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Maternal deaths due to COVID-19 disease: The cases in a single center pandemic hospital in the south east of Turkey

İhsan Bağlı[1], Ece Öcal[1], Mustafa Yavuz[1], Osman Uzundere[2] and Fatma Bozkurt[3]

[1]*Department of Obstetrics and Gynecology, University of Health Sciences Diyarbakir Gazi Yasargil Research and Training Hospital, Diyarbakır, Turkey*
[2]*Department of Anesthesiology and Reanimation, University of Health Sciences Diyarbakir Gazi Yasargil Research and Training Hospital, Diyarbakır, Turkey*
[3]*Department of Infectious Diseases, University of Health Sciences Diyarbakir Gazi Yasargil Research and Training Hospital, Diyarbakır, Turkey*

Abstract

Coronavirus-19 disease is still a pandemic health problem and uncertainty in the management of severe or critically ill pregnant women confuses continually the obstetricians. The nationwide maternal mortality rate due to covid-19 still has not been presented in any study in Turkey. The study includes four maternal mortality cases in a referral single pandemic center in our country. Case 1, a 34-year-old, 34 weeks of gestation with moderate disease. The cesarean section was performed due to nonreassuring nonstress tests. She died on the postpartum seventh day. Case 2, a 37-year-old, at 36 weeks of gestation. The symptoms consisted of dry cough, shortness of breath and labor pain, and 3 cm cervical opening. Her second cesarean section was performed and she died at postpartum ninth day. Case 3, 33 years old, 33 weeks of gestation with moderate/severe stage of the disease. A few days after the treatment, CS was performed due to her severe condition and she died at postpartum 15th day. Case 4, 39 years old, 35 weeks of gestation, she was at a severe stage of the disease. On the second day after the treatment, CS was performed due to her severe condition and she died at postpartum seventh day. The postpartum period after cesarean section should be followed cautiously under the appropriate treatment of the COVID-19 disease. Unfortunately, the reason for this rapid deterioration which we observed in our cases is not well known and appropriate medications and algorithms should be established as soon as possible.

Key words: COVID-19 disease, maternal mortality, pregnancy.

Introduction

The World Health Organization announced a global pandemic caused by COVID-19 disease on March 11, 2020.[1] As of March 2021, the virus has infected over 100 million people.[2] There are some concerns about the effect of COVID-19 on pregnancy. While a report published in May 2020 suggests that overall clinical outcomes in pregnant patients do not differ from nonpregnant patients,[3] the other study published in September 2020 stated that pregnancy worsens the morbidity of COVID-19 and it seems more likely to increase as the pregnancy advances.[4]

An exact management algorithm for severe or critically ill pregnant women infected with Covid-19 regarding to timing and mode of delivery and appropriate medication could not be developed up to the date.[5] Some experts suggest delivery if the mother's condition is stable after 32–34 weeks of gestation, while the others decide to give birth only in hypoxemic respiratory

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Correspondence: Ihsan Bagli, Diyarbakir Gazi Yasargil Egitim Arastirma Hastanesi Ek Bina, Urfa Yolu, Baglar, 21090 Diyarbakir, Turkey. Email: ihsanbagli@gmail.com

failure.[6,7] Moreover, a report demonstrated that critically ill 34 week pregnant women with COVID-19 can be managed and treated successfully even under the mechanical ventilation without performing emergent CS.[8] A nationwide study was not conducted yet about maternal mortality regarding COVID-19 diseases in Turkey. In our institution, 25 000 births occur per year. During the pandemic, 83 symptomatic pregnant women who were Covid-19 PCR positive gave birth between March 2020 and January 2021. Sixteen of those were followed up at the intensive care unit. Fifty-four of 83 pregnant women (asymptomatic and symptomatic) gave birth in cesarean while 29 of them gave birth via vaginal, and 4 maternal deaths occurred only among cesarean births. Maternal mortality rate can be calculated as 4.8% (4/83) in this symptomatic cohort. The study aims to present our four maternal mortality cases in Diyarbakır province in Turkey. The written informed consent was obtained from the relatives of the patients.

Case 1

Our first patient was a 34-year-old, gravida 3 parity 1 (CS) and abortion 1, woman who presented at 34 weeks of gestation with symptoms of subjective fevers, dry cough, and back pain for a few days. Oxygen saturation in room air was 94%, the fever was 37°C. Her body mass index (BMI) was 26.5 kg/m^2. Fetal evaluation was resulted as well by performing fetal ultrasonography and nonstress test (NST). There was no contact history with a COVID-19 positive person as known and her medical history was unremarkable. She was hospitalized with suspicion of Covid-19 disease (September 2020). PCR for COVID-19 was performed and resulted as a positive test. Computed tomography was interpreted as compatible with COVID-19 pneumonia. First laboratory findings were not remarkable (Table 1). Lopinavir-ritonavir to reduce viral replication, subcutaneous heparin for anticoagulation, and nasal oxygenation were started. After 2 days, oxygen saturation in room air was 92% and she had mild uterine contraction, cervical opening, and effacement were increased (2 cm and 50% respectively), the NST was nonreassuring. The patient was evaluated between a perinatologist, an anesthesiologist, and an obstetrician. Decision of CS was taken according to these consultations. CS was performed without any problems and the newborn was healthy with 1- and 5-min APGAR score 5 and 8. The patient who was going on initial treatment was not bad for 2 days after the operation, but on the third day the patient deteriorated and oxygen saturation started to decrease up to 80%. A follow-up chest tomography showed bilaterally increased consolidations and opacities in the lung (Figure 1). On the postoperative fourth day she had to be intubated in the ICU and hydroxychloroquine, steroids, and vancomycin were added to the treatment. Tocilizumab was given once a day for 2 days. Arterial blood gasses confirmed worsening and severe metabolic acidosis. All laboratory findings can be seen on Table 1. Decision of hemodialysis could not be applied, because we lost the patient without response to the cardiopulmonary resuscitation (CPR) on the postpartum seventh day. The planned autopsy was not accepted by the relatives of the patient, whom we thought to have died as a result of multiorgan failure.

Case 2

The second patient who was admitted to our referral hospital was 37 years old, gravida 4 parity 3 (one vaginal and two cesarean delivery), she was at 36 weeks of gestation. Besides the labor pain, shortening of breath and dry cough were main complaints. Her body temperature was 38°C and her BMI was measured as 28 kg/m^2. She was diagnosed with COVID-19 on her admission and the antiviral therapy was started. Three centimeter cervical opening was detected during the physical examination and oligohydramnios was detected during the sonographic examination and then CS was performed after consultations between the department of perinatology, infectious disease, and anesthesiology on the same day of her admission (August 2020). A healthy baby boy was born with 1- and 5-min APGAR scores were 6 and 8, respectively with the negative result of the COVID-19 PCR. Gradually, she worsened despite the treatment (lopinavir-ritonavir, anticoagulant, corticosteroids). Continuous positive airway pressure (CPAP) was started on day 3 of admission in the ICU and the computed tomography scan demonstrated that bilateral lung airspace densities were common (Figure 2). Mechanical ventilation had to be performed on day 5 of admission. Tocilizumab was added to her treatment with two dosages. Prone position was admitted twice in a day for 3 h. But, even with all supportive and intense interventions, she died because of cardiopulmonary arrest secondary to the septic shock at postpartum ninth day.

Table 1 Maternal-neonatal features and maternal laboratory findings

Parameters		Case 1	Case 2	Case 3	Case 4
Maternal age (year)		34	37	33	39
Symptoms on admission		Fever, cough	Dyspnea, cough	Fever, dyspnea	Fever, cough shortness of breath
Comorbid events		None	None	Obesity	Obesity
Body mass index (kg/m^2)		26.5	28	33	30
Gravidity		3	5	4	7
Parity		2 (CS)	3 (2 VD, 1 CS)	3 (VD)	6 (VD)
Gestational age (week)		34	36	32	35
Delivery mode		Cesarean	Cesarean	Cesarean	Cesarean
Indication of CS		Fetal distress	preterm delivery	Moderate/ severe covid-19	Severe covid-19
Anesthesia		Spinal	Spinal	Spinal	Spinal
Apgar score of newborns (first and fifth min)		5–8	6–8	7–8	8–9
Newborn weight (g)		2500	3000	2000	2250
Newborn's COVID-19 PCR results		Negative	Negative	Negative	Negative
Length of hospital stay (day)		11	9	20	10
Pulmonary tomography findings		+	+	+	+
Oxygen therapy		Yes	Yes	Yes	Yes
Antiviral treatment (Lopinavir-ritonavir, favipiravir)		Yes	Yes	Yes	Yes
Antibiotic treatment		Yes	Yes	Yes	Yes
Glucocorticoids (IV)		Yes	Yes	Yes	Yes
Immune suppressor (Tocilizumab)		+	+	+	+
Date of the death		Postpartum 7th day	Postpartum 9th day	Postpartum 15th day	Postpartum 7th day
Laboratory results	Reference ranges				
IL-6 levels	0–5.9 pg/mL				
On admission		No	No	45	No
Prepartum		No	No	10	No
Postpartum		No	No	No	No
Leucocytes	(4–10) × 10³				
On admission		6.75	5.85	5.15	7.89
Prepartum		8.28	5.51	11.95	17.35
Postpartum 4 h		15.66	7.51	13.96	20.14
Postpartum 24 h		18.71	12.02	15.60	21.02
Pre-exitus		22	7.34	29.12	5.98
Neutrophills	(2–7) × 10³				
On admission		4.96	4.93	4.15	6.46
Prepartum		6.25	4.57	14.53	16.02
Postpartum 4 h		12.64	6.71	12.35	18.97
Postpartum 24 h		15.5	11.05	13.74	19.82
Pre-exitus		18.79	5.80	27.64	2.98
Platelets	(100–400) × 10^3				
On admission		187	230	109	155
Prenatal		334	233	282	183
Postpartum 4 h		307	234	257	215
Postpartum 24 h		479	273	238	245
Pre-exitus		312	269	98	240
Hemoglobin	(11–16 g/L)				
On admission		11.5	12.5	9.5	12.6
Prenatal		12.2	12.1	9.2	10.8
Postpartum 4 h		10.8	11.8	10.7	11.3
Postpartum 24 h		9.1	11.5	10.6	10.5

(*Continues*)

Table 1 Continued

Parameters		Case 1	Case 2	Case 3	Case 4
Pre-exitus		9.4	9.2	10.4	8.1
Lymphocytes	(0.8–4) × 10^3				
On admission		1.19	0.74	0.88	1.10
Prepartum		1.65	0.83	1.18	0.79
Postpartum 4 h		2.34	0.63	1.29	0.62
Postpartum 24 h		7.03	0.87	1.42	0.73
Pre-exitus		2.54	1.31	1.03	2.55
Aspartat aminotransferase	(0–32 U/L)				
On admission		58	34	23	38
Prepartum		124	34	23	27
Postpartum 4 h		37	-	26	38
Postpartum 24 h		75	30	84	41
Pre-exitus		30	20	529	69
Alanine aminotransferase	(0–33 U/L)				
On admission		31	14	8	21
Prepartum		47	14	12	18
Postpartum 4 h		25	-	16	24
Postpartum 24 h		52	13	51	23
Pre-exitus		24	8	751	151
Ferritin	(13–150 µg/L)				
On admission		110	137	-	103
Prepartum		-	137	66	126
Postpartum 4 h		373	-	106	133
Postpartum 24 h		392	183	566	158
Pre-exitus		387	240	2000	218
d-dimer	(0–243 ng/mL)				
On admission		**444**	-	186	**394**
Prepartum		-	**463**	**339**	192
Postpartum 4 h		**434**	-	**2804**	117
Postpartum 24 h		-	633	**9987**	**461**
Pre-exitus		**4336**	**2792**	**1641**	**2134**
Procalcitonin	(<0.05 ng/mL)				
On admission		**0.154**	**0.254**	**0.077**	**0.257**
Prepartum		**0.174**	**0.299**	**0.069**	**0.269**
Postpartum 4 h		-	-	**0.79**	**0.244**
Postpartum 24 h		**0.140**	**0.345**	**1.04**	**0.220**
Pre-exitus		**0.12**	**0.07**	**8.11**	**0.630**
C-reactive protein	(0–5 mg/L)				
On admission		**98**	-	**41**	**90**
Prepartum		**113**	**96**	**45**	**92**
Postpartum 4 h		-	**116**	**36**	**84**
Postpartum 24 h		**123**	**178**	**34**	**96**
Pre-exitus		**340**	**38**	**47**	**18**
Glucose	(70–105 mg/dL)				
On admission		142	125	108	90
Prepartum		174	128	110	159
Postpartum 4 h		274	128	163	145
Postpartum 24 h		317	109	111	104
Pre-exitus		108	98	170	87
Lactate dehidrogenase	(135–225 U/L)				
On admission		**309**	**280**	**371**	**393**
Prepartum		**408**	**363**	**254**	**285**
Postpartum 4 h		**448**	**-**	**410**	**492**
Postpartum 24 h		**496**	**373**	**1189**	**308**
Pre-exitus		**745**	**905**	**1460**	**850**

(*Continues*)

Table 1 Continued

Parameters		Case 1	Case 2	Case 3	Case 4
Blood urea nitrogen	(16.6–48 mg/dL)				
On admission		8	10	7.2	16.3
Prepartum		12	10	5.2	20.3
Postpartum 4 h		22	10.7	25.9	21.8
Postpartum 24 h		50	29.2	57	26.0
Pre exitus		50	35	167	110
Creatinine	(0.5–0.9 mg/dL)				
On admission		0.64	0.61	0.46	0.68
Prepartum		0.66	0.54	0.44	0.62
Postpartum 4 h		0.76	-	0.48	0.68
Postpartum 24 h		0.89	0.56	0.91	0.63
Pre-exitus		**2.87**	0.69	**4.09**	**3.86**
PT	(9.4–12.5 s)				
On admission		11	12.1	10.5	10.5
Prepartum		11.9	10.3	10.7	9.4
Postpartum 4 h		10.2	-	10.8	9.1
Postpartum 24 h		10.7	11.1	11.3	8.7
Pre-exitus		14.6	13	12.6	17.7
PTT	(25.1–36.5 s)				
On admission		35.9	29.2	29.1	29.0
Prepartum		34.8	29.2	33.4	33.6
Postpartum 4 h		26.2	**38.8**	23.6	29.0
Postpartum 24 h		32.2	37.4	25.7	25.6
Pre-exitus		31.8	32	**45.4**	36.2
INR	(0.88-1.17)				
On admission		1.11	1.13	0.98	0.98
Prepartum		1.03.	1.13	1.00	0.88
Postpartum 4 h		1.00	0.96	1.01	0.85
Postpartum 24 h		1.06	1.03	1.06	0.81
Pre-exitus		**1.36**	**1.21**	**1.18**	**1.65**
pH	(7.35-7.45)				
On admission		7.41	7.37	7.39	7.42
Prepartum		7.38	7.27	7.48	7.40
Postpartum 4 h		7.32	7.53	7.42	7.23
Postpartum 24 h		7.22	7.32	7.33	7.37
Pre-exitus		**6.70**	**7.07**	**6.98**	**6.69**
O_2 saturation (%)					
On admission		94	93	70	82
Prepartum		88	89	89	47
Postpartum 4 h		81	86	83	79
Postpartum 24 h		81	66	77	56
Pre exitus		41	87	30	25
pCO_2	(35–45 mmHg)				
On admission		22.6	55.3	32.3	26.9
Prepartum		21.4	55.3	27.1	32.4
Postpartum 4 h		52.4	18,8	29.3	35.1
Postpartum 24 h		55.6	28.5	30.8	40.5
Pre-exitus		**198**	**41.8**	**144**	**136**
HCO_3	(21–26 mg/dL)				
On admission		16.8	15.2	20.1	19.4
Prepartum		18.1	15.2	22.8	20.6
Postpartum 4 h		19.9	19.9	23.8	22.1
Postpartum 24 h		19.9	21.1	17.3	14.9
Pre-exitus		12.5	30.3	21.2	14.8

(*Continues*)

Table 1 Continued

Parameters		Case 1	Case 2	Case 3	Case 4
Lactic acid	(>1.8 mmol/L)				
On admission		3.8	4.7	2.1	2.5
Prepartum		5.5	4.7	3.8	3.3
Postpartum 4 h		1.3	1.9	3.7	3.8
Postpartum 24 h		1.4	3.1	1.7	1.3
Pre-exitus		20	2.8	3.6	5.8

Abbreviations: CS, cesarean section; PT, protrombin time; aPTT, activated partial tromboplastine time; VD, vaginal birth; INR, international normalized ratio.

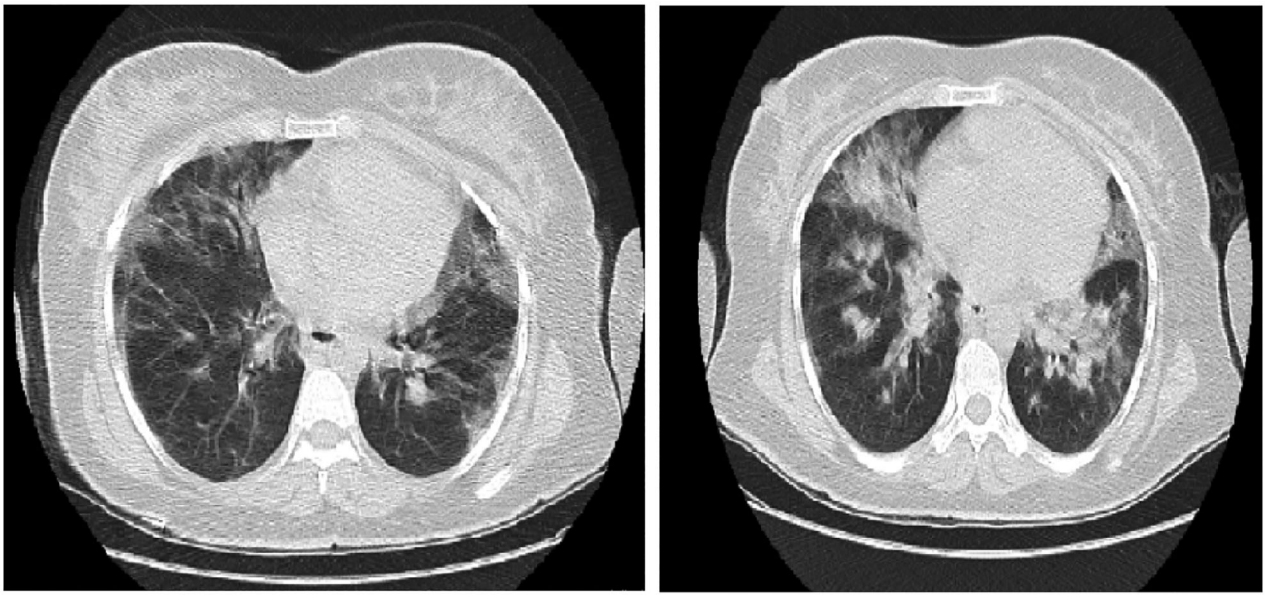

Figure 1 Case 1's CT images show increasing opacities in the lung at the postpartum period (left; antepartum, right; postpartum)

The relatives of the patient did not accept the offered autopsy.

Case 3

Our third case was 33 years old gravida 4 parity 3 (vaginal birth) and when she came to the emergency service which separated the area for COVID-19 patients who suspected or known. Thirty-three weeks of gestation was measured and she was hospitalized (October 2020). Her medical history was not remarkable and body mass index was 33 kg/m^2.

It was accepted as a moderate COVID-19 disease due to complaints of mild cough and shortness of breath and a 93% O_2 saturation with capillary measurement. The fetal well-being was uneventful. The initial laboratory findings were not remarkable. Lopinavir–ritonavir, the corticosteroid, low molecular weight heparin, and nasal O_2 support were started by using nasal cannula. Gradually, the patient's O_2 requirement was increased the next day and in spite of CPAP therapy, O_2 saturation could only reach up to the 90 s. CS was performed after consultations between the department of perinatology, infectious disease, and anesthesiology on day 5 of admission. The common opacities were observed on the CT scan at postpartum on the first day (Figure 3). The patient's condition worsened after CS, despite of the changing antiviral therapy (lopinavir-ritonavir to favipiravir), antibiotics (klaritromisin to karbapenem), and starting to the high flow O_2 therapy and she was had to be intubated on

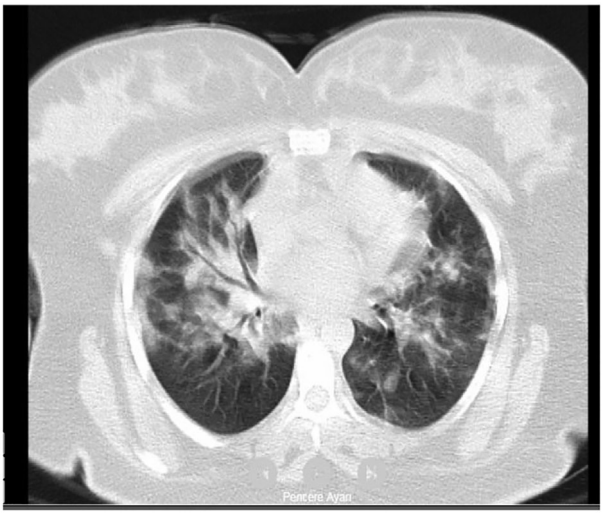

Figure 2 Case 2's CT image indices common opacities after cesarean section

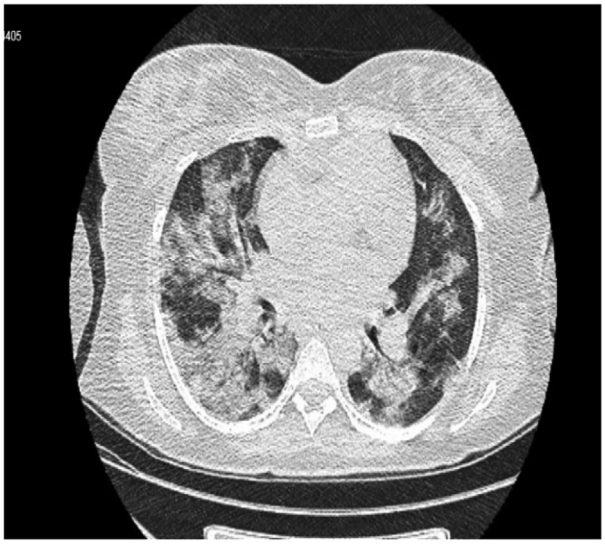

Figure 3 Case 3's CT scan indices common opacities at first day after cesarean section

October, 2020. The Tocilizumab [interleukin-6 (IL-6) inhibitor] was started on same day of intubation while IL-6 level was 45 pg/mL on admission and 10 pg/mL (normal range 0–5.9 pg/mL) on day 2 of admission. Postpartum fifth day, the unconscious patient underwent hemodialysis due to low urine output (150 cc urine/24 h). Postpartum 13th day, the patient had to be taken to the prone position for increasing her O_2 saturation. The patient, who was hypotensive despite the maximum norepinephrine and dopamine doses, was arrested at postpartum 15th day and did not respond to the cardiopulmonary resuscitation. Her husband refused the autopsy procedure.

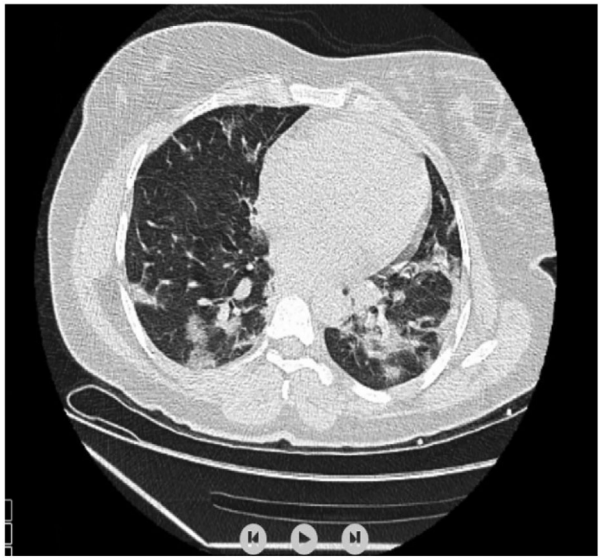

Figure 4 Case 4' CT scan shows opacities on admission

Case 4

The patient was 39 years old, gravida 7 parity 6 (vaginal births). She was at 35 weeks of gestation. COVID-19 PCR positivity was known for 5 days. Her main complaints were shortening of breath and dry cough when she arrived at the emergency service on November 2020. O_2 saturation increased with O_2 mask (3 L/min) up to the 95. Fetal sonographic examination was uneventful. She was hospitalized and low molecular weight heparin, lopinavir-ritonavir, and steroids were ordered. The lung CT findings were evaluated to be compatible with COVID-19 disease on the admission day, but it was not common (Figure 4). During the courses, the need of O_2 support was increased and on day 2 of admission, CS was performed due to low O_2 saturation (88% with CPAP). The newborn was seen as healthy. After Postoperative eighth hour, she underwent mechanical ventilation. On day 4 of admission, the lopinavir-ritonavir was changed with the favipiravir, and 0.6 mL subcutaneous low molecular weight heparin dosage was increased to twice in a day. Tocilizumab was added to the treatments for 2 days. Piperacillin-tazobactam and teicoplanin were started. Hemodialysis

was required at postpartum third and sixth day. It was thought that severe acute respiratory disease syndrome developed and she died at postpartum seventh day without responding to CPR. The relatives of the patient refused the autopsy procedure.

Discussion

In general population, according to the severity of disease, COVID-19 was stratified as being mild (symptomatic or mild pneumonia), severe (tachypnea ≧30 breaths/min, or oxygen saturation ≤93% at rest, or $PaO_2/FiO_2 < 300$ mmHg), and critical (respiratory failure requiring endotracheal intubation, shock, or other organ failure that requires intensive care), accounting for 81%, 14%, and 5% of cases, respectively.[9] However, in pregnant population, severely and critically ill rates were reported as 8% and 1%, respectively.[10] These different rates may indicate the preventative feature of pregnancy against the worsening of the disease. During pregnancy human chorionic gonadotropin and progesterone can downregulate the Th-1 proinflammatory activity by decreasing tumor necrosis factor-alpha. Therefore, this immune modulation can have a protective effect on pregnant women, so that, the cytokine storm that aggravates the COVID-19 disease may not occur if pregnancy goes on.[11] On the other hand, data showed that pregnant women are more likely to be hospitalized, admitted to the intensive care unit, and require the mechanical ventilation.[12] The pathogenesis of the worsening of the disease in pregnancy cannot be fully explained. There is a balance between Treg and Th17 immune responses, these are critical for embryonic implantation and healthy pregnancy.[13] The reduced levels of Treg cells (regulatory T cells) and increased levels of Th17 cells are associated with obstetric complications, such as miscarriage, preeclampsia, preterm birth, and deterioration of maternal condition.[14] However, it is not clear in which patient these changes will occur. In cytokine storm, we know that IL-1 and IL-6 levels increase, anakinra and tocilizumab block these interleukins receptors and may have potential protective and therapeutic effects for severe or critical ill patients.[15] However, accessibility to these drugs is not possible for everywhere. For instance, we had some difficulties reaching these agents at the appropriate time.

Among our 83 delivered pregnant women, only four deaths occurred at the postpartum period after cesarean section and death was not seen during pregnancy and after vaginal birth in our pandemic hospital which is unique in our region. Takemoto et al. found that the postpartum period should be considered as a risky situation for the mothers infected by COVID-19, the data about mode of delivery is missing in their study that included 124 maternal deaths versus 854 maternal cures. Thus, according to the Brazilian data of Takemoto et al., the rate of maternal death due to covid-19 was found to be 12% at a dramatic level.[16] On the other hand, Elshafeey et al. published a review article included 385 pregnant infected with COVID-19 disease, only one maternal death reported.[11] Centers for Disease Control in US reported 16 cases (0.2% maternal mortality) of maternal death between 8000 pregnant women with COVID-19 including the asymptomatic persons, this report identified an increased risk of hospital admission, admission to the ICU and mechanical ventilation in pregnant women, although there was no higher rate of death than the non-pregnant population.[12] Tug et al. evaluated 188 pregnant women with COVID-19 in their multicenter study in Turkey, only 6 patients admitted to the intensive care unit and the death was not occurred.[4] There is another publication by Sahin et al. in Turkey, this single center's study stated that maternal mortality rate is 0.4%.[17]

Hessami et al. assessed 37 maternal deaths, 24 of them were at postpartum period and mode of deliveries were not clear in their study too.[18] The rate of CS among pregnant women infected with COVID-19 was exceed up to 80% in Huntley et al.'s study but the outcome of the mothers was not clarified exactly and maternal death was not occurred.[19] Cesarean section may be considered as a surgical burden that leads to worsening of the disease. In addition, Lei et al. pointed out those patients who underwent surgery have an increased risk of negative consequences of COVID-19 disease.[20] Our experiences make us think that, surgical procedure may trigger the inflammatory cascade. Similar to what we observed, Vallejo et al. experienced a patient who died with rapid deterioration after cesarean section.[21] Zheng et al. also had to struggle with two worsening patient especially after cesarean section and the death was not occurred.[22] However, Maldarelli et al. and Hong et al. demonstrated that critically ill 34 week and 23 week pregnant women with COVID-19 can be managed and treated successfully under the mechanical ventilation without performing emergent CS.[8,23]

As effective treatments continue to be developed for COVID-19 disease, the basis and of the treatment is supportive therapy. In addition to the supportive therapy, we used only hydroxychloroquine and lopinavir–ritonavir for our mild–severe ill pregnants on admission

and kept on postpartum period according to the ongoing investigational trials for use in severe or critical COVID-19 infections such as anakinra for anticytokine effect, hydroxychloroquine to reduce acute tissue injury and antiviral medications, such as remdesivir or lopinavir–ritonavir, to inhibit SARS-CoV-2 viral replication.[24] However, after a randomized controlled trial and meta-analysis that did not recommend the use of hydroxychloroquine, we did not use it in our second, third, and fourth patients.[25] These changing response to the drugs and intensity of the occurrence of the infection in different time period may point to the viral mutations. As a matter of fact, the increased cases in the United Kingdom in the last days of 2020 explain this viral mutation.[26]

Moreover, a drug whose efficacy on pregnant women has been definitely accepted has not been determined yet. In a study published in early October 2020, it seems that the antiviral drug remdesivir which has been firstly evaluated in pregnant and puerperant women may have good results.[25] In that study, among 86 pregnant and postpartum women with severe COVID-19 who received remdesivir, recovery rates were high and maternal death did not occurred. At December 2020, in a network meta-analysis, anti-inflammatory agents (corticosteroids, tocilizumab, anakinra, and intravenous immunoglobulin), convalescent plasma, and remdesivir were found to contribute to improved outcomes in hospitalized COVID-19 patients. Hydroxychloroquine did not provide clinical benefits while posing cardiac safety risks when combined with azithromycin.[27]

However, WHO expressed the opposing view of the organization for the use of remdesivir.[28]

In conclusion, maternal deaths have devastating consequences and more appropriate management guidelines for pregnant women infected with covid-19 should be prepared immediately. Postpartum period after cesarean section should be followed cautiously under the appropriate treatment of COVID-19 disease.

Conflict of interest

The authors have no conflict of interest as financial, personal, political, intellectual, and religious interests.

Author contributions

İhsan Bağlı done conception, analyzing, and writing. Ece Öcal carried out, data collection; Osman Uzundere wrote the manuscript; Mustafa Yavuz carried out data collection. Fatma Bozkurt done revision of the manuscript.

Data availability statement

Data available on request due to privacy/ethical restrictions

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