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Case Series

Subarachnoid block in parturients with mild COVID-19 disease for Caesarean delivery- A case series

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ABSTRACT

Background: The obstetric population has been most vulnerable in this COVID-19 pandemic. We could not retrieve any study evaluating the safety and efficacy of anaesthetic techniques in parturients with COVID-19 undergoing caesarean delivery (CD) from South Asian Sub-continent. We, herein present the detailed clinical analysis and anaesthetic management of a case series of seven parturient with COVID-19 undergoing CD under subarachnoid block (SAB) in a tertiary care designated COVID hospital in the city of Delhi between June and December 2020.

Case Presentation: Herein, we report 7 parturients with mild COVID-19 disease undergoing CD under SAB. Our observations are that the use of SAB was associated with transient haemodynamic perturbations in terms of hypotension in 3 patients and bradycardia in one patient. The neonatal outcome was observed to be favourable.

Conclusions: To conclude, our experience is that SAB is safe and effective for parturient with mildly symptomatic COVID-19 disease; however, was found to be associated with transient haemodynamic changes exclusively in parturients with anaemia.

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1. Introduction

The obstetric population has been most vulnerable in this COVID-19 pandemic. There have been limited articles evaluating the anaesthetic management in parturients with COVID-19. We could not retrieve any study evaluating the safety and efficacy of anaesthetic techniques in parturients with COVID-19 undergoing caesarean delivery (CD) from South Asian Sub-continent. We, herein present the detailed clinical analysis and anaesthetic management of a case series of seven parturient with COVID-19 undergoing CD in a tertiary care designated COVID hospital. All consecutive

seven parturients with confirmed diagnosis of COVID-19 by RTPCR between June and December 2020 who were scheduled for CD were included.

2. Case Presentation

A written informed consent was sought from each patient for participation in this case series. A detailed characteristic and laboratory investigations of all the parturient with COVID-19 scheduled for CD is shown in Table 1. Three patients had anaemia, two had hypothyroidism, one had twin pregnancy and the baby of one parturient was a case of intrauterine death. Out of seven, only one patient had fever, cough and breathlessness on exertion who was

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accepted under ASA physical status-III. This patient was maintaining a normal oxygen saturation on face mask. All seven were tested COVID-19 positive using RT-PCR on nasopharyngeal swabs. All patients were receiving pre-surgical antibiotics, hydroxychloroquine, oseltamivir, ivermectin 12 mg twice a day, vitamin C, zinc and prophylactic enoxaparin i.e. 1 U/kg in two divided doses. However, the patient with intrauterine dead baby was on broad spectrum antibiotics i.e. meropenem and vancomycin along with the therapeutic dose of enoxaparin i.e. 2 U/kg in two divided doses. Subarachnoid block was kept as the first choice of anaesthetic technique and general anaesthesia (GA) was kept as the second alternative in case of maternal or foetal emergencies or those with contraindications to regional anaesthesia or if subarachnoid block fails. All seven parturient had mild to moderate COVID-19 disease and received SAB for CD.

After shifting to operating room, routine American Society of Anaesthesiologists (ASA) recommended minimal mandatory monitors i.e. intermittent non-invasive blood pressure and continuous electrocardiogram, pulse oximetry, end-tidal CO₂ were instituted. All health care staff used personal protective equipment (PPE) during the operation which included N95 mask, goggles, protective suits, disposable medical caps and medical rubber gloves. A large bore intravenous (IV) access was secured. The baseline haemodynamic parameter was recorded. Co-loading was done with lactated Ringer's solution. Subarachnoid block was administered in sitting position in L₃-L₄ or L₄-L₅ interspace. After skin infiltration with 2% lignocaine, 2.0- 2.2 ml of 0.5% hyperbaric bupivacaine was used for intrathecal administration. The level of sensory and motor blockade was maintained to T₄-T₅ level. The intraoperative haemodynamic parameters were recorded. Out of seven, three patients had hypotension and one had bradycardia (Table 2). Hypotension was defined as a systolic blood pressure of 90 or 100 mmHg or a 20% fall in blood pressure from the baseline, and bradycardia as less than 20% from the baseline or < 60/min. Hypotension was transient and managed with IV fluid and 1-2 bolus doses of mephentermine and bradycardia with the single dose of 0.6 mg of IV atropine. After delivery, the newborn's nose and face was quickly wiped with a sterile towel and transferred to a radiant warmer in the other operating room. The APGAR score was assessed at one and five minutes. All neonates were shifted to neonatal intensive care unit (ICU) by the nurse. A severe acute respiratory disease syndrome Coronavirus-2 (SARS-CoV-2) real time polymerase chain reaction (RT PCR) test with nasal swab was performed for neonates twice i.e. on the day of delivery and before discharge. No vertical transmission amongst neonates and no mortality or morbidity was recorded (Table 2). After the surgery, the window air conditioner was shut down till the arrival of next case and all the surfaces

including the anaesthesia workstation were wiped with 1% sodium hypochlorite solution and the OT is fumigated with monopersulphate compound.

Table 1: Patients' characteristics

Parameters	Values
Age (in yr) (Mean)	31 (± 4.29)
Height (in cm) (Mean)	159.71 (± 3.45)
Weight (in kg) (Mean)	62.57 (±6.26)
Gestational age	
a) <37 week (n, %)	2 (28.57%)
b) ≥ 37 week (n, %)	5 (71.42%)
Coexisting disorder (n, %)	
Anemia	5 (71.4%)
Hypertension	0
Diabetes	0
Hypothyroid	2 (28.57%)
Sign and symptom (n, %)	
Fever	3 (42.85%)
Cough	5 (71.42%)
Respiratory distress	0
Dyspnea	1 (14.28%)
Diarrhoea	1 (14.28%)
Alternation in taste and smell	0
Laboratory characteristics (Mean±SD)	
Haemoglobin (gm%)	9.71 (±1.30)
TLC (/μL)	9957.14 (±4272.72)
Platelet count (/μL)	1.64 (±0.47)
ALT (IU/L)	66 (±78.60)
AST (IU/L)	97.57 (±167.82)
Alkaline phosphatase (IU/L)	248.14 (±77.47)
Blood urea (mg/dl)	26 (±6.05)
Serum creatinine (mg/dl)	0.82 (±0.11)
CRP (mg/L)	10.2 mg/L (±2.02)
Chest Xray evidence (n, %)	3 (42.85%)

ALT: Alanine transaminase; AST: Aspartate aminotransferase; TLC: Total leucocytes count; SD: Standard deviation

The transmission of COVID-19 amongst health care workers could not be explored as these 7 cases were conducted over a period of six months and the duties of doctors and other health care workers were rotated on weekly basis.

3. Discussion

Herein, we report seven parturients with mild COVID-19 disease undergoing CD under SAB. Our observations are that the use of SAB was associated with transient haemodynamic perturbations in terms of hypotension in 3 patients and bradycardia in one patient. The neonatal outcome was observed to be favourable.

Neuraxial blockade, SAB in particular has been the anaesthetic technique of choice for CD due to its rapid onset and dense blockade. In parturients with COVID-19,

Table 2: Anaesthesia management and neonatal outcome

Parameters	Values
Indication of LSCS	
a) Fetal distress	1 (14.28%)
b) Breech	1 (14.28%)
c) Twin pregnancy	1 (14.28%)
d) Previous LSCS	1 (14.28%)
e) MSL with IUD	2 (28.57%)
f) Placenta previa	1 (14.28%)
Anaesthetic technique	
a) SAB	7 (100%)
b) GA/CSE	0
ASA physical status	
a) III	1
b) II	6
c) I, IV	0
Duration of surgery (Mean±SD) (in min)	105 (±25.98)
Blood loss (in ml) (Mean ± SD)	992.85 (±130.47)
Side effects	
a) Hypotension (n)(%)	3 (42.85%)
b) Bradycardia (n)(%)	1 (14.28%)
Length of stay in hospital (days) (Mean±SD)	8.14±3.04
Clinical outcome	
a) Recovered (n, %)	7 (100%)
b) Deteriorated (n, %)	0
Neonatal Outcome	
APGAR score	
At 1 min [Median (IQR)]	6 (1.25)
At 5 min [Median (IQR)]	7.5 (1)
Birth weight (in kg) (Mean ±SD)	2.36 (±0.97)
Low birth weight [n (%)]	1 (14.28%)
Clinical outcome	
Discharged (n) (%)	7(100%)
In hospital (n) (%)	0

IQR- Interquartile range

it also avoids exacerbating pulmonary complications due to airway manipulation as the pulmonary system is involved primarily. Additionally, coughing and bucking associated with GA may cause aerosol generation and dispersion of virus particles, thus increasing the risk of transmission to the health care workers.

All patients underwent routine blood investigations; however, one patient with dyspnea underwent CRP, procalcitonin, d-dimer level, lymphocyte count, in addition which came out to be normal. All patients were receiving prophylactic dose of anticoagulation; however, the patient with IUD baby received the therapeutic dose.

In a case series of 17 parturient evaluating the safety and efficacy of different anaesthetic regime for patients with COVID-19 undergoing CD administered continuous epidural anaesthesia in 14; wherein, 12 experienced hypotension and three patient received GA with tracheal intubation.¹ They concluded that both epidural and general

anaesthesia were safe; however, former is associated with significant hypotension. Since this published study from China was conducted during the initial phase of the pandemic, none of the patients received SAB due to the fear of viral transmission via CSF. The potential reason for increased incidence of hypotension was attributed to the reason that SARS-CoV-2 binds to the angiotensin converting enzyme-II (ACE2) receptor. The ACE2 receptor is a cardio-cerebrovascular protective factor playing an important role in regulating blood pressure, in addition to have an anti-atherosclerosis mechanism.^{2,3} The risk of hypotension is as such higher due to the higher level of block (T₄) required for the CD, unique physiological and anatomical changes of pregnancy and increased susceptibility to the effects of sympathectomy due to reduced sensitivity to the endogenous vasoconstrictors.

In the present case series of seven patients, transient hypotension was observed in 3 patients which was easily managed with 1-2 bolus doses of IV mephentermine and IV fluids and bradycardia in one patient was managed with a single dose of atropine single dose. The hypotension was observed despite adequate co-loading in these patients. It was observed that these 4 patients who developed haemodynamic changes were also anaemic. Our finding is in contrast to the largest retrospective observational cohort; wherein, SAB was concluded to be safe for CD in a parturients with COVID-19.⁴ In addition, few case reports,^{5,6} have also affirmed the safety of SAB for parturients with COVID-19 undergoing CD. The increased incidence of hypotension in our case series could be attributed to the coexisting anaemia which is a very common cause of maternal morbidity and mortality in a developing country like ours.

Limitations were that the neonatal arterial blood gas analysis was not done and the transmission amongst the health care workers could not be explored.

4. Conclusions

To conclude, SAB is safe and effective for parturient with mildly symptomatic COVID-19 disease; however, was found to be associated with transient haemodynamic changes exclusively in parturients with anaemia. Further larger cases series may be warranted to validate this finding. Extrapolating the findings of the present series on parturients with mild COVID-19 disease, we hypothesize that the incidence and severity of intraoperative haemodynamic changes could be significant in parturients with moderate to severe COVID-19 disease.

5. List of Abbreviations

COVID- Corona-Induced Viral Disease; SAB- Subarachnoid Block; GA- General Anaesthesia; CD- Caesarean Delivery; SARS-CoV-2- Severe Acute

Respiratory Syndrome; ACE-2-M Angiotensin Converting Enzyme-II

6. Author's Contribution

1. Geetanjali Tolia Chilkoti (GTC)- conception, drafting of manuscript
2. Prakriti Maurya (PM)- Data collection and drafting of manuscript
3. Rachna Wadhwa- Drafting and editing of manuscript
4. Medha Mohta (MM)- Drafting of manuscript
5. Anju Gupta (AG)- Conception and drafting of manuscript

7. Source of Funding

None.

8. Conflict of Interest

None.

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