severe breathlessness and more requirement for mechanical ventilation. The silver lining was that there was a slightly lesser death rate compared to the first wave.

The virological basis behind this is the mutations that occur in the spike proteins and these are designated by health organizations as “Variants of Concern” which have changed between the first wave and second wave.^[3]

- B.1.1.7 lineage (or VOC 202012) described in the United Kingdom in December 2020.
- B.1.351 lineage (or 501Y.V2) in South Africa.
- B.1.1.248/B.1.1.28/P1 (or 501Y.V3) reported in Brazil
- B.1.427/B.1.429 reported in California
- B.1.617 which seems to have spread rapidly in India

However, the principles governing the management of pregnant women have evolved immaterial of the virological variant.

Effects of Covid in Pregnancy

The knowledge about the impact of COVID-19 in pregnancy is constantly increasing. With the initial “protection-of-the-healthcare worker” concern driving a high cesarean section rate initially (up to 80%), the rate has now dropped to around 50%.

The prevalence of preterm labor is between 15% to 45%, with a large variation reported in different study populations.^[4,5]

In one large review of 793 neonates, it was noted that only 5.5% of the neonates tested positive, suggesting a small but probable vertical transmission. The majority of the neonates were asymptomatic; respiratory support was needed in only 7.6% of neonates and mechanical ventilation need was only 1.8%.^[6] At present, there appears to be no risk of transmission of COVID-19 by breast milk.^[7] There is currently no data suggesting an increased risk of miscarriage or early pregnancy loss in relation to COVID-19, which is reassuring when counseling potential mothers.^[8]

In a comparison between pandemic time and pre-pandemic time, Khalil *et al* ^[9] report an increase in the stillbirth rate from 2.38% to 9.31%, immaterial of positivity of COVID-19. While this may be multifactorial, the definite increase is a pointer towards gaps in care.

Is Becoming Pregnant a Risk Factor for Developing COVID?

It has been noted in prior pandemics (influenza)

that pregnancy poses a higher risk of acquiring respiratory infection and is associated with higher morbidity and mortality when compared with nonpregnant subjects. In one systematic review, the proportion of women with COVID who had critical disease requiring mechanical ventilation was 3.4% and the maternal death rate was 0.9%.^[10] In January 2021, Wong *et al* summarized that the available evidence suggested that pregnancy did not appear to have any specific impact on the course of COVID, however, this appears to have changed.^[11]

Even with respect to the Indian scenario, the initial experience ^[12] comparing the outcomes of COVID and non-COVID pregnancies showed that there is no increase in the morbidity/ mortality parameters. In the second wave, the higher number of mild disease cases appear to be even more reassuring.

Findings from the latest management guidelines issued by the Federation of Obstetrics and Gynecological Societies of India (FOGSI) and National Neonatology Forum (NNF), released in June 2021^[13] should be considered the standard in the current scenario:

- Pregnant women with COVID-19 are at increased risk of severe infection (relative risk of 3.38)
- Pregnant women are at risk of various pregnancy complications e.g., preeclampsia/eclampsia (Odds ratio of 1.21), gestational diabetes, and thrombosis (OR: 3.43).
- Pregnancy increases the risk of hospitalization, admission to the intensive care unit (RR: 5.04), and death (RR: 22.3).
- The adverse effects of pregnancy are much higher in the third trimester and symptomatic women.
- Compared with a normal population, the presence of asymptomatic COVID- positivity also raises the risk for maternal morbidities.
- Factors associated with an increase in severity of COVID-19 in pregnancy are increased maternal age, obesity, pre-existing maternal comorbidity (hypertension, diabetes).

Antenatal Care During the Pandemic and Managing a Covid Positive Woman During Antenatal Period

Numerous organizations have stated their position and advice regarding the care of the antenatal COVID woman. Federation of Obstetrics and Gynecological Societies of India (FOGSI) being the flagbearer for obstetric services in India has issued Good Clinical Practice Recommendations, having reviewed existing guidelines and data, with revisions and improvements

at appropriate junctures. These are summarized below.^[14]

- Women are advised to seek routine antenatal care at the discretion of the maternal care provider. Recommended times of gestation are 12, 20, 28 and 36 weeks of gestation.
- Visits should be postponed if they need self-isolation.
- Healthcare providers should ensure patients are placed one meter apart in the waiting area.
- In the first trimester visit at 12 weeks, screening for medical disorders, baseline antenatal investigations, the first dose of TT, nuchal translucency scan and biochemical screening are advised.
- In the second trimester visit at around 18-20weeks – a detailed anomaly scan with cervical length, blood pressure measurement, urine protein measurement are done and hematinics and calcium are advised. An oral glucose tolerance test is prescribed for 24 weeks.
- In the third trimester visit around 28 weeks- a daily fetal kick count is advised, mental health is assessed, blood pressure measurement, urine protein measurement, hemoglobin measurement and Anti-D prophylaxis as appropriate.
- In the 34 weeks visit, fetal wellbeing is assessed, a growth scan is advised, birthing routes and isolation are discussed and Tdap vaccine is offered.
- Most of the drugs which are medical indicated in pregnancy (eg Aspirin) are recommended to be continued, with no change due to the presence of COVID.

When to Test Pregnant Women?

Testing for pregnant women should be done as per the latest ICMR testing strategy or state / local government guidelines. In the last few updates of the guidelines, ICMR has been consistent: “The criteria for testing non-pregnant persons are applicable to pregnant women. Pregnant women residing in clusters/containment area or large migration gatherings centre from hotspot districts presenting in labor or likely to deliver in the next 5 days should be tested even if asymptomatic”^[15]

If a woman meets the criteria for COVID-19 testing, she should be tested, as follows:

- Symptomatic pregnant women
 - Travelled to another country within 14 days
 - Close contact with a confirmed case of COVID-19
- Until test results are available, she should be treated as though she has confirmed COVID-19. If COVID negative, monitoring is stopped but all precautions are advised to be continued.
- If the Rapid Antigen Test is positive (irrespective of the symptom status), there is no need for confirmation with any other tests. It is taken as a confirmatory of COVID-19.
 - If the Rapid Antigen Test is negative and the individual is symptomatic, RT-PCR, TrueNat, or CBNAAT is recommended for confirmation.^[13]

Consideration for Admission

The following criteria should be taken into account for admission to a health facility:

- Any obstetric complication which would otherwise need admission. (co-morbid condition warranting admission)
- Fever >39°C despite the use of paracetamol (which raises concern for cytokine storm syndrome)
- Classification as moderate or severe COVID illness
- Classified as mild COVID-19 illness but there is no facility for telemonitoring or teleconsultation
- Social conditions are not appropriate for distancing/ other home-based care modalities.

Investigations in All Admitted Patients:

All COVID positive pregnant women should undergo investigations outlined in Table 1.

Management of Asymptomatic and Mild Illness

- Home isolation with active surveillance by tele-

Table 1: Investigations in admitted COVID pregnant women

Blood investigations		Tests for maternal well being	Tests for fetal well being
CBC with differential count	CRP	ECC	USG Obstetrics at admission
Total leukocyte count	PT/aPTT	Chest XRay/ Chest CT with abdominal shield, if clinically indicated.	Biophysical profile (BPP) once a week
Liver function tests	D-dimer	For the unwell woman, chest imaging should not be delayed, despite pregnant status.	Non-stress test (NST) twice a week in patients who are stable
Renal function tests	LDH		
Blood Sugar	Troponin		
	Ferritin		

monitoring is the backbone of management of asymptomatic/ mild illness

- Admission to a health facility is dictated by the presence of obstetric risk factors, co-morbidities, and social conditions
- Paracetamol 650 mg three or four times a day is the mainstay of treatment
- Oxygen saturation monitoring with a pulse oximeter is strongly suggested
- During home isolation, emergency medical care is sought when there is
 - o Worsening dyspnea
 - o Unremitting fever >39°C despite appropriate paracetamol usage
 - o Intolerance to oral hydration and medications
 - o Persistent chest pain
 - o Mental confusion
- Use of ivermectin or doxycycline is contraindicated
- Multivitamin supplementation does not appear to have any significant role in COVID treatment.

Severe Cases of Covid in Pregnancy: A Dilemma

Initially, the pre-COVID scoring system like the SOFA score was used. However, currently, the ICMR/MOHFW suggests a classification as mentioned below:

Severity classification in pregnant women (adapted from ICMR/MOHFW guidelines)

- a. Asymptomatic: Only test positive; no signs and symptoms
- b. Mild: Upper respiratory tract symptoms &/or fever, WITHOUT shortness of breath or hypoxia
- c. Moderate: Breathlessness / RR >24/min OR SpO2 90% to <93% on room air
- d. Severe: Breathlessness, RR>30/min OR SpO2 <90% on room air

Management of Moderate or Severe Illness

- Admission to be considered in dedicated COVID hospital with facilities of HDU/ ICU
- Oxygen therapy is aimed at maintaining SpO2 >94%.
- Awake prone positioning is acceptable

- Corticosteroids:
 - o In resource-constrained settings, Dexamethasone 6 mg IM every 12 hourly for four doses (2 days) followed by Dexamethasone 6 mg/day PO/IV for 8 more days or until discharge.
 - o In resource plenty settings, methylprednisolone/ hydrocortisone can also be considered.
- Remdesivir: When remdesivir is otherwise indicated, pregnancy should not be a reason to withhold remdesivir. Rational use of remdesivir based on prevailing guidelines should be followed.
- Prophylactic anticoagulation with low molecular weight heparin/ unfractionated heparin (e.g., enoxaparin 40 mg once daily or dalteparin 5000 IU once daily) is considered. Duration is usually 10 days following hospital discharge, after ruling out contraindications
- Other medications: Tocilizumab (interleukin-6 receptor antagonist), monoclonal antibody (Bamlanivimab- etesevimab and casirivimab- imdevimab) combination should not be withheld from pregnant patients if they qualify for its use. Decisions are taken on an individualized basis.
- There does not appear to be any specific role of convalescent plasma therapy.

Delivery in COVID-19

The updated recommendations are summarized in Table 2.

Table 2: Recommendations for delivery in COVID-19 patients

Delivery	Main recommendation	Comments
Mode of delivery	Obstetric indications and physiological stability (cardio-respiratory function and oxygen status) dictate the mode of delivery in pregnant women with COVID-19. SARS-CoV-2 infection, per se, is not to be taken as an indication for cesarean section.	A critically ill pregnant woman having refractory hypoxemia can be considered for cesarean section for better management of respiratory failure.
Timing of delivery	The decision regarding the timing of delivery in a pregnant woman with COVID-19 is to be individualized. This is based on many factors like the severity of the disease, co-morbidities, and gestational age.	In asymptomatic/mild disease, delivery is considered only for appropriate obstetric indications (as applicable to non-infected women). SARS-CoV-2 positivity, per se, does not warrant delivery in the asymptomatic/ mild disease group.
Decision regarding delivery	A multi-disciplinary team approach is recommended for decision making. The decision for delivery is considered when it is expected that it may result in improvement of respiratory condition and aid in the utilization of a full range of respiratory support	Pregnancy is considered for continuation when there are no signs of an imminent threat to maternal life.
Induction of labor	SARS-CoV-2 infection per se is not an indication for induction of labor.	-

Labor Room Management Decisions in a Covid Patient

- Location of delivery: It is now recommended that all COVID positive pregnant women deliver in Dedicated Covid Health Care Centre, and an initial triage is done for estimating severity. (Figure 1)
- Once settled in an isolation room, a full maternal and fetal assessment should be conducted:
 - Maternal vitals including temperature, respiratory rate and oxygen saturation
 - Electronic fetal monitoring using a cardiotocograph (CTG)
 - Hourly oxygen saturation during labour

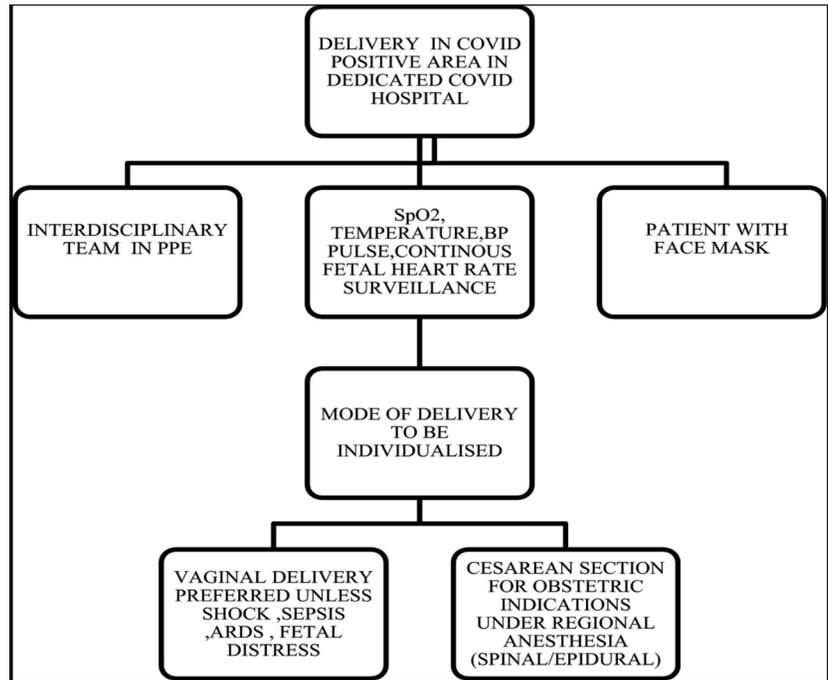


Figure 1: Management flow - COVID positive pregnant woman

Some Pointers Towards Operative Care In COVID

- General Advice for Obstetric/ Emergency Gynecology Theatre
 - Elective obstetric procedures should be scheduled at the end of the operating list.
 - A second or separate operation theatre should be made available allowing for full post-operative fumigation as per existing guidelines.
- All team – obstetricians, anesthetists, pediatrician, OT staff to be in PPE
- Visibility is a challenge, and experienced surgeons are the first choice.
- It is important to avoid amniotic fluid and blood spills.
- It is preferable to minimize the use of cautery.
- Delayed cord clamping was initially not recommended. However, as per updated recommendations, delayed cord clamping is now accepted that there are no adverse effects
- Rooming in of healthy neonates with their mothers
- The mother-baby couple should be kept separate from uninfected mother-baby couples.
- Exclusive breastfeeding is to be promoted. Formula feeding and mixed feeding are best avoided.
- Direct breastfeeding should be encouraged.
- Mothers should be educated about the importance of washing hands frequently, including before breastfeeding and usage of the appropriate mask.
- Expressed breastmilk is the alternative to be considered when direct breastfeeding is not feasible due to maternal or neonatal conditions.
- Even if there has been exposure to mother (or other persons) with COVID infection, rooming in and exclusive breastfeeding is to be considered.
- Nurses trained in newborn care and lactation management should be provided
- Support to the mother-neonate couple can be offered by a healthy and willing family member who is not infected and has not been exposed otherwise.

Challenges and Solutions for Breastfeeding Covid Positive Mothers

In the previous guidelines, there was a consideration for temporary separation as the risk of transmission was not known. However, it is now established that the risk of transmission through close contact or through breastfeeding is negligible. Hence, the following is recommended:

Conclusions

The last 14 months have been the most difficult and challenging for the entire medical fraternity, both personally and professionally. Many obstacles have been bridged, and many lessons have been learnt, mainly from our patients and their pregnancies. We urge the reader to arm himself with updated guidelines, keep-

ing in mind that these may change in the foreseeable future.

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