Impact of the Coronavirus Infection in Pregnancy: A Preliminary Study of 141 Patients

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Abstract

Background The novel coronavirus disease (COVID-19) is the most challenging health crisis that we are facing today. Against the backdrop of this pandemic, it becomes imperative to study the effects of this infection on pregnancy and its outcome. Hence, the present study was undertaken to evaluate the effects of COVID-19 infection on the maternal morbidity and mortality, the course of labour as well as the neonatal outcome.

Materials and Methods A total of 977 pregnant women were included in the study, from 1st April to 15th May 2020 at a tertiary care hospital. There were 141 women who tested COVID positive and remaining 836 patients were included in the COVID negative group. Findings were compared in both the groups.

Results The incidence of COVID positive pregnant women was found to be 14.43%. More patients delivered by LSCS in the COVID positive and the COVID negative group (50%) as compared to COVID negative group (47%), \( p > 0.05 \). Low APGAR score (0-3) was observed in 2(1.52%) neonates of COVID positive mothers and in 15 (1.91%) neonates of COVID negative mothers. Overall most of the babies were healthy. Out of all babies tested, 3 were detected positive initially which were retested on day 5 and were found to be negative.

Conclusion There is no significant effect of COVID infection on maternal and foetal outcome in pregnancy and there is no evidence of vertical transmission of the COVID-19 infection but long-term follow-up of these babies is recommended.

Keywords COVID-19 · Pandemic · Pregnancy · Mortality · Morbidity · APGAR · Neonate

Introduction

The novel coronavirus infection (COVID-19) is a global public health emergency. The first case of coronavirus infection was identified in Wuhan, Hubei province of China and was notified to the WHO on 31st December 2019. By 30th of January 2020, the coronavirus disease was declared as a Public Health Emergency of International Concern (PHEIC) [1]. It did not take long for the COVID-19 to establish its roots in India as the first case was confirmed on 30th January [2]. As of 16th May 2020, the total number of cases in India was 85,940 with 2753 deaths reported by the Ministry of Health and Family Welfare [3].

The mode of transmission is by droplets which can occur when the patient sneezes or coughs. The incubation period varies from 2 days to 2 weeks following exposure to the virus [4]. An analysis of 181 confirmed COVID-19 cases outside Wuhan, China, found the mean incubation period to be 5.1 days and that 97.5% of the individuals who developed
results in pregnant women diagnosed with COVID infection in the early phase of the pandemic.

Materials and Methods

This is a retrospective observational analytical study done in the Department of Obstetrics and Gynaecology at Tertiary Care Hospital attached to a Medical College, located in Central Mumbai, draining patients from the entire Mumbai Metropolitan region and referrals from far away places like Raigad, Ratnagiri districts too. The hospital is located near a red zone of COVID infection and conducts deliveries of approximately 10,000 patients every year. The Institutional Ethics Committee (IEC) approval was taken for the study.

A total of 977 patients were included in the study, who were in labour or who had an abortion or an ectopic pregnancy, from 1st April to 15th May 2020. Out of which 141 women tested COVID positive and 836 women were COVID negative. Aims and Objectives of the Study were to assess the effects of COVID-19 infection on the maternal morbidity and mortality as well as the effects on newborn in the 141 pregnant women diagnosed with COVID infection in the early phase of the pandemic.

Results

A total of 977 pregnant women were included in the study period of 45 days, from 1st April to 15th May 2020. Of these, there were 141 women who tested COVID positive and the remaining 836 patients were COVID negative. Thus giving the incidence of COVID infection in pregnancy as 14.43%. Among COVID positive cases, only 8 patients gave a history of contact with patients diagnosed with COVID-19 infection and 133 were community acquired cases.
Demographic Profile

Table 1 shows Demographic profile of the patients (n=977).

| Parameters               | COVID positive | COVID negative | p value |
|--------------------------|----------------|----------------|---------|
| Age group (years)        |                |                |         |
| <20                      | 8 (5.67%)      | 104 (12.44%)   | > 0.05  |
| 21–25                    | 64 (45.39%)    | 361 (43.18%)   |         |
| 26–30                    | 57 (40.42%)    | 300 (35.88%)   |         |
| >30                      | 12 (8.51%)     | 71 (8.49%)     |         |
| Parity                   |                |                |         |
| Primigravida             | 55 (39%)       | 291 (34.80%)   | > 0.05  |
| Multigravida             | 84 (59.57%)    | 534 (63.87%)   |         |
| Grand multipara          | 2 (1.41%)      | 11 (1.31%)     |         |
| Gestational age (in weeks)|              |                |         |
| ≥37                      | 103 (73.04%)   | 597 (71.41%)   | > 0.05  |
| 34.1–36.6                | 23 (16.31%)    | 143 (17.10%)   |         |
| <34                      | 15 (10.63%)    | 96 (11.48%)    |         |
| Total                    | 141            | 836            |         |

**Table 2** Associated Comorbidities

| Parameters               | COVID positive | COVID negative | p value |
|--------------------------|----------------|----------------|---------|
| DM/GDM                   | 4 (2.83%)      | 24 (2.87%)     | > 0.05  |
| HTN/PIH/Eclampsia        | 7 (4.96%)      | 45 (5.38%)     |         |
| TB/Asthma/LRTI           | 2 (1.41%)      | 11 (1.31%)     |         |
| Hypothyroidism           | 5 (3.54%)      | 17 (2.03%)     |         |
| Anaemia                  | 5 (3.54%)      | 30 (3.58%)     |         |
| Thalassemia              | 1 (0.70%)      | 1 (0.11%)      |         |
| HIV/HBSAG/HCV            | 1 (0.70%)      | 13 (1.55%)     |         |
| Others                   | 2 (1.41%)      | 20 (2.39%)     |         |
| Total                    | 27 (19.14%)    | 161 (19.25%)   |         |

**Table 3** Mode of delivery

| Outcome                  | COVID positive | COVID negative | p value |
|--------------------------|----------------|----------------|---------|
| Vaginal delivery         | 66 (49.25%)    | 415 (51.87%)   | > 0.05  |
| Instrumental             | 1 (0.74%)      | 9 (1.12%)      | > 0.05  |
| LSCS                     | 67 (50%)       | 376 (47%)      | > 0.05  |
| Total                    | 134            | 800            |         |

**Table 4** Maternal complications

| Complications            | COVID positive | COVID negative | p value |
|--------------------------|----------------|----------------|---------|
| Abortions                | 6 (4.25%)      | 33 (3.94%)     | > 0.05  |
| Ectopic pregnancy        | 1 (0.70%)      | 3 (0.35%)      | > 0.05  |
| APH and PPH              | 3 (2.12%)      | 17 (2.03%)     | > 0.05  |
| Maternal deaths          | 3 (2.12%)      | 8 (0.95%)      | > 0.05  |
| Total                    | 13 (9.21%)     | 61 (7.29%)     |         |

**Mode of Delivery**

Table 3 shows that the number of patients who were delivered by LSCS in COVID positive group (50%) was higher as compared to COVID negative group (47%) but the difference between the two groups was not statistically significant, (p > 0.05). Chen et al. [10] reported a study with LSCS done for all patients. In our study LSCS was done for Obstetric indications only. Out of the total 141 patients in the COVID positive group, 134 patients delivered either by LSCS/vaginal delivery/Instrumental delivery, 6 had abortions and 1 had an ectopic pregnancy. Similarly in the COVID negative group, we had 800 post-delivery patients with 16 pairs of twin deliveries, 33 abortions and 3 ectopic pregnancies.

**Maternal Complications**

Table 4 shows incidence of maternal complications in both the groups. Most of our patients (97%) of them were asymptomatic or had mild symptoms like fever or cough not requiring any oxygen therapy. The rate of maternal death in COVID positive patients 3(2.12%) was slightly higher as compared to COVID negative pregnant women 8 (0.95%), (p > 0.05). We had 3 maternal deaths in COVID positive patients. First case was a Primigravida with 35 weeks of gestation with sepsis and hepatitis, other 2 patients were referred to us in moribund condition on day 2 of normal delivery with severe anaemia with pneumonia with cardiogenic shock with HELLP syndrome and other was a post LSCS patient with sepsis and acute kidney injury (AKI). There were 8 maternal deaths in the COVID negative group.
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Neonatal Outcome

Table 5 shows APGAR score was normal (7–10) in most of the neonates in both the groups, (> 0.05). Low APGAR i.e. 0–3 was observed in 2 (1.52%) neonates of COVID positive mothers and in 15 (1.91%) neonates of COVID negative mothers. In both the groups, majority of neonates had birth weight between 2.5 and 2.9 kg, (< 0.05).

Neonatal Complications

Table 6 shows that out of the 134 patients in the COVID positive group, 3(2.23%) had an IUFD while 31(3.79%) women had an IUFD in COVID negative group. Out of 24 babies of COVID positive mothers in NICU, 16 babies went to NICU due to low birth weight (LBW), 2 for low APGAR score, 6 babies due to various reasons like neonatal seizures, meconium aspiration syndrome and ABO incompatibility. Out of total 131 babies tested, only 3 babies were tested positive on first swab and all of them tested negative on day 5 (Fig. 1).

Discussion

Viral pneumonia is believed to be the most common non-obstetric infectious disease during pregnancy associated with maternal and neonatal morbidity and mortality [11]. Atypical coronavirus disease (COVID-19), caused by the SARS-CoV-2 virus, is highly infectious and is currently spreading rapidly across the world [12]. It has caused thousands of morbidities and mortalities worldwide since its emergence of SARS-CoV-2 in Wuhan, Hubei Province, China in December 2019 [13]. Many studies have focused on infected patients from the general population; however, details of COVID-19 related pregnancy outcomes are scarce. Chen et al. [10] reported the maternal–neonatal outcomes and vertical transmission potential of COVID-19 pneumonia in pregnant women. Their study focused on pregnant women who only delivered babies by LSCS, and no case has been reported for normal vaginal delivery.

There is a very limited data currently available on maternal outcomes in COVID-19 infection in pregnancy. However, as per the data from other viral illnesses such as influenza, SARS and MERS, pregnant women are more likely to develop viral pneumonitis, with higher morbidity and...
mortality [14]. The present study involved 977 deliveries, among these, 141 patients tested COVID positive with an incidence of 14.43%. Although the pregnant women with COVID-19 infection tended to present with mild respiratory symptoms, the risk of severe pneumonia during this period is high [10, 14, 15]. WHO report found that in these patients, the adverse pregnancy outcomes was high, especially among those with other associated diseases such as preeclampsia or other complications because respiratory syndromes may aggravate pulmonary oedema and decrease oxygen saturation [16]. In our study, patients had presented with a number of comorbidities or complications in their pregnancy such as anaemia, gestational DM (GDM), hypertension and other medical disorders in both the groups.

Liu et al. [16] and Fan et al. [17] reported that most pregnant women acquired the infection in the third trimester of pregnancy. Similar findings were noted in our study. The emergence of a disease with respiratory implications in the third trimester of pregnancy is usually associated with a higher risk of LSCS, preterm births, low Apgar indexes, and low birth weight. In our study, out of 141 COVID positive cases, 134 women were post-delivery (vaginal delivery/LSCS) cases, 1 patient had ectopic pregnancy and six patients had abortions. Several studies have reported that most women underwent LSCS [10, 14, 15, 17, 18]. Recent literature tends to lean towards LSCS; however, much depends on woman’s comorbidities. In our study, more number of patients were delivered by LSCS in COVID positive group (50%) as compared to COVID negative group (47%) but difference was not statistically significant, \( p > 0.05 \). LSCS was done for obstetric indications like non-progression of labour, foetal distress, etc. and not just because the pregnant woman had COVID 19 infection. Regarding the characteristics of the newborns, majority of neonates were born with a normal Apgar index (7–10) with average birth weight of (2.5–2.9 kg) in both the groups.

Certain generalized viral infections, such as HIV are predisposed to intrapartum neonatal transmission [10, 19]. For COVID-19, data is limited. In one case series three neonates were born vaginally (one singleton, one set of twins) and throat swabs for PCR at day one of birth were negative for COVID-19 in all three cases [20]. Another COVID-19 positive patient had negative vaginal swab testing during delivery [18]. Many studies [10, 20] have suggested no increased risk of perinatal vertical transmission. Histopathological review of three placentas of confirmed COVID-19 positive patients following delivery by caesarean section showed no signs of villitis and chorioamnionitis, and all three placental samples were negative for COVID-19 RNA. These reports showed no evidence for intratertiary vertical transmission for COVID-19 in second or third trimester has been confirmed. These findings are in accordance with the findings of our study. The Neonatal mortality (IUFD) was found to be 3(2.23%) in COVID positive group and 31(3.79%) in COVID negative group. We had 3 maternal deaths in COVID positive patients. First case was a Primigravida with 35 weeks of gestation with sepsis and hepatitis, other 2 patients were referred to us in moribund condition on day 2 of normal delivery with severe anaemia with pneumonia with cardiogenic shock with HELLP syndrome and other was a post LSCS patient with sepsis and acute kidney injury (AKI). There were 8 maternal deaths in COVID negative group, out of these 2 were due to direct causes like Postpartum haemorrhage and Antepartum haemorrhage. Other six maternal deaths were due to indirect causes.

Conclusion

Research on the effects of COVID-19 infection during pregnancy is still in its initial stages. In the present study, we compared the outcomes of COVID-19 positive and negative pregnant women and their neonates. The results of the study suggested that there is no effect of COVID 19 infection on maternal and perinatal outcome. The majority of the women were discharged without any major complications and there was no evidence of vertical transmission of the COVID-19 infection. However, long-term follow-up of these babies to see any delayed effects is necessary. Our study was a small preliminary analysis of COVID positive pregnant women in the initial stage of the epidemic. As several pregnant women are getting infected all over the world, a clear picture will emerge in the coming days about the effect of COVID 19 infection on pregnancy, labour and the neonates.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval Approved by IEC.

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