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Maternal and perinatal outcome in Covid 19 pregnancies in tertiary care center

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Abstract

Background: The Global pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus (SARS-COV 2) has been growing at an accelerating and the first case was reported from Wuhan, China in December 2019. Pregnant women generally do not appear more likely to contract the infection than the general population. But the anatomical and physiological changes that take place in the pregnancy make pregnant women more vulnerable to severe infections. Hence we aimed to conduct a study on pregnancies affected by COVID-19 and present a report of the maternal and perinatal outcomes in those affected pregnancies.

Materials and Methods: It is a hospital-based prospective observational study conducted in a tertiary care center, Government General hospital, Kakinada from August to October 2020. A total of 300 antenatal women with more than 28 weeks period of gestation who were tested COVID-19 were included.

Results: The majority of women belong to the age group of 21 to 25 years (43%) and the majority were primigravida (56%). Among the COVID-19 positive pregnant women majority were Asymptomatic (63%) in the symptomatic women, the major symptoms were cold and cough (15%) followed by fever (10%), sore throat (7%) and shortness of breath (5%). Out of 300 cases there were five maternal death (1.6%). Out of 265 babies delivered, there were 25 NICU admissions and of those there were three neonatal deaths. Two babies (0.75%) were tested COVID positive and were asymptomatic and discharged healthy.

Conclusion: Reported cases of COVID-19 pneumonia in pregnancy are mild with good recovery. Materno-foetal transmission of SARS COV 2 virus was not detected in majority of cases. Close monitoring of COVID-19 pregnancies and measures to prevent neonatal infection are warranted.

Keywords: COVID 19, Pregnancy, neonates, hypoxia

Introduction

The Global pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus (SARS-COV 2) has been growing at an accelerating rate affecting millions of individuals and its outbreak is cited as a global public health emergency by the World Health Organization. ^[1] COVID-19 closely resembles the SARS infection and is responsible for the coronavirus outbreak in 2019-2020. This emerging case of pneumonia was first reported from Wuhan, China in December 2019. Pregnant women generally do not appear more likely to contract the infection than the general population. But the anatomical changes such as an increase in the transverse diameter of the thoracic cage and an elevated level of diaphragm decreases the maternal tolerance to hypoxia ^[3]. Lung volume changes and vasodilatation can lead to mucosal edema and increased secretions in the upper respiratory tract ^[4]. All of these factors make pregnant women more vulnerable to severe infections⁵. Pregnant women with heart diseases are at higher risk. The coronavirus epidemic may increase the risk of perinatal anxiety and depression. It is important that support for women and families should be strengthened as far as possible; those women are asked about mental health at every contact.

In the fetus and the newborn, the immaturity of the innate and adaptive immune system makes them highly susceptible to infections ^[6]. Finding out whether an infectious agent can infect the foetus or the new born by vertical transmission is of particular interest⁸. Pregnant women and their newborns as they are being potential risk groups they should be evaluated in the current COVID-19 pandemic. Hence we aimed to conduct a study on pregnancies affected by COVID-19 and present a report of the maternal and perinatal outcomes in those affected pregnancies.

Materials and Methods

It is a hospital-based prospective observational study conducted in a tertiary care center, Government General Hospital Kakinada from August to October 2020. A total of 300 antenatal women with more than 28 weeks period of gestation who were tested COVID-19 positive on routine screening, and women admitted with symptoms for safe institutional delivery and the referred cases from the near primary health centers and private hospitals in view of COVID-19 positive were included. Rapid antigen test was used as the routine screening procedure in all the antenatal women close to the expected date of delivery attending to the outpatient department and to the labor room. However in the suspected cases admitted in the intensive care unit (ICU) with the symptomatology Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) was performed if the rapid was negative. The variables that were extracted and analyzed were maternal age, parity, literacy, socioeconomic condition, occupation, clinical symptoms on admission, mode of delivery, maternal outcome, and perinatal outcome.

Results

The majority of women belong to the age group of 21 to 25 years (43%) and the majority were primigravida (56%).

Table 1: Showing the distribution of age groups (n=300)

Age	No.	
15-20	60	20%
21-25	130	43%
25-30	98	32%
30-35	12	5%

Table 2: Showing the gravida of women

Primi	170	56%
multi	130	44%

Table 3: Showing the educational status of the mother

Illiterate	9	3%
Primary education	141	56.4%
Secondary education	110	44%
Graduate	40	16%

56.4% of Women had primary education, 44% had a secondary Education. 16% were graduates and 3% were illiterates.

The majority (60%) of women belong to low socioeconomic status, and the majority of women were housewives (82%), and the rest belong to a working group (18%)

Table 4: Showing the symptomatology of the women

Asymptomatic	190	63%
Fever	30	10%
Cold and cough	45	15%
Sore throat	20	7%
Dyspnoea	15	5%

Among the COVID-19 positive pregnant women majority were Asymptomatic (63%) and admitted with labor Pains and for Institutional safe delivery in COVID Labour room. Majority of these women were diagnosed COVID-19 positive on a routine screening performed in the antenatal period close to expected date of delivery and some who are contacts of COVID-19 positive family members underwent voluntarily testing and found to be COVID-19 positive. However in the symptomatic

women, the major symptoms were cold and cough (15%) followed by fever (10%), sore throat (7%) and shortness of breath (5%). The women with complaint of shortness of breath were admitted in COVID ICU. The women with minor symptoms and those with gestational age far from expected date of delivery were given antibiotics for 5 days and discharged after 1 week observation.

Table 5: Showing the mode of delivery in the covid pregnancies

NVD	180	66%
LSCS	90	34%

Out of 300 cases, 270 were delivered. 180 were delivered through vaginal route and 90 were delivered by LSCS. In the remaining 30 cases 27 were discharged after 1 week as the expected date of delivery is far from 4 weeks and there were three maternal deaths in the antenatal period.

Maternal Outcome

Out of 300 cases, 27 were discharged during the antenatal period one week after admission, and in the remaining 273 there were three maternal deaths in the antenatal period and Two hundred seventy cases were delivered. out of these 270 delivered cases, there are two maternal death in Postpartum period and the rest of 268 delivered cases were discharged healthy. All the 5 maternal death cases were referrals from outside Private hospitals and PHC's in view of covid positive and were admitted in COVID ICU. Four of these women were complicated with Comorbidities like eclampsia, preeclampsia, GDM, and hypothyroidism, respectively.

Perinatal Outcome

Among the cases admitted for delivery, there were four IUD and one stillbirth. All the babies born were tested for COVID-19 antigen 48 to 72 hours after birth, and two babies (0.75%) were tested positive, and they were admitted to NICU. Both the babies were asymptomatic and were discharged after five days of admission. Out of the 265 babies born, there were 25 NICU admissions, of which eight babies were admitted in view of Respiratory distress, four were admitted in view of meconium aspiration syndrome, three in view of neonatal sepsis, and four for birth asphyxia. Four babies were admitted in view of preterm with low birth weight and respiratory distress. Two babies were found to be COVID-19 positive and admitted in ICU. Three neonatal deaths were reported, of which two died due to birth asphyxia and one baby due to sepsis.

Table 6: showing the reasons for NICU admissions

Respiratory distress	8
Meconium aspiration	4
Neonatal sepsis	3
Birth asphyxia	4
Low birth weight	4
Covid positive	2

Table 7: showing the birthweight of the babies

Birth weight		
3 and >3 kgs	135	51%
2.5 -2.9 kgs	103	39%
2-2.4 kgs	22	8%
1.5-1.9 kgs	5	2%

The majority (89%) of the babies were more than 2.5kgs and 8% of the babies were between 2 to 2.4kgs and 2% were below 2kgs. Out of them, two were twins (preterm) and one spontaneous preterm labour with premature rupture of membranes, two babies were born out of induced labor for severe preeclampsia. All the women were advised to breastfeed the babies as there is no evidence that COVID 19 is secreted in milk. Though risk through air droplets when in close contact with mother during breast feeding is likely, still considering the advantages of breast milk in our setting, proper guidelines regarding hand hygiene and respiratory hygiene were given to all mothers, that is, washing the hands before and after touching the baby and wearing a face mask while feeding the baby. All the women practiced breastfeeding with hygiene, but in 10% of the women who were symptomatic or on oxygen support, temporary separation of the baby is done. Maintenance of milk supply is done by manual expression.

Discussion

The first cases of COVID-19 pneumonia were reported from Wuhan, Hubei province in china in December 2019. Since then, there was rapid spread of infection all over the world^[9, 10]. The majority of women belonged to the age group of 21 to 25 years (43%) and were primigravida (56%). Among 300 women who tested positive, 58% had a history of family members who tested COVID-19 positive. Some of them were retrospectively tested after the antenatal women were tested positive and were asymptomatic. In the remaining 42% of the women, 30% of the family members were not tested for COVID-19 and 12% had no history of any infection in the family members. 2% had a travel history and 15% had a history of attending gatherings and in remaining all the source of infection is from the family members from their working groups. Out of 300 majorities were asymptomatic (63%), and they were admitted with labor pains and for safe institutional delivery. In the symptomatic women, cold and cough (15%) is the major symptom, followed by fever (10%) and sore throat (7%). In line with Huang *et al.*,^[11] the fever and a non-productive cough were the major symptoms. malaise, shortness of breath and diarrhoea were occasionally reported. Women with the complaint of shortness of breath were admitted in COVID ICU and four maternal deaths were among them. A recent editorial on COVID-19 in pregnancy^[12] argues that management guidelines must be based on data from the current epidemic rather than drawing on the limited experience from previous outbreaks, as their epidemiology, clinical course and treatment may differ.

Among the 270 cases delivered 180 (66%) were delivered by vaginal route and 90 (34%) were delivered by LSCS. Out of these 90 cases 70 were repeat LSCS and 20 were primary LSCS. Among the primary LSCS indications were breech (40%), foetal distress (25%), Cephalopelvic disproportion (CPD 20%) and failed induction (15%). In other studies^[13-15] with regard to mode of delivery, caesarean section was performed in majority of cases and the authors cited foetal distress as the reason behind the decision.

Out of 300 cases there were five maternal death (1.6%). 3 deaths in the antenatal period and two in Postpartum period. Of the three antenatal cases--- one was primigravida with 28 weeks period of gestation admitted in COVID ICU with shortness of breath, and cough with saturations of 69% on oxygen, and history of plasma transfusion was died of COVID pneumonia.

Second case was G4 P1 L1 A2 with 33 weeks gestation, Previous Caesarean Pregnancy with hypothyroidism admitted

with low saturation (92% with 8 litres O₂) referred from private hospital, died after 3 days of admission with COVID pneumonia.

Third case was G5P1L1A3 with 34 weeks gestation, Previous Caesarean Pregnancy with cough and breathlessness since 2 days and saturation 45% with 15 litres O₂ referred from private hospital and died within 2 hours of admission with Type 1 respiratory failure with shock. Two women admitted in antenatal period died Postpartum-- of which one was primigravida with 37 weeks gestation referred from primary health centre in view of antepartum eclampsia and she was found to be COVID positive on routine screening and she was asymptomatic. She delivered at 37 weeks period of gestation through LSCS for antepartum eclampsia and nonprogress of labour and died on third postoperative day with cardiac arrest secondary to COVID pneumonia with shock.

Another case was G2 P1 L1 with 35 weeks gestation with Previous caesarean pregnancy with Intra uterine fetal demise (IUFD) with Gestational hypertension and Gestational Diabetes Mellitus (GDM) complicating pregnancy with CORAD 4 delivered by LSCS, died on first postoperative day with Multiorgan dysfunction syndrome (MODS).

Out of 265 babies delivered, there were 25 NICU admissions. There were three neonatal deaths, of which two died due to birth asphyxia and one with neonatal sepsis. Two babies (0.75%) were tested COVID positive and were asymptomatic and discharged healthy. In a recent retrospective study by Chen *et al.*^[13] nine pregnant women with confirmed COVID-19 pneumonia admitted to Zhongan Hospital were studied. Intrauterine vertical transmission was assessed by testing cord blood, amniotic fluid and neonatal throat swab samples for the presence of SARS-CoV-2 and all were tested negative. None of newborn had asphyxia and their Apgar scores were good. Hence, the clinical symptoms of COVID-19 pneumonia in pregnant women were similar to those of non-pregnant women and there was no evidence of intrauterine and vertical transmission of disease in COVID-19 positive pregnant women.

In contrary to the chen et al, a study by Zeng L *et al*^[16] showed 9% of new borns were tested COVID positive and a literature review by Alfaraj *et al.*,^[17] it was reported that among 11 pregnant women with MERS-CoV infection, 10 women developed adverse outcomes. Six (55%) neonates were admitted to NICU and three (27%) died and because of severe maternal respiratory failure, 2 neonates were given birth prematurely.

Majority (89%) of the babies were more than 2.5 kgs and 8% of the babies were between 2 to 2.4 kgs and 2% were below 2 kgs. Out of them 2 were twins (preterm) and one was spontaneous preterm labour with premature rupture of membranes and of the other two babies labour was induced in the mothers in view of severe preeclampsia before the term. All the women were advised to breast feed the babies as there is no evidence that COVID 19 is secreted in milk. But as the risk of close contact of baby with the mother during breast feeding likely to share air droplets, all women breastfed babies with respiratory and physical hygiene but in 10% of the women who were symptomatic or on oxygen support baby was separated temporarily. In a comment published in Lancet in 12th Feb 2020, it was recommended that newborns born to women with suspected or confirmed COVID-19 infection be isolated for at least 2 weeks after birth and not to be breastfed in order to prevent close contact with mother, as long as she is suspected of or infected with COVID-19^[18].

Due to lack of adequate data on the COVID-19 pneumonia during pregnancy, all pregnants suspected of COVID-19

infection should be screened and in confirmed infection cases, both the mother and the fetus must be followed up extensively. All the postnatal and postoperative women at the time of discharge in addition to the puerperal hygiene and care were advised to have home quarantine for 14 days and follow hand hygiene and use face mask before each breast feeding and maintain social distance with other members of the family. All the women were advised to follow up after one week with chest X- ray, complete blood picture and all the necessary blood investigations. Subsequent follow up is not required if the chest X- ray, blood tests and patient's health returns to normal.

Conclusion

Reported cases of COVID-19 pneumonia in pregnancy are mild with good recovery but the woman with comorbidities like Gestational hypertension, GDM and hypothyroidism were been complicating and required ICU admission. Materno-foetal transmission of SARS COV 2 virus was not detected in majority of reported cases although two babies had a positive test after 36 hours. Close monitoring of COVID-19 pregnancies and measures to prevent neonatal infection are warranted.

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