ORIGINAL RESEARCH

An Experience with Management of COVID-19 Positive Pregnant Patients in a Tertiary Care Institute

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Abstract

Background: The new coronavirus disease 2019 (COVID-19) is a worldwide pandemic. Concerns have been raised about the influence of SARS-CoV-2 infections on pregnant mothers and their fetuses, and patient care in the setting of COVID-19 is difficult. As a result, the current study was conducted to determine the outcomes of pregnant females with COVID-19 infection and their obstetric care of COVID-19.

Materials and methods: The study enrolled 8622 pregnant women from April 1st, 2020 to September 30th, 2020 at Lokmanya Tilak Medical College and Sion Hospital, a tertiary care hospital. There were 455 women who tested positive for COVID, whereas the remaining 8167 patients tested negative for COVID. The results obtained were compared in both groups.

Results: The percentage of pregnant women who tested positive for COVID was determined to be 5.27%. Most patients were delivered by LSCS in the COVID-positive group (49.45%) than in the COVID-negative group (43.95%) (p >0.05). Among 455 COVID-positive women, 401 were asymptomatic, whereas 54 patients showed COVID-19 symptoms like fever and cough (12%). All patients with mild symptoms were adequately handled with a multivitamin supplement, high-protein diet, fluid-electrolyte balance, regular vitals monitoring, and prophylactic antibiotic therapy. In total, 23 women were admitted to the intensive care unit after developing severe COVID-19 pneumonia with ARDS. The risk of maternal mortality in COVID-positive patients was somewhat higher 16 (3.51%) than in COVID-negative pregnant women 39 (0.47%) (p <0.05). In the majority of neonates in both the COVID-positive and -negative women, Apgar score was normal 7–10, and birth weight between 2.6 and 3 kg. Low Apgar scores (0–3) were seen in 6 (1.43%) of COVID-positive mothers' neonates and 197 (2.60%) of COVID-negative mothers' neonates. Overall, the majority of the newborns were healthy. Swabs from seven neonates were first determined to be positive, but were retested on day five and proved to be negative.

Conclusions: In times of global pandemic, quick and judicious management of COVID-19 positive pregnant women is a critical notion for safe motherhood and healthy children. However, our findings reveal that COVID infection has no substantial influence on maternal and fetal outcomes in pregnancy, and there is no indication of vertical transmission of the COVID-19 infection, but long-term monitoring of these newborns is suggested.

Keywords: Antibiotic, Apgar score, COVID-19, Hypothyroidism, Multigravida, Multivitamin, Pandemic, Pneumonia, RT-PCR.

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Introduction

Coronavirus disease 2019 (COVID-19) is a global public health issue caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Corona is an enclosed, non-segmented, positive-sense RNA viruses of the Coronaviridae family.[1,2] Since its commencement in December 2019, the COVID-19 pandemic has had a significant impact on people's lives all around the world.[3] The reproductive age group of girls accounts for the majority of the worldwide people. As the entire world is struggling with a new COVID-19 crisis, it is important to understand the effect and development of illness in pregnant women. In June 2020, the Centers for Disease Control and Prevention (CDC) revealed that 31.5% of pregnant women were hospitalized with COVID-19 compared to 5.8% of non-pregnant women.[4]

Despite the fact that pregnancy is a biologically immune weakened condition, they may have greater levels of endogenous steroids, which may be supporting lower symptoms in COVID-19 patients.[5] This is characterized by a change in immunity from helper T-cell-1 to helper T-cell-2. Pregnancy, on the other hand, affects the body's immune system and reaction to viral infections in general, which can occasionally result in more severe symptoms, and this will be the case with COVID-19. Other kinds of coronavirus infection (SARS, MERS) tend to enhance the hazards to the mother, particularly during the latter trimester of pregnancy. If we know the influence of COVID-19 viral disease in pregnancy, we can take the necessary precautions and fight the disease.[6]

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Furthermore, pregnant women are more sensitive to respiratory infections and are more prone to develop severe pneumonia due to reduced cellular immunity and physiological abnormalities. Both SARS-CoV and MERS-CoV have been linked to serious pregnancy problems.[7] There is currently no indication that pregnant women are more vulnerable to COVID-19 infection or that those infected with COVID-19 are much more likely to develop severe pneumonia. Given the frequency of COVID-19, some pregnant women may have previously been infected. With the rising prevalence of COVID-19 pneumonia, the impact on pregnant women and newborns has received increased attention. Nevertheless, there is a paucity of evidence on the clinical course and treatment of COVID-19 in pregnancy.[8,9] As a result, the current study was designed to assess

Table 1: Demographic data of the patients

Parameters		*COVID-positive*	*COVID-negative*	*p value*
Age group (years)	<20	73 (16.04%)	1703 (20.85%)	>0.05
	21–25	182 (40%)	3566 (43.66%)	
	26–30	148 (32.52%)	2322 (28.43%)	
	>30	52 (11.42%)	576 (7.05%)	
Parity	Primigravida	169 (37.42%)	3178 (38.91%)	>0.05
	Multigravida	241 (52.96%)	4288 (52.50%)	
	Grand multipara	45 (9.89%)	701 (8.58%)	
Gestational age (in weeks)	<34	50 (10.98%)	1401 (17.15%)	>0.05
	34–37	134 (29.45%)	1118 (13.68%)	
	>37	271 (59.56%)	5648 (69.15%)	
Total		455	8167	–

the clinical course, results, obstetric care, and vertical transmission of COVID-19 during pregnancy.

Materials and Methods

After obtaining written informed consent from all the patients and Institutional Ethical Committee approval, the present prospective observational study was carried out in the Department of Obstetrics and Gynecology at Lokmanya Tilak Medical College and Sion Hospital, Mumbai over a period of 18 months from April 2020 to September 2021. All COVID-19 positive as well as COVID-negative pregnant women admitted in LTMGH, Sion were involved in the study. During the study period, a total of 455 COVID-19 positive women and 8167 COVID-19 negative women were enrolled in the study. Details about the cases like age, gestational age, parity, history of contact, address, mode of delivery/outcome, baby details, any comorbid conditions, Apgar score, and treatment given were noted.

A thorough history was taken, and clinical and obstetric investigation was performed. After that, all COVID-positive cases were subjected to relevant examinations including complete blood count, blood sugar, electrolytes, kidney/liver function test, electrocardiography, obstetric ultrasound for fetal parameters, and ABG when required. All the positive cases were managed depending on the clinical course of the disease and the pregnancy trimester. COVID-19 symptomatology was closely monitored in all patients. Before discharge, RT-PCR was used to confirm viral clearance using throat swab samples. Both the mother and baby were either kept in home quarantine after discharge or sent to quarantine centers designated by BMC. Patients with mild disease were given symptomatic treatment and general fluid-electrolyte balance, as well as regular vital monitoring. It was emphasized that subsequent bacterial infections should be monitored and that antibiotics should be used promptly when needed.

Statistical Analysis

The data were collected and placed into a Microsoft Excel spreadsheet before being statistically evaluated using SPSS Version 20.0. Continuous variables were reported as means ± standard deviations, whereas categorical variables were summarized as frequencies and percentages. To compare categorical variables in COVID-positive and negative groups, the Chi-square test was performed. A *p* value of less than 0.05 was deemed significant.

Table 2: Associated comorbidities

Comorbidities	*COVID-positive*	*COVID-negative*	*p value*
DM/GDM	11 (10.37%)	255 (12.49%)	>0.05
HTN/PIH	17 (16.03%)	304 (14.89%)	
Anemia	28 (26.43%)	563 (27.58%)	
TB/Asthma	16 (15.09%)	234 (11.46%)	
HBs Ag/HCV/HIV	12 (11.32%)	186 (9.11%)	
Thyroid	17 (16.03%)	304 (14.89%)	
Others	5 (4.73%)	195 (9.55%)	
Total	106	2041	

DM, diabetes mellitus; GDM, gestational diabetes mellitus; HTN, hypertension; PIH, pregnancy-induced hypertension

Observations and Results

From April 2020 to September 2021, a total of 8622 pregnant women were involved in the 18-month trial. There were 455 women who tested positive for COVID and the rest 8167 patients who tested negative for COVID, providing the incidence of COVID infection in pregnancy as 5%, compared to 14.43% in our earlier study.[9]

The demographic information of COVID-positive and negative patients is shown in Table 1. The majority of the patients were between the ages of 21 and 25. In our study, the majority of women were multigravida with a gestational age of 37 weeks.

Table 2 shows the associated comorbidities which were present in almost 106 (23.30%) COVID-positive patients and 2041 (24.99%) COVID-negative patients. Anemia, hypothyroidism, PIH/HTN, and DM/GDM are the most common co-morbidities present in these women.

Among 455 women, 401 were asymptomatic whereas 54 showed COVID-19 disease symptoms, main complaints reported by patient associated with COVID-19 illness was fever and cough (12%). All mild symptomatic patients were managed effectively with multivitamin supplements, frequent vitals monitoring, high protein diet, fluid-electrolyte balance, and preventive antibiotic treatment.

Table 3 demonstrated the incidence of maternal complications in both groups. Out of the 455 COVID-positive pregnant women, 19 (4.17%) had abortions either in the first or second trimester, 17 women (3.73%) had ectopic pregnancies, and 14 women had either an antepartum or postpartum hemorrhage. About 23 (5.05%)

Table 3: Maternal complications

Complications	*COVID-positive*	*COVID-negative*	*p value*
Abortion (T1/T2)	19 (4.17%)	384 (4.71%)	>0.05
EP	17 (3.73%)	208 (2.54%)	>0.05
APH/PPH	14 (3.07%)	342 (4.18%)	>0.05
ICU admission	23 (5.05%)	152 (1.86%)	<0.05*
Maternal deaths	16 (3.51%)	39 (0.47%)	<0.05*
Total	89 (19.56%)	1125 (13.77%)	–

*Significant; APH, antepartum hemorrhage; EP, ectopic pregnancy; PPH, postpartum hemorrhage

Table 4: Mode of delivery

Outcome	*COVID-positive*	*COVID-negative*	*p value*
Vaginal delivery	189 (41.53%)	3857 (47.22%)	
Instrumental	5 (1.09%)	128 (1.56%)	>0.05
LSCS	225 (49.45%)	3590 (43.95%)	
Total	419	7575	–

women developed severe COVID-19 pneumonia with ARDS and were shifted to ICU for further management, and most of these were referred from a peripheral hospital in a moribund condition. The risk of maternal mortality in COVID-positive patients was statistically significant (16.51%) compared to COVID-negative pregnant women 39 (0.47%), (p <0.05).

Table 4 reveals that the number of patients delivered by LSCS in the COVID-positive group (49.45%) was greater than in the COVID-negative group (43.95%), although the difference was not statistically significant (p >0.05). In the COVID-positive group, 419 patients delivered through LSCS, vaginal birth, or instrumental delivery, 19 had abortions, 17 had an ectopic pregnancy, and no twin deliveries occurred. Likewise, we had 7575 post-delivery patients in the COVID-negative group, with 48 twin births, 384 abortions, and 208 ectopic pregnancies.

Table 5 shows indications of cesarean sections done in both groups. Meconium-stained amniotic fluid (MSAF), fetal distress, cephalopelvic disproportion (CPD) and non-progress of labor being the most common reasons for LSCS.

Table 6 demonstrates that the Apgar score was normal (7–10) in the majority of the newborns in both groups (>0.05). Low Apgar, i.e., 0–3 was found in 6 (1.43%) newborns of COVID-positive mothers

Table 5: Indications of cesarean sections (LSCS)

Causes of LSCS	*COVID-positive*	*COVID-negative*	*p value*
MSAF	43 (19.11%)	518 (14.42%)	>0.05
Fetal distress	32 (14.22%)	515 (14.34%)	>0.05
Previous cesarean delivery	26 (11.55%)	485 (13.50%)	>0.05
Multiple pregnancy	0 (0.0%)	48 (1.33%)	–
Breech	14 (6.22%)	180 (5.01%)	>0.05
Cephalopelvic disproportion	28 (12.44%)	248 (6.90%)	>0.05
Non-progress of labor	30 (13.33%)	552 (15.37%)	>0.05
IUGR/Oligohydramnios	21 (9.33%)	293 (8.16%)	>0.05
Severe PIH/Eclampsia	8 (3.55%)	261 (7.27%)	>0.05
Abruption	6 (2.66%)	168 (4.67%)	>0.05
Others	17 (7.55%)	322 (8.96%)	>0.05
Total	225 (100%)	3590 (100%)	–

IUGR, intrauterine growth restriction; MSAF, meconium-stained amniotic fluid; PIH, pregnancy-induced hypertension

Table 6: Neonatal parameters

Outcome		*COVID-positive*	*COVID-negative*	*p value*
Apgar score	7–10	370 (88.30%)	6747 (88.50%)	>0.05
	4–6	43 (10.26%)	679 (8.90%)	>0.05
	0–3	06 (1.43%)	197 (2.60%)	>0.05
Birth weight (kgs)	<1.5	12 (2.86%)	247 (3.24%)	>0.05
	1.5–2	32 (7.63%)	760 (10.00%)	>0.05
	2–2.5	102 (24.34%)	1501 (19.70%)	>0.05
	2.6–3	181 (43.19%)	3483 (45.69%)	>0.05
	>3	92 (21.95%)	1632 (21.40%)	>0.05
Complications	IUFD	16 (3.81%)	264 (3.46%)	>0.05
	IUGR	38 (9.06%)	495 (6.50%)	>0.05
	NICU admission	46 (10.97%)	761 (9.98%)	>0.05

IUFD, intrauterine fetal death; IUGR, intrauterine growth restriction

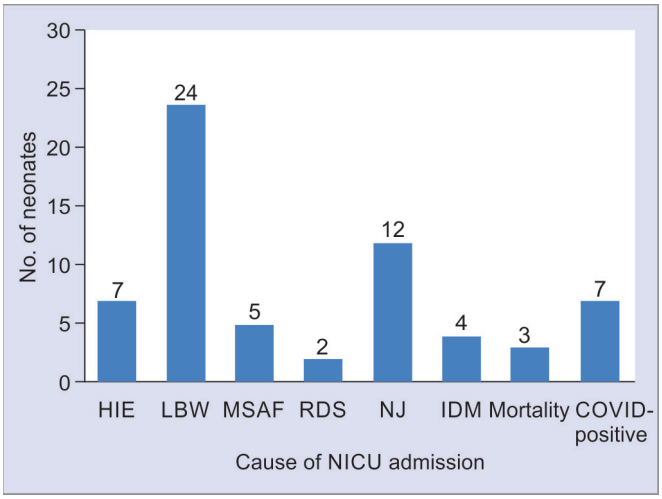

Fig. 1: Causes of NICU admission—HIE, hypoxic ischemic encephalopathy; LBW, low birth weight; MSAF, meconium-stained amniotic fluid; RDS, respiratory distress syndrome; NJ, neonatal jaundice; IDM, infant of diabetic mother

and 197 (2.60%) neonates of COVID-negative mothers, $p > 0.05$. The majority of neonates in both groups were born weighing between 2.6 and 3.0 kg. Out of the 419 COVID-19 positive patients, 16 (3.81%) had an intrauterine fetal death (IUFD), 38 (9.06%) had intrauterine growth restriction (IUGR), and 46 (10.97%) needed NICU admission due to various reasons.

Figure 1 shows the detailed causes of NICU admissions in COVID-positive mothers' babies. The maximum number, i.e., 24 babies went to NICU because of low birth weight (LBW), 12 due to neonatal jaundice, and other causes of NICU admission are depicted in Figure 1. All neonates were subjected to RT-PCR, out of total 419 babies tested, only 7 babies were tested positive on first swab and all of them were shifted to NICU for further management and they were tested negative on day 5. Breastfeeding was commenced shortly after delivery, although mothers were urged to practice careful respiratory and hand cleanliness. While feeding or caring for the newborn, a fluid-resistant surgical face mask was required. Hand washing and the usage of sanitizer were strictly enforced.

Discussion

COVID-19 has been affecting the planet since December 2019, and this sickness has the potential to infect the whole population. Because of physiological responses in the cardiovascular and respiratory systems that occur during pregnancy, pregnant women are particularly vulnerable to pathogen infection, severe pneumonia, and systemic damage, which could also contribute to poor results.[10] COVID-19 infections are very infectious, and this must be considered during pregnancy care. The majority of patients in the current study (72.52%) were between the ages of 21–30 years, with an average age of 27.32 ± 12 years, which is comparable to the studies done by Adhikari et al.[11] and Chen et al.[12]. The majority of the women were multigravida, with the remainder being primigravida. Cough and fever were the most common symptoms reported by patients with COVID-19 illness. These findings are consistent with earlier research.[13–15] The prognosis is heavily influenced by the patient's gestational age at the time of diagnosis, and the perinatal side effects are caused by a probable placental inflammatory syndrome. The majority of the COVID-positive women had gestational age >37 weeks with the mean gestational age of 36.94 ± 12.3 weeks which is correlated with the study done by Di Mascio,[16] where the average gestational age at diagnosis was 30.6 ± 9.5 weeks, and at the delivery time, it was 37.2 ± 3.9 weeks. Also, Chen et al. reported mean gestational age of 36 weeks,[12] and Zhu et al.[17] found mean gestational age of 35 weeks. A recent systematic assessment of all published findings on coronaviruses in pregnancy (COVID-19, SARS, and MERS) discovered that COVID-19 was related to an increased incidence of cesarean birth.[18–21] Similarly, in the present study, 49.45% of patients were delivered by LSCS which is also comparable with the study conducted by Di Mascio.[16] According to Naseer et al., the cesarean rate for females with proven COVID-19 infection might reach up to 47%.[13] In other research,[18,22] the rate has been estimated to be as high as 91–92%.

Most patients have mild symptoms (94.94%), but 23 (5.05%) women developed severe COVID-19 pneumonia with ARDS and were shifted to ICU. In Di Mascio[16] and Villar et al. study,[23] 11.1% and 8.35% of women required admission to the ICU, respectively. Among the study population (455), 419 patients were delivered, 19 had abortions, and 17 had ectopic pregnancies which is comparable with the study performed by Chen et al.[14] All these patients were asymptomatic for COVID-19 disease. Comorbidities may increase the likelihood of presenting with more serious clinical symptoms. Pregnant women with COVID-19 do not have a greater risk of miscarriage or early pregnancy loss, according to current evidence. Cases of preterm birth and fetal distress have been reported in women with COVID-19 infection during the third trimester, while the data is currently insufficient to establish a link. In the current study, medical comorbidities were present in 23.30% of patients which is correlated with the study conducted by Naseer et al.[13]

COVID-19 infection is not presently an indication for medical abortion in India. According to Metz et al.,[24] unfavorable perinatal outcomes were more prevalent in individuals with severe or critical illness than in asymptomatic SARS-CoV-2 infection, including an increased frequency of cesarean delivery, hypertensive disorders of pregnancy, and preterm birth. Furthermore, the perinatal results for individuals with mild to severe disease were similar to those seen in asymptomatic SARS-CoV-2 patients. In the current study, Apgar score was normal (7–10) in many neonates while low Apgar, i.e., <3 was observed in 7 (1.63%) neonates of COVID-positive mothers. Most of the neonates had birth weights between 2.6 and 3 kg (43.19%). In total, 16(3.81%) patients had an IUFD, 38 (9.06%) had IUGR, and 46(10.97%) had NICU admission. These findings are in accordance with the earlier studies.[13,23] Most of the babies went to NICU because of LBW and neonatal jaundice. All neonates were subjected to RT-PCR, out of total 419 babies tested, only 7 babies tested positive on first swab, and all of them were shifted to NICU for further management and they were tested negative on day 5. As a result, the possibility of vertical transmission appears to be exceedingly minimal (1.67%). Zheng et al.[25] also noted that the ratio of SARS-CoV-2 infected mother-to-fetus transmission will be comparatively low, while other studies[12,18] found no clinical signs of vertical transmission. Even while SARS-CoV-2 cannot be passed from mothers to newborns, it can be transmitted through close contact since coronavirus can be found in sweat glands and the distal convoluted tubules of the kidney in addition to the intestinal and respiratory tracts.[26] As a result, neonates born to COVID19 pregnant mothers should be separated for at least 14 days and should not be breastfed.[27] However, there is no indication of SARS-CoV-2 in the milk of affected mothers.[12] Breast

milk contains antibodies and other protective substances in a passive form. According to current research, most international scientific organizations[28,29] permit nursing if maternal and newborn circumstances are good, always with contact and droplet protections in place (correct hand hygiene before and after contact, use of a surgical mask, cleaning breast skin and surfaces that could be in contact).

Conclusion

In times of global pandemic, quick and judicious management of COVID-19 positive pregnant women is a critical notion for safe motherhood and healthy children. COVID-19 appears to be milder during pregnancy. Pregnant women with COVID-19, on the other hand, should be constantly followed even if their etiological tests come back negative. Furthermore, hospitalization of all pregnant women with proven COVID-19 infection, provision of a personalized strategy, adequate drug usage, and case management within the framework of a multidisciplinary approach appear to be related with good results.

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