

Anaesthetic Management of Caesarean Section in Asymptomatic COVID-19 Positive Parturients with Abnormal Laboratory Findings: A Series of 15 Cases

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ABSTRACT

During the Coronavirus Disease 2019 (COVID-19) pandemic, Caesarean Sections (CS) were prioritised over other elective surgeries, leading to the identification and management of asymptomatic COVID-19 positive parturients. The present case series aimed to explore the possibility of laboratory abnormalities and adverse events that can occur in asymptomatic COVID-19 positive cases in the post-pandemic era when routine screening is no longer in place. Out of 141 asymptomatic COVID-19 positive CS patients, 15 cases were selected based on specific criteria. Demographic characteristics and clinical indicators were analysed, including age, gravidity, indications for CS, laboratory values {such as D-dimer, C Reactive Protein (CRP), and platelet count}, blood transfusion requirements, and obstetric outcomes. Indications for CS were predominantly previous CS and failure to progress. Laboratory abnormalities included elevated D-dimer, CRP, leukocyte count, and thrombocytopenia in some cases. Haemodynamic stability was maintained in all patients. The use of prophylactic anticoagulation was noted, potentially offering protection against thrombosis. Asymptomatic COVID-19 positive parturients can exhibit significant laboratory abnormalities. Thromboprophylaxis may play a role in mitigating thrombotic risks. The significance of the present case series lies in the fact that the laboratory abnormalities could only be detected since all positive patients were investigated as per hospital protocol, which will be missed in the post-COVID-19 era where routine investigations are not performed on asymptomatic patients. Therefore, healthcare workers should be aware of this possibility.

Keywords: Anaesthesia, C-reactive protein, D-dimer

INTRODUCTION

Caesarean sections had to be performed without exception due to their inherent nature during the COVID-19 pandemic, even though many other elective cases were postponed. Routine screening, as per hospital protocol, allowed for the detection of many asymptomatic parturients who were managed according to guidelines. The primary anaesthetic technique employed was subarachnoid blockade, unless contraindicated. Despite being asymptomatic, significant laboratory abnormalities and untoward incidents could occur in such cases. These findings hold relevance in the post-COVID-19 era when routine screening and laboratory investigations are not conducted for asymptomatic patients. Guzey NA et al., have discovered that closely monitoring laboratory values will provide information about the clinical course in COVID-19 positive parturients [1]. Therefore, healthcare workers must maintain a high degree of suspicion and vigilance regarding the possibility of abnormal laboratory findings.

CASE SERIES

In this case series, patients were classified as symptomatic or asymptomatic based on the presence or absence of any of the following symptoms: fever, cough, rhinitis, breathlessness, headache, and palpitation [2]. Out of a total of 157 COVID-19 positive caesarean sections performed at the institution between March 2020 and February 2022, only 16 patients were symptomatic. Among the remaining 141 asymptomatic patients, the authors selected 15 cases who met one or more of the following criteria. Routine investigations were conducted for all positive patients according to hospital protocol. The modified cut-off values were based on previous studies.

1. D-dimer >1500 ng/mL [3]
2. C-Reactive Protein (CRP) ≥3 mg/dL [4]
3. Platelet count <100,000/mm³ [5]

4. Requirement of blood transfusion [6]
5. Intrauterine death of the baby [7]

Subarachnoid blockade was administered to 14 patients, while general anaesthesia with endotracheal intubation was performed in one patient due to thrombocytopenia. Preoperatively, all patients were kept in an isolation ward, and the cases were conducted in a dedicated operation theatre for COVID-19 cases using Personal Protective Equipment (PPE) kits. The majority of patients were between the ages of 20 and 30 years and were second gravidas. The most common indication for caesarean section was a previous caesarean section, followed by failure to progress [Table/Fig-1]. Four patients had haemoglobin levels below 11 gm%. Other blood results are provided in [Table/Fig-2]. Significant laboratory abnormalities are highlighted in [Table/Fig-3]. All patients maintained haemodynamic stability with a Mean Blood Pressure (MBP) of at least 70 mmHg or higher. Hypotension was prevented by administering intravenous fluid preloading with 5 mL/kg and co-loading with 10 mL/kg, along with a bolus dose of 5mg of intravenous Ephedrine. Except for one patient, all patients received prophylactic Enoxaparin/Heparin, which was discontinued preoperatively according to recommended guidelines. The patient with thrombocytopenia received general anaesthesia for the caesarean section, while the others underwent subarachnoid blockade. This patient tested negative for dengue IgM. Postoperatively, this patient required transfusion of four units of Platelet Concentrate (PC), two units of Packed Red Blood Cells (PRBC), and two units of Fresh Frozen Plasma (FFP). One patient with a history of previous caesarean section experienced complications including abruptio placentae, uterine rupture, and intrauterine death of the baby. This patient also received two units of PRBC transfusion. The average duration of hospital stay was 8.2 days, with only three patients requiring more than 10 days

Case	Age	Gestational age (weeks)	Parity	Comorbidity	COVID test	Indication for CS
1	19	39	Primi para	Hypothyroid	RAT	Failure to progress
2	28	40	Primi para	NIL	RT PCR	Oligo hydramnios, Failed induction
3	24	33	Primi para	NIL	RAT	Abruption
4	20	38	G2 P1 L1	NIL	RAT	Previous CS
5	27	38	G3 P1 L1 A1	NIL	RAT	Uterine rupture, IUD/previous CS, abruption
6	26	39	G2 A1	Hypothyroid	RAT	Foetal distress
7	25	38	G2 P1 L1	NIL	RAT	Previous CS, placenta previa
8	24	39	Primi para	NIL	RAT	Oblique lie, oligo hydramnios
9	24	38	G2 P1 L1	NIL	RT PCR	Previous CS
10	24	37	G2 P1 L1	NIL	RT PCR	Previous CS
11	21	39	G2 A1	NIL	RT PCR	Failure to progress
12	26	39	G4 A3	NIL	RAT	Precious pregnancy
13	18	39	Primi para	NIL	RT PCR	Failed induction
14	30	34	G2 P1 L1	Asthma	RAT	Previous CS
15	25	38	G2 P1 L1	NIL	RT PCR	Previous CS

[Table/Fig-1]: Demography, screening test & indication for Caesarean Section (CS).

RAT: Rapid antigen test; RT-PCR: Reverse transcription polymerase chain reaction; CS: Caesarean section; IUD: Intra uterine death

Case	Hb (g/dL)	TWC (/mm ³)	P,L,M,E (%)	Platelets (lac/mm ³)	RBS (mg/dL)	Urea (mg/dL)	Creatinine (mg/dL)	Bilirubin- total, direct (mg/dL)	SGOT (U/L)	SGPT (U/L)	D-dimer (ng/mL)	CRP (mg/dL)
1	10	7500	81,14,0,5	1.36	110	20	0.8	0.3, 0.2	32	12	1858	1.2
2	13.4	8000	60,35,5,0	3.1	73	18	0.4	0.4,0.2	32	31	815	9.6
3	11.4	14000	79, 17,4,0	1.8	73	19	0.9	0.3,0.1	16	12	2311	NEG
4	13.3	9100	63,33,4,0	4.1	98	10	0.6	0.4,0.2	24	21	1185	3
5	7.5	11300	82,14,4,0	3	121	15	0.7	0.4,0.1	35	17	1143	NEG
6	12	22000	70,25,5,0	0.7	100	16	0.6	0.4,0.2	30	18	3700	NEG
7	12	5800	64,33,3,0	1.9	77	15	0.7	0.6,0.3	34	22	2065	NEG
8	10.6	3900	50,46,4,0	1.8	89	10	0.7	0.4,0.1	26	8	650	17
9	11.8	7000	78,17 5,0	1.3	98	14	0.5	0.3,0.1	16	13	501	18
10	13.2	9100	73,20,7,0	1.9	88	16	0.6	0.4,0.2	20	10	1595	NEG
11	12.7	12500	64,30,6,0	2.2	109	12	0.8	0.5,0.2	32	13	4480	3
12	11.3	12600	85,11,4,0	2.2	83	12	0.5	0.3,0.1	16	11	1752	4.3
13	14.2	12900	72,20,8,0	3.2	83	18	0.7	0.5,0.2	26	14	287	14.5
14	10.6	17200	82,14,4,0	2.3	123	17	0.6	0.4,0.2	28	15	2568	33
15	12.6	13300	66,25,9,0	3	82	16	0.7	0.3,0.1	14	18	890	7

[Table/Fig-2]: Laboratory results.

Hb: Haemoglobin; TWC: Total white cell count; P,L,M,E: Polymorphs, lymphocytes, monocytes, eosinophils; RBS: Random blood sugar; NEG: Negative (Less than 1 mg/dL)

Result	Values	No. of patients
Hb	≤7.5 g%	1
TWC	>10,000/mm ³	8
Platelet count	≤70,000/mm ³	1
D-dimer	1500-2500 ng/mL	5
	2500-4000 ng/mL	2
	>4000 ng/mL	1
CRP	6-15 mg/dL	3
	16-30 mg/dL	2
	>30 mg/dL	1

[Table/Fig-3]: Significant laboratory abnormalities.

Hb: Haemoglobin; TWC: Total leukocyte count; CRP: C-reactive protein

[Table/Fig-4]. There were no other major adverse incidents, and all patients were discharged safely.

DISCUSSION

Asymptomatic COVID-19 positive parturients were only detected due to routine Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR)/Rapid Antigen Test (RAT) screening. The major indication for Caesarean Section (CS) in the present case series was a history of previous CS and failure to progress, which is consistent with the findings of Guzey N et al., who evaluated 254 CS patients with COVID-19 [1]. Complications such as placental abruption, preterm labour, stillbirth, and anaemia were observed, in line with previous studies [5,7-9]. The occurrence of two cases of placental abruption and one case of intrauterine death in the present case series could potentially be attributed to COVID-19. Aghaamoo S et al., found

Case no.	HR 0 min	HR 10 min	HR 20 min	MBP 0 min	MBP 10 min	MBP 20 min	SpO ₂ 0 min	SpO ₂ 10 min	SpO ₂ 20 min	Treatment given (Antiviral/Steroid/Enoxaparin)	Postoperative ICU	Hospital stay (Days)
1	96	88	94	92	93	92	100	100	100	Heparin 40 SC OD	NIL	7
2	130	120	100	107	104	105	100	100	100	Enoxaparin 40 mg SC OD	NIL	9
3	88	108	92	97	96	96	100	100	100	Enoxaparin 40 mg SC OD	NIL	14
4	80	80	79	79	79	79	100	100	100	Enoxaparin 40 mg SC OD	NIL	10
5	120	130	120	123	122	123	100	100	100	Enoxaparin 40 mg SC OD	2 PRBC	6

6	94	92	98	96	97	96	100	100	100	Dexamethasone 8mg IV OD	4 platelet, 2 PRBC, 2 FFP	14
7	80	84	84	84	84	84	100	100	100	Enoxaparin 40 mg SC OD, Oseltamivir	NIL	10
8	80	96	100	99	99	99	100	100	100	Enoxaparin 40 mg SC OD	NIL	6
9	96	86	90	89	89	89	100	99	98	Enoxaparin 40 mg SC OD	NIL	7
10	80	82	84	83	84	83	100	100	100	Enoxaparin 40 mg SC OD	NIL	7
11	80	82	84	83	84	83	100	100	100	Enoxaparin 40 mg SC OD	NIL	11
12	80	76	115	102	106	105	100	100	100	Enoxaparin 40 mg SC OD	NIL	6
13	100	98	92	94	93	94	100	100	100	Enoxaparin 40 mg SC OD	NIL	5
14	78	82	86	85	85	85	100	100	100	Enoxaparin 40 mg SC OD	NIL	6
15	70	68	70	69	70	69	100	100	100	Enoxaparin 40 mg SC OD	NIL	5

Table/Fig-4): Haemodynamics and management.

HR: Heart rate; min: Minutes; MBP: Mean blood pressure; SC: Subcutaneous; OD: Once daily; PRBC: Packed RBCs; FFP: Fresh frozen plasma

a higher risk of abruption, preterm labour, and stillbirth in patients with COVID-19 [7]. The occurrence of anaemia in COVID-19 is significant as it can impair oxygen-carrying capacity and potentially exacerbate hypoxia due to lung damage. Bergamaschi G et al., and Dakshnamurthy P et al., have reported the occurrence of anaemia in COVID-19 positive parturients [8,9]. One patient presented with a haemoglobin level of 7.5g%, which was corrected with packed red cells and oxygen was administered via mask to improve oxygen flux. Leukocytosis greater than 10,000/cmm was reported by Chen R et al., [10]. Eight patients had a total leukocyte count higher than 10,000, and only one patient had a count lower than 5,000/cmm. Jamal S et al., found that thrombocytopenia can occur even in asymptomatic COVID-19 positive parturients [5]. One patient had a platelet count of 70,000/cmm, negative dengue tests, and no other identifiable cause. Denizli R et al., noted in their study that elevated liver enzymes could occur in COVID-19 positive pregnant patients, but no such findings were seen in this case series [11]. Zhang Y et al., reported the importance of highlighting the increased risk of hypotension related to neuraxial anaesthesia in COVID-19 positive parturients undergoing caesarean deliveries [12]. However, in this study, all patients remained haemodynamically stable. The Royal College of Obstetricians and Gynaecologists (RCOG) and the American College of Obstetricians and Gynecologists (ACOG) have differing guidelines for administering prophylactic Low Molecular Weight Heparin (LMWH)/Unfractionated Heparin (UFH) in COVID-19 positive antepartum patients [13,14]. In this case series, except for one patient, all patients were administered prophylactic LMWH/UFH as per institutional guidelines. This may have had a protective effect against thrombosis, even in asymptomatic cases, which could indirectly reflect as reduced D-dimer values. Garcia IG et al., demonstrated that throughout pregnancy, D-dimer levels progressively and significantly increased, reaching higher levels in the third trimester, with a reference value of 551-3333 ng/mL [15]. Since the above reference values are for normal pregnancies and thromboprophylaxis was used, a D-dimer value higher than 1500 ng/mL was taken as an inclusion criterion in this case series. Watts DH et al., found that the median CRP value for women in labour at term was 1.3 mg/dL [16]. The CRP values higher than six in six patients in this series could be attributed to COVID-19. According to Kinsey KE et al., COVID-19 can cause intraoperative coagulopathy and significantly more oozing [17]. This may have contributed to the increased requirement of blood products in two patients, even though there were other obvious indications for blood transfusion.

In summary, all mothers in the present case series study had a safe and healthy postoperative period, with only two patients requiring admission to the intensive care unit for blood transfusion and monitoring. There was one case of intrauterine death, but all other newborns were healthy and without any symptoms. Anesthesiologists can play a crucial role in ensuring the safety of newborns by assessing the APGAR score and providing resuscitation

if necessary [18]. Anticoagulation therapy for postpartum patients may contribute to a good prognosis [19].

CONCLUSION(S)

COVID-19 positive parturients, even if asymptomatic, can exhibit laboratory abnormalities such as thrombocytopenia, high D-dimer, and CRP levels. In some cases, the D-dimer levels were higher than expected during pregnancy, even after administering thromboprophylaxis. Further studies are needed on a country or region-specific basis to determine whether routine thromboprophylaxis is necessary, as different strains of COVID-19 vary in their tendency to cause thrombosis. Timely recognition of these laboratory abnormalities can help prevent potential complications such as bleeding, thrombosis, or sepsis. Although anaesthesia and perioperative management could be performed safely in this case series, it would be advisable for healthcare providers to exercise caution in the post-COVID-19 era when routine screening for COVID-19 is not conducted, as many asymptomatic cases can easily be missed.

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