

Symptomatic COVID-19 Positive Parturients Posted for Lower Segment Caesarean Section

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ABSTRACT

Since the outbreak of the Coronavirus Disease-2019 (COVID-19) pandemic many elective cases were postponed worldwide. But emergency Lower Segment Caesarean Sections (LSCS) is one surgery which can't be postponed at any cause, since two lives are at risk. The present case series reports 16 symptomatic COVID-19 patients in whom emergency LSCS was performed. The aim of presenting the series was to analyse how far the clinical and laboratory findings were deranged in such patients and to find out whether the current anaesthetic techniques were safe in these patients. Out of a total of 157 COVID-19 positive patients who had undergone LSCS in the study, 16 presented with symptoms such as fever, cough, dyspnoea, rhinitis, headache and palpitation. Six (37.5%) were preterm. Seven patients had elevated C-Reactive Protein (CRP) (>5 mg/L). Liver function tests abnormalities were seen in 5 (31.25%). Most of the patients had elevated D-dimer of which (>1500 ng/mL) were seen in seven. The most common indication was foetal distress. COVID pneumonia was an indication for LSCS in 3 (18.75%). All the surgeries were performed under subarachnoid block. Of the four patients who had fall in oxygen saturation two were admitted in Intensive Care Unit (ICU) and one required Non Invasive Ventilation (NIV). There were no mortalities. Thus, LSCS can be done safely under subarachnoid block even in symptomatic COVID-19 parturients. Elevation of D-dimer is common in pregnancy and it does not always indicate severe COVID-19 disease.

Keywords: Anaesthesiology, Coronavirus disease-2019, Pregnancy, Spinal anaesthesia

INTRODUCTION

The COVID-19 infection presents with a wide array of severity ranging from asymptomatic to severe pneumonia requiring ventilatory support. Pregnant women may be especially susceptible to respiratory pathogens because of the physiological changes in both their immune and cardiorespiratory systems making them intolerant to hypoxia. Symptoms of COVID-19 in pregnant patients are similar to non pregnant individuals [1]. Neutrophilia, lymphopenia, elevated levels of D-dimer, CRP, serum transaminases, and other inflammatory markers like ferritin, procalcitonin are found in COVID parturients [1,2]. Spinal anaesthesia is safe in COVID-19 positive patients undergoing elective LSCS [3]. Neuroaxial anaesthesia may be associated with exaggerated hypotension in COVID-19 parturients [4]. General anaesthesia is less preferred in LSCS to avoid the aerosolisation of viral particles during endotracheal intubation and extubation [5]. There is limited data on emergency LSCS in symptomatic COVID-19 patients.

CASE SERIES

The series presents the symptomatic COVID-19 positive parturients admitted for emergency caesarean section, between March 2020 and February 2022. Of the total 157 COVID-19 positive LSCS, 16 patients presented with symptoms of coronavirus infection. The presenting symptoms like fever, headache, rhinitis, cough, breathlessness, and palpitation along with indication for surgery and any co-morbidities were noted. To avoid unnecessary exposure of radiation to mother and foetus, and due to patient overload Computed Tomography (CT) chest was done only in one patient.

Age of the 16 patients ranged from 19-38 years. The common presenting symptoms in these cases were cough, fever and dyspnoea. Six patients had preterm deliveries (37.5%), of which the shortest gestational age was 33 weeks and five days for case number seven. The indications for caesarean section in these patients were foetal distress (six patients), previous LSCS in labour (five patients), COVID-19 pneumonia (three patients), and one each for failed induction and meconium-stained amniotic fluid [Table/Fig-1].

Case number	Age	Gestational age	Parity	Co-morbidity	Indication for LSCS	Fever	Cough	Rhinitis	Breathlessness	Headache	Palpitation
1	21	38w 6d	Primi	Nil	Foetal distress	Yes	-	-	-	-	-
2	23	39w 3d	Primi	Nil	Failed induction	-	Yes	-	-	-	-
3	23	39w 4d	G2P1L1	Anaemia	Previous LSCS in labour	Yes	Yes	-	-	-	-
4	27	35w 3d	G5P1L1A3	Nil	COVID pneumonia	-	Yes	-	Yes	-	-
5	24	38w 1d	G2P1L1	Nil	Previous LSCS, Foetal distress	-	-	-	Yes	-	-
6	38	36w 5d	G3P2L1	GDM, Hypothyroidism	COVID pneumonia	Yes	Yes	Yes	-	-	-
7	30	33w 5d	G2P1L1	Bronchial asthma	Previous LSCS in labour	-	Yes	-	Yes	-	-
8	30	38w 3d	G2P1L1	NIL	COVID pneumonia, deranged Liver Function Test (LFT)	-	Yes	-	-	Yes	Yes
9	30	40w	Primi	Nil	Foetal distress, MSAF	Yes	-	-	-	-	-
10	30	38w 4d	G2P1L1	Nil	Previous LSCS in labour	-	Yes	-	-	-	-
11	25	37w 5d	G2P1L1	NIL	Previous LSCS in labour	Yes	Yes	-	-	-	-

12	19	36w 5d	Primi	Nil	Foetal distress	Yes	-	-	Yes	-	-
13	19	36w 1d	Primi	Nil	MSAF	Yes	Yes	-	-	-	-
14	28	39w 1d	G2P1L1	Nil	Previous LSCS in labour	-	Yes	-	-	-	-
15	26	36w 5d	G2P1L1	Nil	Previous LSCS, Foetal distress	Yes	-	-	-	-	-
16	26	38w 1d	G4P1L1A2	Nil	Previous LSCS, Foetal distress	-	Yes	Yes	Yes	-	-

[Table/Fig-1]: Demographic and clinical features.

LSCS: Lower segment caesarean section; GDM: Gestational diabetes; CPD: Cephalopelvic disproportion; MSAF: Meconium stained amniotic fluid; w: Weeks; d: Days

Laboratory tests showed leukocytosis in five patients of which four had neutrophilia. Platelet count, random blood sugar, blood urea and creatinine were not deranged in these patients [Table/Fig-2]. Liver function tests were deranged in five patients. D-dimer values were elevated between 500 ng/mL to a maximum value of 4690 ng/mL in eleven patients [Table/Fig-3] and CRP above 5 mg/L in seven patients. All surgeries were done under Lumbar Subarachnoid Block (LSAB) with 1.7 mL to 1.8 mL of 0.5% bupivacaine heavy with or without buprenorphine 30 µg. Intraoperative tachycardia was seen in case numbers 1, 12, 13 and 15. Blood pressure did not show fluctuations and mean blood pressure was maintained above 65 mmHg throughout. Oxygen saturation was maintained above 95% in case numbers 4,5,8,12 and 16 with the help of oxygen supplementation through face mask. Postoperative Intensive Care Unit (ICU) admission was needed in case numbers 12 and 16 of which case number 12 required NIV [Table/Fig-4]. The duration of hospital stay ranged from a minimum of four days to a maximum of 15 days. No mortality occurred among these cases.

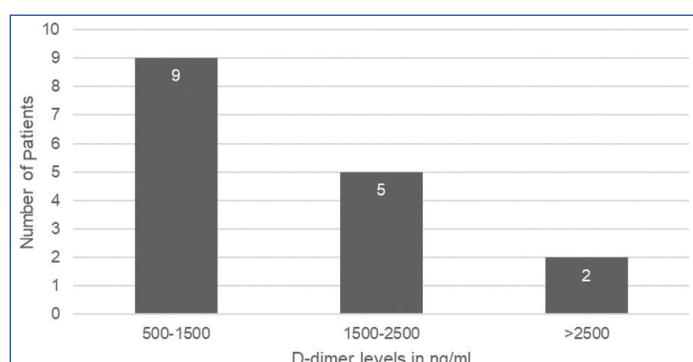
DISCUSSION

Healthcare workers faced a new challenge with the onset of the novel Coronavirus infection. In spite of these challenges, emergency LSCS is one surgery which cannot be postponed at any cost. In the series, 16 symptomatic COVID-19 patients underwent LSCS successfully, without any perioperative mortality. Cough, fever, and dyspnoea were the common symptoms of these patients. Few studies have reported similar observations [6,7]. Foetal distress and previous LSCS patients in labour were the two common indications for emergency LSCS in the study. Aydin Güzey N and Uyar Türkyılmaz E, evaluated 254 caesarean sections in COVID-19 and the two common indications for surgery were foetal distress and previous LSCS patients in labour [8], this correlates with findings in the present study. In three patients the indication for LSCS was COVID-19 pneumonia to reduce further stress on already compromised lung. Preterm delivery and foetal distress were found to be more in third trimester in COVID-19, according to the analysis of Kapote D and Nayak AH [9]. In the present series, there were six preterm deliveries.

Case number	Hb	TLC	P,L,M	Platelet	RBS	Urea	Creatinine	TB/DB	SGOT	SGPT	D-Dimer (ng/L)	CRP (mg/L)
1	11.8	16300	87,10,3	3.4	96	20	0.8	0.5,0.2	24	18	882	4.4
2	13	7800	66,28,6	1.8	95	12	0.7	0.3,0.1	26	14	1145	9.6
3	8	6400	64,30,6	2.8	86	10	0.6	0.6,0.2	20	12	1062	0.6
4	12.8	7200	81,19,0	2.6	143	10	0.7	14.4,0.4	89	56	2330.4	12
5	11.6	7600	80,17,3	2.6	107	15	0.6	0.6,0.2	35	15	803.5	4.8
6	11.2	10000	71,23,6	2.1	115	14	0.7	1.1,0.5	160	140	1850	0.4
7	11	17200	82,14,4	2.4	123	18	0.6	0.8,0.1	22	18	2568	33.06
8	10.3	7600	72,22,6	3.3	116	15	0.7	0.7,0.3	420	150	1735	2.4
9	12.3	20000	63,27,10	3.3	82	10	0.8	1,0.3	28	13	759	0.8
10	16	7700	40,52,8	2.5	80	18	0.6	15.4,0.9	24	20	1022.3	1.2
11	12.7	6700	68,24,8	1.9	103	19	0.9	0.3,0.1	16	12	1440	7.18
12	10.9	12640	78,11,6	2.5	93	10	0.4	0.5,0.1	20	19	4690	6.4
13	10.2	8000	76,17,7	3.1	92	29	0.7	0.3,0.1	66	25	984	2.0
14	9.3	7600	79,17,4	2.6	94	16	0.8	0.6,0.2	18	11	867	1.6
15	10	10200	84,10,6	2.3	90	10	0.6	0.6,0.2	18	12	2465	11.6
16	11.4	6800	66,30,4	2.1	94	21	0.9	0.5,0.1	13	10	1649.1	9.6

[Table/Fig-2]: Laboratory findings.

Hb: Haemoglobin in grams/litre; TLC: Total leukocyte count; P,L,M: Polymorphonuclear cells, lymphocytes, mixed cells; Platelet: Platelet count in Lakhs/mL; RBS: Random blood sugar in mg/dL; Urea: Blood urea in mg/dL; Creatinine: Creatinine in mg/dL; TB/DB: Total bilirubin/Direct bilirubin in mg/dL; SGOT: Serum glutamic oxaloacetic transaminase in IU/L; SGPT: Serum glutamic pyruvic transaminase in IU/L; CRP: C-reactive protein



[Table/Fig-3]: Graph showing D-dimer levels.

The coronavirus infection can cause leukocytosis, neutrophilia, lymphopenia and thrombocytopenia [10]. Four of the patients had leukocytosis with neutrophilia. The liver plays an essential role in host defense against microorganisms and is frequently involved in most systemic infections, as it receives a dual blood supply from the systemic and portal circulation [11]. COVID-19 causes change in several liver biomarkers, which may be closely related to the severity of the disease [12]. Elevated liver enzymes are associated with higher rates of preterm deliveries [13]. Of the cases in the present case series, deranged liver function tests were found in 5 (31.25%). These include isolated elevation of bilirubin and elevation of both SGOT and SGPT. Also, in one patient only SGOT was elevated, while another patient had both abnormal bilirubin and

Case number	HR 0	HR 10	HR 20	BP 0	BP 10	BP 20	SPO ₂ -0	SPO ₂ -10	SPO ₂ -20	O ₂ requirement	Postop ICU	Postop NIV	Hospital stay in (days)
1	125	108	106	110-70	98-60	98-68	100	100	100	Nil	Nil	Nil	5
2	90	80	78	130-80	110-60	100-50	100	100	100	Nil	Nil	Nil	13
3	104	98	92	130-80	110-70	108-70	100	100	100	Nil	Nil	Nil	14
4	80	84	84	120-80	110-70	108-70	94	96	98	Yes	Nil	Nil	10
5	110	96	92	130-80	110-54	108-50	98	100	100	Yes	Nil	Nil	11
6	80	84	86	120-80	112-68	110-68	100	100	100	Nil	Nil	Nil	6
7	78	86	76	126-74	110-68	116-80	100	100	100	Nil	Nil	Nil	11
8	90	90	88	100-70	120-80	110-70	93	98	98	Yes	Nil	Nil	9
9	80	84	86	120-80	110-70	110-70	100	100	100	Nil	Nil	nil	7
10	80	86	86	120-84	102-80	110-74	100	100	100	Nil	Nil	Nil	14
11	80	93	97	110-70	96-64	98-60	100	100	100	Nil	Nil	Nil	5
12	146	136	128	122-78	106-62	100-64	92	98	100	Yes	Yes	Yes	15
13	110	106	106	130-80	118-62	116-60	100	100	100	Nil	Nil	Nil	10
14	90	86	82	120-70	100-54	112-66	100	100	100	Nil	Nil	Nil	5
15	110	125	124	110-67	108-58	108-57	100	100	100	Nil	Nil	Nil	4
16	90	87	88	110-70	109-61	104-61	94	98	98	Yes	Yes	Nil	14

[Table/Fig-4]: Intraoperative monitoring and postoperative course.

HR0: Baseline heart rate; HR10: Heart rate at 10 min; HR20: Heart rate at 20 minutes; BP0: Baseline Blood pressure; BP10: Blood pressure at 10 min; BP20: Blood pressure at 20 min; SPO₂-0,10,20: Oxygen saturation at baseline, 10 minutes and 20 minutes; O₂: Oxygen; ICU: Intensive care unit; NIV: Non invasive ventilation

transaminases level. One of the main mechanisms of liver damage in COVID-19 is the abundance of angiotensin converting enzyme-2 receptor in cholangiocytes and bile duct cells [14]. Other causes are hepatic ischaemia, hypoxic reperfusion injury and drug induced hepatic injury. Further research is required to assess any correlation between elevated serum transaminases and perioperative morbidity in pregnant patients.

Pereira A et al., suggested that pregnant patients with severe COVID pneumonia had elevated levels of D-dimer and CRP. D-dimer is elevated in uncomplicated pregnancy as well [15]. In the current study, seven patients had maximum D-dimer values above 1500 ng/mL of which two had values above 2500 ng/mL [Table/Fig-4]. None of them had thrombotic complications even after LSCS. Of the two patients admitted in ICU postoperatively case number 12 had the highest D-dimer value of 4690 ng/mL and case number 16 had a D-dimer value of 1649.1 ng/mL. These findings show that D-dimer as such cannot be used to predict the severity of pneumonia in pregnancy. A CRP of ≥ 40 mg/L on admission to hospital should be seen as a reliable indicator of disease severity and increased risk of death [16]. In this series, CRP levels of more than 5 mg/L was seen in seven (43.7%) patients-ranging from 6.4 to 33.06 mg/L. An interesting finding in case number seven was that the patient, a known case of bronchial asthma, presented with cough and rhinitis and had a peak D-dimer value of 2568 ng/L and CRP value of 33.06 mg/L, developed no desaturation and had only mild disease. Koumoutsea EV et al., [17] reported two cases of coagulopathy due to COVID-19 with elevated D-dimer without any features of pneumonia. Lack of standardisation of D-dimer values in pregnancy makes it interpretation difficult. But the potential prognostic values of D-dimer in pregnancy cannot be dismissed as such, but requires further investigation. Thromboelastography is an additional tool to assess the thrombotic complications [18].

All 16 patients underwent LSCS under spinal anaesthesia. General anaesthesia was not required in any. Four patients who presented with fever had tachycardia in the perioperative period, which later on subsided with antipyretics. None of them developed significant hypotension that couldn't be managed with vasopressor bolus. Thus, it shows that even in patients with symptoms and deranged laboratory parameters LSAB can be safely performed in COVID-19.

Four patients who required oxygen therapy in the preoperative period to maintain a saturation above 95%, also tolerated the spinal anaesthesia very well. A few authors have demonstrated the safety of LSAB in COVID caesarean section [3,19]. The benefits of regional anaesthesia are reducing the worsening of respiratory function by intubation and mechanical ventilation and reducing the risk of exposure of health care professionals to coronavirus due to aerosol generation [20]. Gahlot D et al., reported a case of LSCS in morbidly obese female successfully managed with LSAB and Total Intravenous Anaesthesia (TIVA) due to the undue prolongation of operative time [21].

Out of the four patients who required perioperative oxygen supplementation, 2 patients-case number 12 and 16 required ICU admission which constitutes 12.5% and 1 patient, case number 12 (6.25%) required NIV. Karasu D et al., [19] found 15% of symptomatic parturients required ICU follow-up which was similar to the present series. Studies showed 5-10% of pregnant patients require intubation and mechanical ventilation [22]. No mortality was reported. In a cross-sectional study of COVID positive pregnant patients, by Asalkar M et al., [23] there were nine maternal deaths among 871 cases. All these patients presented with breathlessness and had elevated D-dimer along with leukocytosis. Mean duration of hospital stay in the present series was nine days.

It is difficult to generalise the conclusions due to limited number of patients. Comparison with asymptomatic cases and non COVID parturients are not done in the present study. Neonatal outcomes and vertical transmission of COVID-19 was not evaluated. Extensive laboratory investigations couldn't be done due to the exhaustion of resources.

CONCLUSION(S)

The LSCS can be done safely under subarachnoid block even in symptomatic COVID-19 parturients. Preterm deliveries are more common in these patients. Elevation of D-dimer is common in pregnancy and it does not always indicate severe COVID-19 disease. The interpretation of D-dimer values is difficult due to lack of standardisation in pregnancy and further research is required to predict the severity of the disease. Foetal distress and previous caesarean section are the most common indications of surgery. Postoperative ICU requirement and ventilatory support is less even though the patients have symptoms.

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