

Maternal and Fetal Outcomes of COVID-19 Positive Pregnant Women in Government T.D. Medical College Alappuzha

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ABSTRACT

BACKGROUND

Corona virus disease 2019 (COVID 19) outbreak have evolved rapidly throughout the world. The knowledge on severe acute respiratory disease-corona virus-2 (SARS-CoV-2) infection in pregnant women and newborn is incomplete. Understanding the impact of COVID 19 in pregnancy in terms of morbidity mortality, perinatal and neonatal outcome is essential to propose a strategy for the management of pregnant women with COVID 19 infection.

METHOD

It is a prospective study of all pregnant women who have delivered in the period of April 2020 to December 2020 at Government T.D. Medical College, Alappuzha. In this study, the mode of delivery, neonatal outcome, maternal mortality, morbidity were evaluated. The outcome of pregnancies includes vaginal delivery, caesarean delivery, vacuum delivery and intrauterine fetal demise.

RESULTS

A total of 265 pregnant women infected with COVID 19 delivered during the period. Out of these, 49.4 % was full term caesarean delivery, 3.8 % was preterm caesarean delivery, 39.3 % was full term vaginal delivery and 4.9 % was preterm vaginal delivery. Moreover, 1.1 % of the total pregnant women had intrauterine fetal demise on admission. Among 265 new-borns, 2.3 % babies became COVID 19 positive, of this, 83.3 % were mothers who delivered within 7 days of COVID 19 infection. 0.75 % needed resuscitative emergency caesarean delivery for COVID 19 pneumonia. 0.38 % maternal mortality occurred during the period due to COVID 19 infection.

CONCLUSIONS

Obstetric outcome in most COVID 19 infected term pregnant patients is comparable to non-COVID 19 pregnant women except for a higher incidence of caesarean delivery. Most of the neonates who became positive were born to mothers delivered within 7 days of COVID 19 infection. Severe morbidity among COVID 19 pregnant women were seen only in a small proportion complicated by COVID 19 pneumonia, who required ventilator support.

KEYWORDS

COVID 19, Pregnancy, Maternal, Perinatal, Neonatal Outcome

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BACKGROUND

COVID 19 is a newly emerged respiratory illness caused by a novel corona virus. The major clinical manifestations are fever, sore throat, dry cough, fatigue, myalgia, anosmia, in mildly affected patients, dyspnoea and pneumonia in severely affected patients.¹ Pregnant women carry same risk of contracting this infection as non-pregnant healthy women. However, pregnancy being a situation with altered immune status, we are yet to conclude that outcome of this new infection will be same in pregnant and nonpregnant. Also, we are still in dark regarding post Covid sequelae to mother and fetus. Patients with COVID 19 infection have been divided into 3 categories

1. Category A: Asymptomatic individual who test positive or with mild respiratory symptoms,
2. Category B: Category A plus one or more of following:
 1. Pregnancy
 2. Systemic diseases like hypertension (HT), diabetes mellitus, renal disease, neurologic disease
 3. Age > 60
3. Category C: Breathlessness, chest pain, hypotension, haemoptysis, cyanosis (red flag signs)

All pregnant women with Covid 19 infection fall under category B. 80 % are asymptomatic and can transmit infection to others.

Early recognition of an infected person and isolating them are important method of preventing transmission. World Health Organization (WHO) has advocated several prophylactic measures like frequent hand washing with water and soap, hand rubbing with alcohol-based sanitizers, social distancing, wearing mask and avoiding touching eyes, nose and mouth. Since most asymptomatic individuals do not seek medical assistance due to no obvious symptoms, this can contribute to the rapid community spread of COVID 19. Pregnant women and their new-born become a high-risk category for infection as they are likely to be in contact with asymptomatic healthy family members. Literature on the outcomes of COVID 19 infections during pregnancy is slowly building up. Physiological changes during pregnancy, such as reduced functional residual volumes, diaphragm elevation, and altered cell immunity may lead to increased susceptibility to viral infections and worse outcomes.²

Pneumonia is one of the severe manifestations in pregnant women with COVID 19 infection. Pregnant women with COVID 19 especially in third trimester and with comorbidities have increased risks of complications. Obstetric management can be in a manner similar to non COVID 19 patients except for the precautions to be taken to prevent spread of infection to health care workers. In third trimester, mechanical effect of pregnancy can aggravate respiratory decompensation and, in such cases, irrespective of fetal salvageability, pregnancy will have to be terminated.

Though uncommon, the reviews show that vertical transmission may be possible but no clinical evidence is available at present. Breastfeeding is not contraindicated, based on current published guidelines^{3,4} A retrospective analysis of COVID 19 in pregnancy showed that none of the women had detectable viral loads of SARS-CoV-2 in

breastmilk.⁵ Regardless, if the patient decides to breastfeed, she should wash hands and breast and use a face mask appropriately to reduce the risk of direct transmission to baby. If rooming in is practiced, there should be a distance of at least 6 metres between mother and baby and partition or curtain is preferred This aspect needs to be researched further to make robust recommendations on breast feeding. Overall, it is necessary to monitor pregnant women before and after delivery, and their infants, during this pandemic.

Aim

The aim of the review is to enlighten and summarise the maternal and fetal outcome in pregnancy in relation with COVID 19 among pregnant women with COVID 19 infection managed in a Government Medical College of Kerala.

Objectives

Our main objective was to assess the maternal outcomes of COVID 19 positive pregnant women delivered in Government T. D. Medical College, Alappuzha from April 2020 to December 2020. Course of pregnancy, mode of delivery, effect of COVID 19 infection on the outcome of pregnancy will be studied. Also, the effect of other medical comorbidities in pregnancy in presence of COVID 19 infection will be assessed. The fetal outcomes of COVID 19 positive mother will also be assessed.

METHODS

A prospective study of COVID 19 infection was conducted amongst the women who were admitted and delivered in the Government T.D. Medical College, Alappuzha from April 2020 to December 2020. This study includes cases of pregnant women with a confirmed diagnosis of COVID 19 infection prior to delivery and who delivered during the study period.

The clinical triage was performed as per the WHO guidelines. Diagnosis of COVID 19 infection was based on the results of maternal and child throat swab samples. All women were treated as per the National Guidelines for COVID 19 in pregnancy and treatment was then tailored according to the individual evolution of signs, symptoms, laboratory data and radiologic findings. Fetal growth and well-being were assessed at the time of admission by ultrasonography and fetal heart rate was monitored continuously during labor and delivery. Women were instructed as to how to wear and dispose surgical masks in combination with frequent hand-cleaning using alcohol-based hand rub or soap and water.

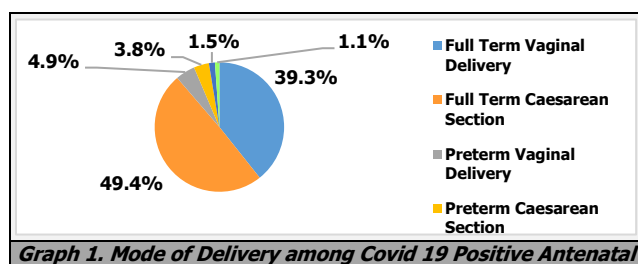
Termination of pregnancy was decided as per obstetric indication. In low risk, Bishop score was assessed at completed 39 weeks, ripening and labor induction was done. Pregnancy was not allowed to go beyond expected date as incidence of meconium staining of liquor was found to be high.

In women with medical complications like diabetes or hypertension, termination was decided as per standard

obstetric practice. Category C patients beyond 26 weeks with worsening signs and symptoms in spite of standard treatment, resuscitative hysterotomy was done. Data were collected on medical or obstetric co-morbidity, course of pregnancy, mode of delivery, neonatal outcome. For the purpose of this report, the neonatal outcome was recorded as only positive or negative test for COVID 19

Frequency (%) (N = 265)	
Full term vaginal delivery	104 (39.3 %)
Full term caesarean delivery	131 (49.4 %)
Preterm vaginal delivery	13 (4.9 %)
Preterm caesarean delivery	10 (3.8 %)
Vacuum assisted vaginal delivery	4 (1.5 %)
Intrauterine death expulsion	3 (1.1 %)

Table 1. Mode of Delivery among COVID 19 Positive Antenatal



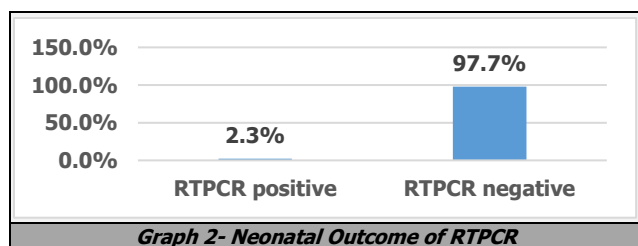
Indications for Caesarean Delivery	Frequency (%) n = 141
Failed induction	21 (14.9 %)
Failed trial	5 (3.6 %)
Fetal distress	12 (8.5 %)
Meconium stained amniotic fluid	9 (6.4 %)
Non reassuring fetal heart rate	4 (2.8 %)
Maternal pyrexia	2 (1.4 %)
Elective caesarean section	86(60.9 %)
Emergency resuscitative hysterotomy for COVID 19 pneumonia	2(1.41 %)

Table 2. Indications for Caesarean Section among Covid-19 Positive Antenatal

Frequency (%) N = 265	
Maternal Outcome	
Severe maternal morbidity	2 (0.8 %)
Maternal mortality	1 (0.4 %)
Neonatal Outcome	
RTPCR positive	6 (2.3 %)
RTPCR negative	259 (97.7 %)

Table 3. Maternal and Neonatal Outcome

RTPCR-Reverse transcriptase polymerase chain reaction



Statistical Analysis

Data were collected and entered in Microsoft Excel and analysis done using Statistical Package for Social Sciences (SPSS software version 16). Frequency and percentage were used to describe the variables.

RESULTS

In this period, we had conducted 265 COVID 19 positive deliveries. A total of 239 (90.1 %) women were delivered at term, preterm birth occurred in 23 (8.6 %) cases and 3 (1.1 %) had intra uterine death and vaginal delivery. There were 121 (45.6 %) vaginal deliveries and 141 (53.2 %) caesarean sections (Table 1). Out of 141 cases, an elective caesarean section was performed in 86 (60.9 %) cases and 2 (1.41 %) emergency resuscitative hysterotomy done for worsening dyspnoea related to COVID 19 pneumonia.

A total of 110 COVID 19 positive women underwent induction of labor for obstetric reasons. The indications for induction of labor were 41 (37.2 %) near date/on date, 29 (26.4 %) gestational diabetic mellitus, 12 (10.9 %) gestational hypertension, 11 (10 %) premature rupture of membrane, 6 (5.4 %) oligohydramnios, 4 (3.6 %) fetal growth restriction, 3 (2.7 %) preterm premature rupture of membrane, 3 (2.7 %) decreased fetal movements, 3 (2.7 %) preeclampsia and 1 (0.9 %) altered liver function test. Among this, 57 (51.8 %) had vaginal deliveries and 53 (48.1 %) had emergency caesarean section. Indications for emergency caesarean section among these 53 cases were 21 (39.6 %) failed induction, 12 (22.6 %) fetal distress, 9 (16.9 %) meconium stained amniotic fluid, 5 (9.4 %) failed trial, 4 (7.5 %) non reassuring fetal heart rate and 2 (3.7 %) maternal pyrexia. (Table 2). Elective caesarean delivery was strictly based on obstetric indication. Among them most common indication was previous caesarean delivery, and others included malpresentation such as breech presentation. Out of all COVID 19 positive antenatals, 7 (2.6 %) were found to have altered liver function tests which was seen first time after admission, but it didn't have any effect on course of pregnancy.

Out of 265 babies, 6 (2.3 %) were tested COVID 19 positive during neonatal period. Of this, 6 neonatal who became positive, 5 (83.3 %) were mothers delivered within 7 days of COVID 19 infection, and remaining 1 (16.7 %) was delivered beyond 7 days.

Out of 265 babies, 25 (9.4 %) babies had meconium stained liquor.

During the study period, 3/265 (0.01 %) pregnant women were admitted in critical care unit and 2/265 (0.007 %) required ventilator support. Underwent resuscitative caesarean delivery, one succumbed to disease, other improved after delivery. (Table 3).

Case Scenario 1

30 year old third gravida, 29 weeks 3 days, previous 2 caesarean delivery with gestational diabetes on metformin and bronchial asthma on inhaler, with history of contact with COVID 19 positive relative, who was tested COVID 19 positive on 21st October 2020, was referred from a COVID 19 first line treatment centre (CFLTC), admitted on 26th October 2020, with c/o breathing difficulty, spo2 93 % in room air. She was started on steroids and antibiotics. The next day her condition deteriorated and shifted to intensive care unit (ICU), started on heparin, critical care board decided that emergency termination of pregnancy to be

done in view of rapidly deteriorating patient condition. Emergency caesarean section done under general anaesthesia. Post-operatively patient continued on mechanical ventilation, injection remdesivir was started. Chest X-Ray showed features of severe COVID 19 pneumonia. Patient became drowsy, was not responding to stimuli, respiratory distress persisted. Two days later patient developed upper gastrointestinal (GI) bleed, platelet count was 33,000; Hence, platelet transfusion was done. Full dose of remdesivir was given. She continued to be in mechanical ventilation, and was showing decerebrate posturing. On 4th Nov 2020, she underwent two episodes of cardiac arrest. Despite all resuscitative measures, patient breathed her last in COVID 19 ICU at 8.30 pm on 4th Nov 2020.

Cause of Death - Type 1 respiratory failure, acute respiratory distress syndrome, COVID 19 pneumonia, gestational diabetes mellitus, bronchial asthma.

Baby expired on neonatal day 3 due to neonatal seizures, intraventricular haemorrhage and apnea.

Case Scenario 2

30-year-old second gravida previous preterm delivery with 30 weeks 1 day of gestational age with gestational diabetes mellitus, who was tested COVID 19 positive on 22nd October 2020 referred from a private hospital, was admitted in COVID ICU on the same day in view of saturation fall to 92 % in room air. Patient had history of breathing difficulty for 1 week. Patient was put on BiPAP (bilevel positive airway pressure), started antibiotics, heparin and steroids. Due to worsening of symptoms, patient underwent emergency lower segment caesarean section under general anaesthesia on 23rd October 2020. Post operatively, patient was put on mechanical ventilation SIMV mode. Post operatively, intra venous antibiotics and heparin was continued. On post-operative day 2 as the patient was maintaining spO₂, she was extubated and was put on continuous positive airway pressure (CPAP). She was on CPAP till post-operative day 10 following which she was maintaining oxygen saturation. Patient was stable after that and was tested rapid antigen test negative on 3rd November 2020. Baby did not survive and expired on neonatal day 3.

DISCUSSION

In the early part of pandemic itself our institution had to cater to a significant proportion of COVID positive pregnant women in our state.

This study evaluates the findings from 265 deliveries confirmed to have COVID 19. We found that COVID 19 during pregnancy can be associated with mild symptoms in majority, but severe maternal morbidity and even mortality can occur especially in women with comorbidities like diabetes mellitus, asthma etc. Though, no virus is identified in cord blood in various studies, possibility of maternal-fetal transmission cannot be ruled out completely, as in the present study, 7 babies were found to be COVID positive, all of them were separated from mother soon after birth and were not breast fed.

This is a descriptive study on the maternal as well as neonatal outcomes, complicated with COVID 19 infection. The mode of delivery is decided assessing various maternal and fetal factors necessitating need for urgent delivery, obstetric factors like Bishop score, fetal presentation and medical complications. During the earlier stages of COVID 19 pandemic, caesarean delivery was offered to most patients. But, if there are no other obstetric indications for caesarean delivery, our study shows normal delivery is feasible without increase in complications to mother or baby.

In our study, caesarean section rate was 53.2 % which is comparable to other studies. UKOSS study showed a caesarean rate of 59 %, ⁶ and a systematic review published in September 2020 issue of European Journal of Obstetrics and Gynaecology and Reproductive Biology showed a caesarean section rate of 72 %. ⁷ The living systematic review and meta-analysis published in September issue of British Medical Journal also concluded a higher preterm delivery (17 %) in COVID 19 infected pregnant ladies. ⁸ But preterm delivery in our study was only 8.6 %.

The induction of labour is generally postponed in COVID 19 positive pregnant ladies if there is no definite indication. ⁹ We have done labour induction only with obstetric indications among them the most common indication was near date/on date.

Previous studies have shown that SARS during pregnancy is associated with high incidence of adverse maternal and neonatal complications, such as spontaneous miscarriage, preterm delivery, intrauterine growth restriction (IUGR), application of endotracheal intubation, admission to the intensive care unit, renal failure and disseminated intravascular coagulopathy. ¹⁰ But the present study showed less adverse maternal and neonatal complications and more favourable outcomes among COVID 19 positive pregnant women. The clinical characteristics reported in pregnant women with confirmed COVID 19 infection are similar to those reported for non-pregnant adults with confirmed COVID 19 infection in the general population and are indicative of a relatively optimistic clinical course and outcomes for COVID 19 infection compared with SARS-CoV19 infection. ^{11,12}

The rates of ICU admission and mortality among pregnant women admitted to hospital with COVID 19 is proportional to the rates among the general population. ^{13,14} Most of the patients in our study had mild symptoms, with only 2 ICU admissions and only 1 maternal mortality among 265 patients delivered. The clinical features of pregnant women with SARS-CoV-2 infection were similar to those of the general population having SARS-CoV-2 infection, as reported in previous studies. ¹⁵

Incidence of prematurity in our study is 8.6 %, and among this, 3.6 % of neonates were delivered by caesarean section. The data from the UKOSS study, where 59 % of the neonates had caesarean births, and 27 % had preterm births. Another study reported that the majority of pregnant women had a planned delivery by caesarean section to prevent neonatal transmission of the virus. ¹⁶ Similarly, a systematic review finds out that the frequent mode of delivery in cases reported was caesarean section. ¹⁷ Though the number studied is low, we consider that COVID 19

infection alone need not be considered an indication for termination of pregnancy, obstetric factors should guide decision for timing and mode of termination in most cases. The timing and mode of delivery should be individualized according to maternal clinical conditions or obstetric factors as usual (and not COVID-19 status alone), furthermore, planned labor induction and delivery is feasible without increasing maternal or neonatal morbidity

In our study, most of the neonates (83.3 %) who became positive were mothers who delivered within 7 days of COVID 19 infection. The lack of maternal-fetal transmission was also reported in early studies of SARS infection in pregnant women.¹⁸ However, several recent case series have suggested a possibility of vertical transmission of SARS-CoV-2, including a recently reported single case study from Wuhan that shows a neonate born to a mother with COVID 19 had elevated IgM antibody level two hours after birth.^{19,20}

More studies are required to find out if susceptibility to this infection is different in different gestational age, or higher risk of infection and complications in any particular period of pregnancy and if risk of transplacental transfer of virus is more possible in any particular period of pregnancy. Another important aspect of this infection to be studied is whether infection can affect fetal organogenesis and growth. For example, if infection occurs in the first trimester, can the virus have teratogenic effects and what are the anomalies that can occur? Besides, it is important to know whether there are any other effects like thrombosis on the uteroplacental blood vessels resulting in growth restriction, placental abruption, infarction, still birth or hypertensive disorders of pregnancy. Large multicentric studies only can give answers to these problems.

CONCLUSIONS

COVID 19 infection in pregnancy is not rare. It can be asymptomatic or associated with mild symptoms in majority. But can be category C with life threatening complication. Obstetric management can be in a manner similar to non COVID 19 patients except for the precautions to be taken to prevent spread of infection. Obstetric decision making has to be well planned and prompt, considering time delay in executing decisions like emergency caesarean delivery. Obstetric outcome in most COVID 19 infected term pregnant patients is comparable to non COVID 19 pregnant women except for a higher incidence of caesarean delivery. Planned labor induction and delivery is feasible without increasing maternal or neonatal morbidity. Most of the neonates who became positive were mothers delivered within 7 days of COVID 19 infection. Moreover, majority of babies born to a COVID 19 positive mother found to have meconium stained liquor at the time of delivery. The morbidity among COVID 19 pregnant women were seen only in complicated COVID 19 pneumonia, who required ventilator support. Pregnant women make an important and vulnerable group of our society and are bound to complete the journey till delivery. If we take proper precautions and follow guidelines, the risk

of COVID 19 infection can be minimized and COVID 19 pregnancy can be managed safely in majority.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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