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Case Report

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Postpartum basal ganglion hemorrhage in a covıd-19 patient: A case report

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Abstract

Pregnancy and postpartum periods are prone to thrombotic events rather than hemorrhages. Also, neurological manifestations of COVID-19 include ischemic events and associated hemorrhages more frequently compared to spontaneous hemorrhages. To date, no spontaneous intracerebral hemorrhage has been described in the postpartum period in a COVID-19 patient. A 26-year-old pregnant woman with diabetes mellitus was diagnosed and treated with COVID-19 following delivery. On the 8th day of treatment, she had a loss of consciousness. Emergency computed tomography revealed a hemorrhage in the right basal ganglion and inside the ventricles. The hematoma was evacuated and a ventricular catheter was placed through a mini burr craniotomy. The hemorrhage was resolved, but she remained tetraplegic. Intracerebral hemorrhage may occur in COVID-19 patients during postpartum which is a period where prothrombotic events are expected. Surgical evacuation and intraventricular catheters may be life-saving in these patients.

Keywords: COVID-19, intracerebral hemorrhage, basal ganglion, postpartum

1. Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2), a novel virus, caused a pneumonia outbreak in Wuhan, China at the end of 2019 which turned into the Coronavirus Disease-19 (COVID-19) pandemic in 2020 (1).

Possible association with intracerebral hemorrhage (ICH) and SARS-CoV-2 was first pointed out by Sharifi-Razavi (2). However, ischemic strokes and venous thrombosis are the most commonly reported lesions in patients with COVID-19. Considering the increased risk of thromboembolic events in COVID-19 patients, this is not unexpected. Also, it is known that women during pregnancy and postpartum are prone to thrombotic events (3).

In this paper, we report a case of spontaneous basal ganglion hemorrhage accompanying COVID-19 disease in the postopartum period.

2. Case Report

A 26-year-old diabetic pregnant female at 36th week of gestation was admitted for contact history with a COVID-19 positive person. Nasal swab test was negative. She was not given any treatment for being pregnant and asymptomatic. 5 days later, she was hospitalized for delivery by cesarean section. The following day, she was undertaken a chest computerized tomography (CT) to evaluate COVID-19 infection. Chest CT revealed bilateral peripherally located areas with ground-glass appearance which was considered as COVID-19 (Figure 1a). No nasal swab was performed. A treatment consisting of favipiravir and enoxaparin sodium (4000 IU daily) was started.

On the 7th day of her treatment, she suddenly lost her consciousness. Her laboratory findings are summarized in Table 1. She had bilateral myotic pupils and Glasgow Coma Scale (GCS) of 4. An acute hemorrhage in the right caudate nucleus and the ventricles was detected in an emergent cranial CT scan (Figure 1b). She was underwent emergent hematoma evacuation and an external ventricular drainage placement through a large burr-hole. The ventricular drainage catheter was removed the next day. She was extubated on the postoperative 4th day. Her nasal swab test for COVID-19 turned out positive in the postoperative period. She gradually improved and exhibited spontaneous eye-opening. At the time of discharge following 3-month hospitalization, her GCS was 8/15 and she was tetraplegic. In the latest cranial CT scan, the ventricles were clear except the frontal horn of the right lateral ventricle, with signs of near-complete resorption, the right basal ganglion had no gross pathology (Figure 1c).

Fig. 1. a) Glass-ground opacities are seen in chest CT. b) Axial CT scan shows acute hemorrhage in the right caudate nucleus and ventricules. c) Hemorrhage is almost totally resorbed as of 42th day.

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3. Discussion

To the best of our knowledge, this is the first case of spontaneous intracerebral hemorrhage secondary to COVID-19 in the perinatal period. Neurological events are quite common in patients with COVID-19. However, they present mostly in the form of ischemic strokes or cerebral venous sinus thrombosis. Though hemorrhage may accompany both ischemic strokes and sagittal sinus thrombosis occasionally, spontaneous intracerebral hemorrhage is quite rare even in nonpregnant population (4).

The age of patients with COVID-19 and cerebrovascular events range from 41 to 67 years, which is relatively younger than non-COVID-19 cerebrovascular cases (5). The interval between COVID-19 diagnosis and intracerebral hemorrhage range between 14-38 days (5). Patients who had experienced spontaneous hemorrhage usually have vascular risk factors like hypertension, hyperlipidemia, and diabetes mellitus (6).

Though the fatal cases were reported to be among those on anticoagulant treatment, Melmet et al found that anticoagulation use was associated with ICH, but not with mortality (6, 7). Altschul et al found that severe COVID-19 requiring mechanical ventilation, international normalized ratio (INR) > 1.2 on the day of hemorrhagic event, and spontaneous occurrence of hemorrhage are associated with increased mortality risk (8).

Among spontaneous hemorrhages, basal ganglions are less frequently involved (6). 4 of 11 cases reported by Mishra et al had hemorrhage in basal ganglia where two had accompanying intraventricular hemorrhage (6). Of 5 cases reported by Benger, only 1 had basal ganglia hemorrhage and that was not accompanied by intraventricular hemorrhage (5). Occasionally bilateral basal ganglia hemorrhage was reported in patients with COVID-19 (9). The basal ganglia receive their blood supply through small medial and lateral lenticulostriate arteries which make them susceptible to increased blood pressure (9). Since unilateral basal ganglia hemorrhage is usually seen in hypertension, it was postulated that bilateral hemorrhage may be due to thrombosis of the great cerebral vein which drains both basal ganglia (9).

Mechanisms of intracerebral hemorrhage in COVID-19 patients is not clear. Hyperinflammatory syndrome may occur and cytokine storm may damage neurovascular units, as seen in other viral infections (4). Apart from hypercoagulability, disrupted hemostasis, prolonged prothrombin time and bleeding disorders may also be seen in COVID-19 (4). This, especially in the setting of anticoagulation, may contribute to intracerebral hemorrhage (4).

Table 1. Laboratory findings of the case throughout the course of the events

	Initial admission (Day 0)	Child delivery (Day 5)	Hemorrhage (Day 13)	Discharge (Day 42)	Reference range
WBC (x 10^9/μL)	9.91*	8.44	15.90*	5.95	3.39-8.86
Hb (g/dL)	13.8	11.3	12.3	10.8*	11.1-14.7
PLT (x 10^9/μL)	133*	87*	202	182	171-388
Lymphocyte	2	1.36	0.95*	1.79	1.05-2.87
NLR	3.48	4.51	14.89	1.89	
ESR (mm/hr)	63*	55*	62*	60*	0-20
CRP (mg/L)	5.31*	10.27*	10.50*	22.13*	0-5
D-dimer (μg/mL)	0.90*	2.21*	2.56*	1.19*	0-0.5
Ferritin (μg/L)	37.6	46.4	93.7	202.5	10-291
APTT (sec)	NS	31.4	27.5	27.2	26-40
INR	NS	0.96	0.92	0.98	0.88-1.3
Fibrinogen (mg/dL)	555*	486*	507*	470*	200-400

* Out of reference range WBC: White blood cell; Hb: Hemoglobin; PLT: Platelet; NLR: Neutophil to lymphocyte ratio; ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein; APTT: Activated partial thromboplastin time; INR: International normalized ratio; NS: Not studied

In our case, the patient's age was 26 whereas the lowest reported age was 41 in the literature, She had diabetes mellitus and was receiving anticoagulation at a prophylactic dose. She had also delivered a baby a week earlier. Since she was mostly asymptomatic, the exact interval between infection and hemorrhage is unknown. But the interval between COVID-19 diagnosis and hemorrhage was 8 days. To the best of our knowledge, intracerebral hemorrhage has not been documented in the perinatal period in COVID-19 patients before, which is an unexpected event considering pregnancy and postpartum is a prothrombotic condition (3). In a pilot study, coagulation parameters were similar in pregnant women with asymptomatic/mild COVID-19, and in those without COVID-19 (10) . So, considering pregnancy is a hypercoagulable situation, in addition to the fact that COVID-19 is more commonly associated with ischemic events rather than spontaneous hemorrhage, one would expect an ischemic infarction or cerebral venous sinus thrombosis in this patient. There may be some possible explanations. First, as postulated in bilateral basal ganglia hemorrhage, this might have been due

to great cerebral vein thrombosis. However, we think it is unlikely since the hemorrhage is unilateral. Second, the mechanisms associated with ICH in COVID-19 might have overcome the tendency to postpartum thromboembolism. And third, it may just be a coincidence. It must be noted that, though the initial GCS was 4/15, placing an EVD and evacuation of hematoma via burr hole, prevented mortality, as of now. Also, she was not on mechanical ventilation at the time of hemorrhage and her INR was normal as well (Table 1), which were suggested to be mortality related factors.

In conclusion, despite an increased tendency to prothrombotic events during pregnancy and postpartum, hemorrhagic complications may occur in this period in patients with COVID-19. Placement of EVD and evacuation of hemorrhage may be life-saving in these patients. Also, diabetes mellitus might be a risk factor for basal ganglion hemorrhages in COVID-19 patients.

Conflict of interest

The authors declared no conflict of interest.

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Authors' contributions

Concept: F.T., Design: F.T., S.B., Data Collection or Processing: F.T., S.B., Analysis or Interpretation: F.T., S.B., Literature Search: F.T., S.B., Writing: F.T., S.B.,

Ethical Statement

This study does not required ethic committee approval.

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