

## Maternal and foetal outcomes in pregnant women undergoing lower segment caesarean section during COVID-19 pandemic: a retrospective analysis

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### ABSTRACT:

**Background and Aims:** Coronavirus disease 2019 (COVID-19) adds more challenges to the perioperative management of pregnant women. The aim of this study is to examine severity of COVID-19 disease and maternal and foetal outcome among COVID-19 positive pregnant women undergoing caesarean section. **Methods:** This retrospective observational study was conducted at a tertiary teaching hospital in Karnataka between 1st April to 31st July 2021, during which 100 COVID-19 positive pregnant women with ASA physical class II, III and IV who have undergone lower segment emergency caesarean section were selected on the basis of simple random sampling method. **Results:** A total of 100 women who had undergone caesarean section under spinal anaesthesia with positive SARS-CoV-2 PCR tests were assessed. Mean age was  $24.45 \pm 4.3$  years, eight women were having severe covid-19 infection and overall mortality rate was 5% (5/100) in women and 1 woman had HELPP syndrome and one met with PPH (post-partum haemorrhage). Seven (7%) COVID-19 pregnant women required intensive care in the perioperative period. Eight neonates required NICU admission and had APGAR score less than 7. Fifty-five (55%) women were asymptomatic. While the rate of pneumonia in symptomatic women was 3.6% (8/45), the pneumonia incidence among all SARS-CoV-2 PCR (+) pregnant women was 8% (8/100). **Conclusion:** In our study, 61% of patients had pulmonary involvement and the mortality rate was 8% among mothers and 1% in neonates.

**Keywords:** COVID-19; Caesarean section; Pregnancy; Spinal anaesthesia, APGAR,

### INTRODUCTION:

COVID-19 infection has affected almost all the age groups in India and pregnant women who are already having hypercoagulable state are one among them who had significant effects by COVID-19 infection.

Corona viruses are family of viruses that can cause infections ranging from mild asymptomatic to serious infection. At the end of 2019 a new entity severe acute respiratory syndrome coronavirus (SARS-COV 2) has emerged which is believed to be originated in Wuhan, China before it spreads to other part of country and rest of the world<sup>1,2</sup>

Pregnant women due to physiological changes in the immune and cardiorespiratory systems are more prone for severe illness when infected with respiratory viruses.<sup>3</sup>

Currently there is dearth in the literature of any systematic studies with regard to Covid19 pregnant patients and the outcomes and hence a study to observe the maternal and foetal outcome of COVID-19 pregnant women with varying severity of covid-19 infection and anaesthetic management outcomes is planned.

#### **MATERIALS AND METHODS :**

After obtaining approval from the Institutional Ethical committee, this retrospective observational study was carried out with the principles of Helsinki declaration at our tertiary care hospital which is designated COVID-19 Centre. This retrospective observational study was conducted at a tertiary teaching hospital of Ballari district in Karnataka between 1<sup>st</sup> April to 31st July 2021, during which 100 COVID-19 positive pregnant women with ASA physical class II, III and IV who have undergone lower segment emergency caesarean section were selected on the basis of simple random sampling method.

The analysis was carried out with the aims to study the clinical presentation, need for vasopressors, need of intensive care and to study the postoperative course, morbidity, mortality among mother as well as neonates.

The data was collected retrospectively using medical record (both paper and electronic), admission notes, operative notes, anesthesia notes, discharge summary, OT records, ICU, ward records, maternal mortality data with following inclusion and exclusion criteria.

#### **INCLUSION CRITERIA:**

1. Patients belonging to ASA physical class II III and IV with singleton pregnancy with term gestation who have undergone caesarean section
2. Parturients aged 20-30yrs
3. Parturients of height 145-170cm
4. Parturients of weight 45kg-70kg.

#### **EXCLUSION CRITERIA:**

1. Patients with multiple pregnancy, placenta previa.
2. Short statured parturients according to WHO guidelines

We collected data about sex, age, operation type, clinical characteristics (including symptoms/signs, blood test results, chest x ray, and throat swab nucleic acid), and type of surgery from electronic medical records. Heart rate, oxygen saturation, and non-invasive blood pressure at the start of anaesthesia and at the end of anaesthesia for all patients were compared.

The caesarean section was performed in operation theatre designated for COVID-19 patients. The complete team was protected with Level-3 personal protective equipment (PPE) (liquid-proof apron, N-95 mask, goggles, double gloves, and shoe covers). An observer used to be present in OT to guide proper donning and doffing of personal protective equipment (PPE). The sequential steps for donning and doffing PPE are presented by the Centres for Disease and Prevention

(CDC; <https://www.cdc.gov/niosh/npptl/pdfs/PPE-Sequence-508.pdf>).

Anaesthesia was administered by two healthcare professionals from the Anaesthesia team, including senior Anesthesiologist and an Anaesthesia Resident.

A third Anaesthesiologist was kept ready outside the operating room in any emergency. After the end of the surgery, the patients were transferred to the COVID-19 wards or COVID-19 ICUs.

Statistical analyses were performed with SPSS 21 Windows (Statistical Package for Social Sciences) package software. Continuous data were expressed in mean, standard deviation, while categorical data were expressed in numbers (percent). Spearman's correlation test and paired t test was used for correlation analysis. The value of  $p < 0.05$  was considered statistically significant.

### RESULTS:

A total of 100 women's record were analysed, who had undergone caesarean section under spinal anaesthesia with positive SARS-CoV-2 PCR tests. Patients' demographics are shown in Table 1, and laboratory findings are presented in - Table 2. Almost 55% patients had no symptoms.

Age	24.45±4.23	
COVID-19 severity	Number	Percentage
MILD	28	28
MODERATE	64	64
SEVERE	8	8
Symptoms		
COUGH	11	11
COUGH BREATHLESSNESS	3	3
FEVER	13	13
FEVER COUGH	18	18
NIL	55	55
Chest X ray		
CLASSIC COVID	45	45
GGO BL LOWER ZONE	2	2
GROUND GLASS APPEARANCE RIGHT LOWER ZONE	14	14
NORMAL STUDY	39	39

Investigations	Mean	Std. Deviation
Haemoglobin, g/dL	10.26	1.70
White blood cell, mcL	9622.06	3780.54
NEUTROPHIL	75.44	6.98
LYMPHOCYTE	17.46	5.66
RBC	2.95	1.00
PLATELETS	1.73	0.65
RBS	98.82	22.96
BLOOD UREA mg/dL	17.26	6.86
SERUMC CREATININE	0.79	0.16

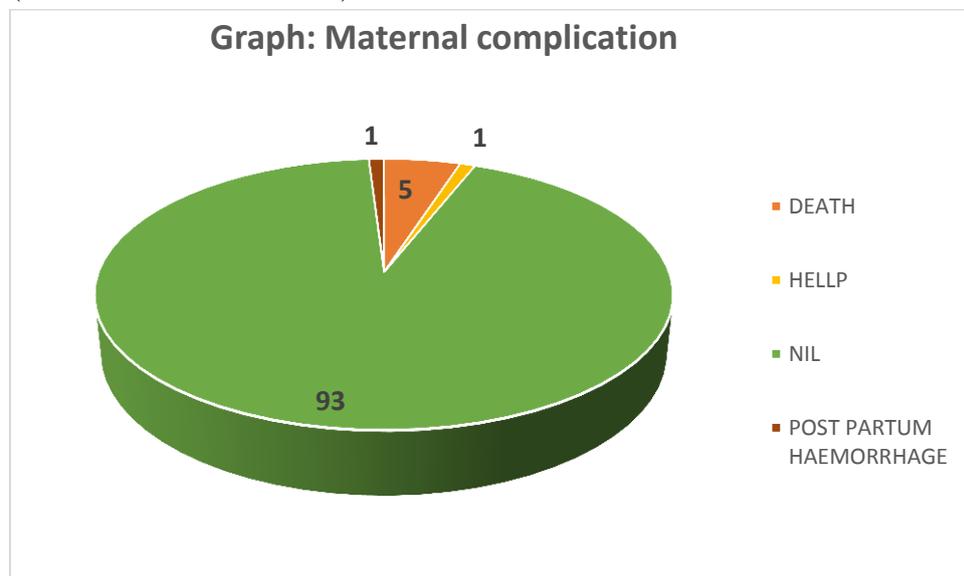
mg/dL		
D-Dimer, ng/mL	0.69	0.86
INR	0.93	0.217
APTT	46.28	15.50
PT	12.59	2.34
C-reactive protein, mg/dL	7.029	6.39
LDH	357.73	292.83
	107.74	
SERUM FERRITIN ng/mL	3	164.64

The spinal anaesthesia was considered to be safe as it minimizes the need for general anaesthesia in case of emergency caesarean section. Spinal anaesthesia was administered with a thin Quincke's spinal needle of 26 G in the left lateral position with hyperbaric bupivacaine 2 ml (10 mg) in L3-L4 subarachnoid space. Spinal anaesthesia was administered to all the pregnant women. No case spinal anaesthesia was failed. All patients received Inj. oxytocin 10 IU after the delivery of baby. 14 (14%) women were administered with Carboprost. It has to be avoided in symptomatic patients as prostaglandin F<sub>2</sub>alpha causes bronchoconstriction and pulmonary vasoconstriction. The need of vasopressor was for 5 women and 6 women had been administered with methargin to prevent PPH.

We analysed the need for ventilatory/ICCU support needed by the patients. Seven of the pregnant women and eight neonates required ICU admission. The maternal and foetal complication is depicted in table 3.

	N (%)
Cried at birth	
Yes	92 (92)
No	8 (8)
APGAR score	
≤7	27 (27%)
8–10	73 (73%)
Need for neonatal intensive care,	
Yes	92 (92)
No	8 (8)
Need of respiratory support	
NIV	5 (5)
NRBM	66(66)
ROOM AIR	29(29)
Maternal complication	
DEATH	5(5)
HELLP	1(1)
NIL	93(93)
POST PARTUM HAEMORRHAGE	1(1)

We had 5% (5 of 100) maternal mortality amongst COVID-19 positive patients, and one each had PPH and HELLP syndrome. Respiratory support was needed for three fourth of the neonates. Sixty-six neonates required NRBM (non rebreather mask), 5 neonates needed NIV (non- invasive ventilation).



## DISCUSSION

Definite surge of COVID-19 in pregnant women was present all over the world, neuraxial (spinal) anaesthesia is vastly used method of administering anaesthesia and analgesia for pregnant women due to the high risk of maternal morbidity and mortality of general anaesthesia.<sup>4,5,6</sup> COVID-19 adds risk of developing rapidly deteriorating respiratory complications, especially for symptomatic patients,<sup>7</sup> in addition to the risk of transmission of COVID-19 to the anaesthesia provider, since airway manipulation is considered a high risk aerosol generating procedures that may lead to high viral load transmission.<sup>8</sup> It is recommended to perform neuraxial anaesthesia for COVID-19 positive patients when there is no contraindication.<sup>9</sup> Previous reports showed safety of neuraxial anaesthesia for patients, and minimal viral transmission to anaesthesia personnel who wore PPEs.<sup>10,11</sup>

In our study all the pregnant women were administered with spinal anaesthesia to avoid the complications from general anaesthesia.

We found that more than half of the COVID-19 positive patients (55%) were asymptomatic, while the 45 patients presented with symptoms like fever (13%), fever and cough (18%), cough (11%) and cough and breathlessness (3%). One study done by Wani RJ<sup>12</sup> et al reported lesser incidence of the symptoms. Khoury et al reported that 61% of women presenting to the labour and delivery unit were initially asymptomatic while only 26% had mild symptoms.<sup>13</sup>

The review of literature showed that the majority of obstetric patients were asymptomatic at the time of admission or had COVID-19 like symptoms (fatigue, muscle pain, shortness of breath, and congestion) which are commonly seen in pregnancy.<sup>4,5,6</sup> In our study, the proportion of maternal critical illness were much lower than the average proportion of SARS-CoV-19 infection in Wuhan.<sup>2</sup> The reason may be that patients had a minimal range of activity and hence the chance of exposure to SARS-CoV-2 was less during late pregnancy.

In the present study chest X-ray (CXR) findings showed that thirty-nine (39%) patients had normal and Forty-five (45%) had classical COVID-19 CXR. 16 (16%) patients were in

indeterminate group with unilateral lung disease. Our results are consistent with the findings of Wong HYF et al<sup>14</sup> study consolidation was found in 47% of cases. Another study done by Misbah Durrani<sup>15</sup> et al reported that very few patients (7%) had normal findings of chest X-ray, whereas 93% had abnormal findings.

Soon after delivery, 92 babies cried whereas 8 babies did not cry and those babies had APGAR score less than 7. Among these 8 neonates one was an IUD case, one had birth asphyxia and 6 developed respiratory distress. Only 29 neonates were kept on room air and 66 neonates were supported with NRBM, whereas 5 required NIV support. Compared to other studies<sup>16</sup> the neonatal admissions to NICU in the COVID-19 positive group (8 NICU admissions) was less in the present study. Prematurity and close monitoring of neonates was the main indication for admission. The reason behind the prematurity is unknown, sometimes maternal factors related to their COVID-19 infection have a role in increasing premature deliveries or increasing NICU admissions. Thus, more studies have to be focussed and researches should be undertaken to explore placental, foetal, and maternal changes in COVID-19 positive pregnant women.

#### **CONCLUSION:**

In our study, 61% of patients had pulmonary involvement and the mortality was 08 but it doesn't reflect the true burden of mortality and morbidity in COVID-19 positive antenatal patients as those who had underwent for LSCS in our hospital were included in the study whereas actual data may be higher. And one more limitation is it was a retrospective study.

We recommend further studies on this research topic for the better understanding of the variations in obstetric and intrapartum care provided to COVID-19 positive women in other centres, and there should be a complete global understanding of how COVID-19 affects expectant mothers and neonates.

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**Conflict of interest:** None declared

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