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Obstetric Outcomes in Covid-19 Pandemic: Single Center Experience at Tertiary Level Institute

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Abstract- *Background:* There has been increased severity and susceptibility in pregnant females with previous viral illness outbreaks. The data of pregnancy outcomes with COVID-19 are lacking and available in few small number series. The objective of this study was to report the maternal and perinatal outcomes of COVID-19 during pregnancy.

Methodology: Retrospective records of 185 pregnant women with laboratory confirmed COVID-19 disease in single center were reviewed from 1st May to 31st July 2020 and descriptive analysis of outcomes was done.

Results: There were 185 laboratory confirmed COVID-19 pregnant females in this study with mean age of 27.3+ 5.33 years. The majority presented in third trimester with no sign and symptoms of disease activity (66%). Lymphocytopenia (34.81%) ,elevated levels of C-reactive protein 49.95% and chest X-ray abnormalities in 32.43% were observed. 72.51% of women were delivered vaginaly and 27.49% required caesarean section with major indication being previous LSCS. The rate of preterm delivery was 17.54% with PPROM in 11.70%. Three maternal intensive care unit admissions were noted but no maternal death. 4 neonatal death and 4 still birth were also noted.

Keywords: *COVID-19, outcomes, delivery, pregnancy.*

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Obstetric Outcomes in Covid-19 Pandemic: Single Center Experience at Tertiary Level Institute

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Conclusion: The study concludes no significant increase in rate of maternal or fetal complications with COVID-19, no increased susceptibility of pregnant female in contracting COVID-19 and no preferred mode of delivery. The multidisciplinary approach and further research is warranted for successful obstetric outcome.

Keywords: COVID-19, outcomes, delivery, pregnancy.

I. Introduction

- Since the first reports of cases from Wuhan, a city in the Hubei, Province of China, more than 20 million cases of COVID-19 have been reported(1). The emerging COVID-19 pandemic is caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV-2). This has led to turmoil in healthcare conduct. There is evolving understanding and hence, upcoming protocols with progressing pandemic.
- Pregnant females are at a heightened risk of contracting viral lower respiratory tract infections due to altered physiology with elevated diaphragm, increased oxygen consumption and mucosal edema of respiratory tract making them relatively intolerant to hypoxic environment. There are also alterations in immune response with pregnancy which may contribute further to this increased vulnerability (2,3). It has been reported that viral pneumonia in pregnant women is associated with an increased risk of preterm birth, foetal growth restriction (FGR), and perinatal mortality (4).
- In 1918 influenza pandemic caused a mortality rate of 2.6 % in overall population but 37% among pregnant women (5). In 2003 it was reported that approximately half of pregnant females diagnosed with SARS-COV required critical care support with one third requiring ventilatory support and maternal demise in one fourth of the cases (6). In 2009 pregnant women were reported to be at increased risk for complications of H1N1 2009 Influenza virus infection and a higher estimated rate of hospital admission than of general population (2). However, in previous small number studies, similar results have not been demonstrated in pregnant females with COVID-19(7-9).
- This study aims to report the impact on women affected by coronavirus during pregnancy. This study was done to address the issues of routine obstetric practice, susceptibility of pregnant females to COVID-19, risk of pregnancy related complications in association with COVID-19, modifications required in antenatal care, care during labor, mode of delivery, post-partum sequelae and neonatal outcomes.

II. Material and Methods

We retrospectively reviewed the clinical records of 185 pregnant women with laboratory confirmed COVID-19 admitted in our center. The epidemiology, outcomes and challenges faced were analyzed. The impact of COVID 19 in ante and peri-partum period, neonatal and maternal sequelae of this disease were addressed in this study.

III. Results

a) Clinical characteristics

- 185 consecutive laboratory confirmed COVID-19 affected pregnant females were included in this study with a mean age of 27.3 $\pm$ 5.33years. Majority were in gestational ages of 37-40 weeks (56.76%, 105/185).
- There was history of residence in containment zone in 110 cases (59.46%), 12.97% cases had contact

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with laboratory confirmed case while 51 patients had no significant supportive history, however were found infected on routine screening. The manifestations on presentation are enumerated in Table. In 35.68% (66/185) cases there were no signs or symptoms of disease activity. Associated comorbidities were seen in 29.19% (54/185) which included hypertensive disorders in 10.81% (20/185) cases, gestational diabetes mellitus in 7.57% (14/185), severe anemia in 4.86% (9/185), hypothyroidism in 2.70% (5/185), bronchial asthma in 2.16% (4/185) and pulmonary TB in 1.08% (2/185).

- ICU admission was required in 3 patients, 2 of them required mechanical ventilatory support and 1 maintained oxygenation on non-invasive ventilation. There was no maternal death in this study.

Table 1: Baseline charastitics and clinical outcome covid-19 disease in pregnancy

Age (years) (Mean ± SD)	*27.3 ± 5.33*
• <20	• 5
• 20-25	• 75
• 25-30	• 57
• 30-35	• 37
• >35	• 11
Gestational age at admission (weeks)	•
• <14	• 9
• 14-27	• 5
• 28-36	• 43
• 37-40	• 105
• >40	• 23
Parity -	•
• Primi-gravida	• 75
• Multi-gravida	• 110
Symptoms -	
• Fatigue	• 30
• Fever	• 25
• Cough	• 20
• Myalgia	• 20
• Diarrhea	• 9
• Sore throat	• 5
• Dyspnea	• 3
• Asymptomatic	• 66
Comorbidities -	•
• Hypertensive disorders	• 20
• Gestational diabetes mellitus	• 14
• Severe anemia	• 9
• Hypothyroidism	• 5
• Bronchial asthma	• 4
• Pulmonary Tuberculosis	• 2

Treatment Received -	*Number of Patients*
• Antibiotic therapy	• 160
• Antiviral therapy	• 3
• Use of corticosteroid	• 3
ICU admission -	• 3
• Non-invasive ventilation	• 1
• Invasive mechanical ventilation	• 2
Hospital Stay (days)	16.74 ± 5.55

b) Laboratory and radiological findings on admission

Lymphocytopenia was present in 34.81% (55/185) cases while leucopenia was observed in 21.62% (40/185) cases. Elevated levels of C-reactive protein were seen in 45.95% (85/185) of patients. Chest X-ray revealed abnormal findings in 32.43% (60/185) cases.

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c) *Pregnancy outcomes*

- 9 cases presented before 14 weeks of gestation of which 2cases were complicated with complete spontaneous abortion, 2 cases with ruptured ectopic and 1 case with missed abortion.
- The remaining 4 patients were discharged and kept on follow up. They have crossed 20 weeks of gestation with normal fetal growth and no anomaly observed in morphology scan. 5 patients with gestational age at presentation between 14 – 27 weeks were discharged after an uneventful hospital stay and are maintaining fine at follow up.
- 43 cases presented between 28-37 weeks of gestation of which 30 cases had pre-term delivery and remaining 13 cases were delivered at term. Of the 30 cases who underwent pre-term delivery, 20 cases had PPROM.
- 124 cases were subjected to vaginal delivery while 47 cases required cesarean section with majority (59.57%, 28/47) due to previous LSCS. The other indications for cesarean section are mentioned in Table.

Table 2: Maternal outcome in covid 19

Mode of delivery- • Cesarean delivery • Vaginal delivery • Not delivered	 • 47 • 124 • 14
Indication of cesarean delivery - • COVID-19 pneumonia • Previous cesarean delivery • Mal-presentation • Cephalo-pelvic disproportion • Placenta Previa • Failure to progress • Pre-eclampsia • Others • Fetal distress	 • None • 28 • 5 • 4 • 3 • 2 • 2 • 2 • 1
Gestational age at delivery • >37 weeks • < 37 weeks ✓ Associated with PPROM	*Number* • 141 • 30 ✓ 20

d) *Clinical Outcome In Neonates*

Among 171 neonates, 22 were transferred to NICU for further management for reasons summarized in Table. There were 4 cases of neonatal death. There were no cases of fetal death.

Table 3: Neonatal outcome in covid-19 disease

Neonatal birth weight (kgs) <1.5 1.5-2.5 2.5-3.5 >3.5	 10 26 130 5
Transferred to NICU • Low birth weight • Meconium aspiration syndrome • Congenital anomalies • Birth Asphyxia	22 • 10 • 4 • 2 • 6
Neonatal death	4
Still birth	4

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IV. Discussion

- This study reports observations of 185 pregnant females who were laboratory confirmed COVID-19 cases. The predominant symptom was observed to be fatigue in 16.22 % (30/185) which was different from the past studies that reported fever as the commonest manifestation (9-11).
- The fatigue may also be present as manifestation of routine pregnancy and therefore could have been confounding with results. They were asymptomatic in 35.68 % cases and were detected in routine testing done prior to hospital admission. In majority of these there was history of residence in containment zones or hotspots or contact with COVID-19 cases. This entails the high index of suspicion that needs to be kept with emphasis on history and routine screening of all before hospital admission to effectively curtail the spread to other patients and healthcare personnel.
- 3 patients (1.62%) required ICU care with 2 of them requiring ventilatory support and one on non-invasive ventilation, however, they recovered and were transferred back to the ward. One of them had pre-term delivery and rest 2 delivered at term with no adverse foetal outcome. This suggests that effective oxygenation and critical care did not worsen the neonatal outcomes, although, the less number of these patients limit us in conclusively authenticating this observation. The ICU admission rates are similar to the study by Huntley et al which quoted 3 % cases requiring ICU care(12).
- The laboratory parameters showed lymphocytopenia in 34.81 % and leukopenia in 21.62% which suggests that lymphocytes were reduced even in patients with normal leucocyte count which has also been demonstrated in other studies with striking differences. A study of 393 hospitalized patients in New York revealed lymphocytopenia in 90 % whilst leukopenia in approximately 15 % only(13). CRP elevations have been associated with inflammation and COVID-19 disease process in cytokine storm states. These were elevated in 45.95% patients in this study corroborating the other studies in this regard. In other studies, CRP elevations have been found as high as 67 % with COVID-19.(8,9,10)
- The Chest X-ray showed abnormal findings predominantly consisting of ground glass opacities or patchy infiltrates in lung fields in 32.43% cases (60/185). CT scan was not done in this study in majority of patients.
- The rates of spontaneous abortion was observed to be 23.08 % cases (3/13, 13 cases presented at or before 20 weeks of gestational age). This rate has been found to be 12.5 % in the study by Yan et al comprising of 116 patients(14).
- The rate of pre-term delivery was noted to be 17.54% (30/171). Of these 30 patients, 20 (66.67%) had PPROM. The overall incidence of PPROM was 11.70% (20/171) which was higher than the study by Yan et al who observed 6.1 % incidence of PPROM(14).
- Wong et al in their study of 12 pregnant females infected with SARS-CoV reported 3 cases of maternal demise, more than 50 % of those who presented before 12 weeks were complicated with spontaneous abortion, 80 % females presenting after 24 weeks had pre-term delivery and ongoing pregnancies were complicated with Intra-uterine growth restriction (15). This study, however, concludes reassuring data with COVID-19.
- The mode of delivery was vaginal in 72.51% and caesarean section in 27.49% with major indication being previous LSCS. No pregnant female underwent LSCS due to COVID-19 pneumonia. Therefore, unless the clinical severity and respiratory status warrant urgent intervention, mode of delivery should be decided without considering COVID-19 status. Liu et al found that delivery did not exacerbate the symptoms of COVID-19. This fact could be corroborated in this study.
- Neonatal COVID-19 testing was not done as routine protocol, hence, risk of vertical transmission cannot be calculated from this study. The risk of vertical transmission has been found to be very low in past studies.(11,14)
- There was no maternal death observed in this study. The findings of Ellington et al also documented that COVID-19 confers no increased mortality compared with non-pregnant reproductive age females. The utmost level of care for a pregnant female with COVID-19 revolves around the multidisciplinary co-operation amongst obstetricians, intensive care specialists, paediatricians trained in neonatal care, epidemiologists and infectious disease surveillance experts.

V. Limitations

This study entails a single centre experience with limited patient subset. The non-carrying out of routine neonatal testing due to logistic and economic issues prevents in ascertaining vertical transmission risk. CT scan which has become an indispensable modality was not used in this study due to institutional logistic issues. This study also has the limitation in concluding vaginal mode of delivery and breastfeeding confer an additional risk of vertical transmission of COVID-19.

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VI. Conclusion

This study concludes that presently there is no evidence that pregnant women with COVID-19 are more prone to experience severe pneumonia than non-pregnant patients. The study suggests that one mode of delivery is not superior over the other as far as risk associated with COVID-19 disease. The risks of pregnancy related complications are not significantly increased due to COVID-19.The ongoing research and data collection may answer the questions in relation to the risk of congenital infection, intrapartum management, and vertical transmission.

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