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A prospective observational study of impact of COVID-19 infection on maternal near miss cases in tertiary care centre**Dr. Sasikala***

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Abstract---Introduction: During pregnancy the immune system is altered, which predisposes to respiratory viral infections. COVID' 19 caused by SARS COV2 is highly infectious disease and has spread rapidly almost around the globe. Since the emergence of SARS-CoV-2 in Wuhan, Hubei Province, China during December 2019, it has caused thousands of morbidities and mortalities around the globe. Materials and Methods: A prospective observational study including all consecutive pregnant women with COVID19 infection. This study was conducted at Department of Obstetrics and Gynecology, Velammal Medical College, Madurai from 1 January 2020 to 20 June 2020. Selection criteria Eligibility criteria included pregnant women with quantitative real-time polymerase chain reaction (PCR) or dual fluorescence PCR-confirmed SARS-CoV-2 infection visiting to the hospital in out-patient department undergoing admission and visiting emergency department. Procedure Data on impact of COVID-19 infection on maternal morbidity and outcomes were extracted and analysed. Results: Of the 76 non-COVID-19 near miss cases, 10 were patients who had disseminated intravascular coagulation as a result of intra uterine fetal death, 20 patients had eclampsia, 10 underwent obstetric hysterectomy, 8 patients had postpartum haemorrhage, 2 was a patient with seizure disorder, 18 patients had LSCS under general anaesthesia, 8 patients had ruptured tubal ectopic pregnancies. Of the 16 COVID-19 positive patients, 4 were patients had disseminated intravascular coagulation as a result of intra uterine fetal death, 2 patients had eclampsia, 1 underwent obstetric hysterectomy, 6 patients had LSCS due to abruptio placentae, 4 had post-partum haemorrhage. During their course in ICU it was found that 12 COVID-19 patients had maternal death representing 75% and 24 non COVID patients had maternal death representing 31.57%. Conclusion: The mortality rate from the above results concludes that in this study mortality appeared to be higher in COVID-19 infection. Multi-centre retrospective analysis with larger population size is required in order for this to be statistically significant.

Keywords---SARS COV2, polymerase chain reaction, abruptio placentae, post-partum haemorrhage.

Introduction

During pregnancy the immune system is altered, which predisposes to respiratory viral infections. COVID' 19 caused by SARS COV2 is highly infectious disease and has spread rapidly almost around the globe.¹ Since the emergence of SARS-CoV-2 in Wuhan, Hubei Province, China during December 2019, it has caused thousands of morbidities and mortalities around the globe. In course of pregnancy transverse diameter of the thorax increases, diaphragm is displaced up- wards; this decreases maternal tolerance to hypoxia. Moreover, alteration of the lung capacity and vasodilation may lead to swelling of the mucous membrane and increase in secretion within upper respiratory tract that contributes to development of respiratory failure. Possibility of transplacental transmission of SARS-CoV-2, which may lead to negative neonatal outcomes re- mains unclear.²

Based on the previous knowledge of two notable corona virus outbreaks, the severe acute respiratory syndrome corona virus (SARS-CoV) and the middle east respiratory syndrome corona svirus (MERS-CoV), it is suggested that pregnant women are particularly susceptible to adverse outcomes, including the need for endotracheal intubation, admission to an intensive care unit (ICU), acute respiratory distress syndrome (ARDS), multiple organ dysfunction syndrome (MODS) and even death.^{3,4,5}

The knowledge gained from previous human corona virus outbreaks suggests that pregnant women are particularly susceptible to poor outcomes. The objective of this study was to summarize the effect of COVID-19 on maternal near miss cases.

Materials and Methods

Study design: prospective observational study including all consecutive pregnant women with COVID19 infection.

Study location: This study was conducted at Department of Obstetrics and Gynecology, Velammal Medical College, Madurai.

Study period: The study period was from 1 January 2020 to 20 June 2020.

Selection criteria Eligibility criteria included pregnant women with quantitative real-time polymerase chain reaction (PCR) or dual fluorescence PCR-confirmed SARS-CoV-2 infection visiting to the hospital in out-patient department undergoing admission and visiting emergency department. Procedure Data on impact of COVID-19 infection on maternal morbidity and outcomes were extracted and analysed. There were 248 women who tested COVID positive during this time period out of which 124 had lower segment caesarean section, 90 patients had full term normal delivery, and remaining 6 had check curettage for incomplete or missed abortions, 2 patients had exploratory laparotomy for ruptured ectopic pregnancy. There were 3patients who were admitted for wound

gapes after discharge from the hospital, 6 antenatal admissions and 13 admissions in the gynaecology ward. In this study, a total of 92 patients were included in near miss cases, who required ICU admission with severe morbidity.

Of these, 16 patients were COVID-19 positive and remaining 76 patients were included in control group (COVID-19 negative). The course of each of their stay in ward was noted and findings were compared in both the groups.

Statistical analysis: All the parameters were studied and analysed on the basis of percentages. As this was a purely observational study, the maternal parameters were analysed using descriptive statistics i.e. percentages and proportions were calculated and no statistical test was applied.

Results

Of the 76 non-COVID-19 near miss cases, 10 were patients who had disseminated intravascular coagulation as a result of intra uterine fetal death, 20 patients had eclampsia, 10 underwent obstetric hysterectomy, 8 patients had postpartum haemorrhage, 2 was a patient with seizure disorder, 18 patients had LSCS under general anaesthesia, 8 patients had ruptured tubal ectopic pregnancies. Of the 16 COVID-19 positive patients, 4 were patients had disseminated intravascular coagulation as a result of intra uterine fetal death, 2 patients had eclampsia, 1 underwent obstetric hysterectomy, 6 patients had LSCS due to abruptio placentae, 4 had post-partum haemorrhage. During their course in ICU it was found that 12 COVID-19 patients had maternal death representing 75% and 24 non COVID patients had maternal death representing 31.57%.

S.No	Parameters	Number
1	LSCS	129
2	Vaginal delivery	90
3	Curettage	6
4	Wound gape	3
5	Antenatal admissions	6
6	Exploratory laparotomy	2

Table 1
Different COVID-19 positive admissions

S.No	Causes	Number
1	Eclampsia	20
2	DIC	10
3	Obstetric Hystereoctomy	10
4	Postpartum Haemorrhage	8
5	Ruptured ectopic gestation	8
6	Seizure Disorder	1
7	General Anaesthesia	9

Table 2
Different causes of COVID19 negative maternal ICU admissions

S.No	Causes	Number
1	Eclampsia	2
2	DIC	4
4	Obstetric Hystereectomy	2
5	Postpartum Haemorrhage	4
6	Abruptio placentae	6

Table 3: different causes of COVID-19 positive maternal ICU admissions

Discussion

The WHO defines a maternal near-miss case as "a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.⁶

Novel corona virus (SARS-CoV-2) is a new strain of corona virus causing COVID-19, first identified in Wuhan City, China towards the end of 2019. Other human corona virus (HCoV) infections include HCoV 229E, NL63, OC43 and HKU1, which usually cause mild to moderate upper-respiratory tract illnesses, like the common cold, MERS-CoV and SARS-CoV.⁷

Most global cases of COVID-19 have evidence of humanto-human transmission. This virus can be secluded from respiratory secretions, faeces and fomites. Transmission of SARS-CoV occurs through close contact with an infected person or contaminated surfaces within 2 m.⁸

This may be the same for COVID-19 but there is currently no evidence that pregnant women are more likely to be severely unwell needing admission to intensive care or die from the illness than non-pregnant adults. Evidence now suggests possibility of vertical transmission, i.e.; transmission from mother to baby during pregnancy. There are, however, serious limitations to the available evidence.⁹ Two reports have published evidence of IgM for SARS-CoV-2 in neonatal serum at birth. Assuming that IgM does not cross the placenta, this would suggest a neonatal immune response to in utero infection.

It is uncertain in these cases whether the IgM levels resulted from cross reactivity as there was no evidence of SARS-CoV-2 in the infant's nasopharyngeal swabs or in the mother's vaginal secretions or breast milk on PCR testing. Moreover, the proportion of pregnancies affected and the significance to a neonate has yet to be determined. In the interim report from the UK Obstetric Surveillance System (UKOSS), 2.5% of babies (N=6) had a positive nasopharyngeal swab within 12 hours of birth.¹⁰

Conclusion

Although the majority of mothers who were COVID-19 positive were discharged without any major complications, severe maternal morbidity as a result of COVID-19 were reported. Also, the mortality rate from the above results concludes that in this study mortality appeared to be higher in COVID-19 infection. Multicentre retrospective analysis with larger population size is required in order for this to be statistically significant.

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