Basal Ganglia Infarction a Rare Neurological Manifestation of COVID-19 in an Elderly Patient: A Case Report

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Research Article

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is spreading rapidly worldwide since the first cases were observed in Wuhan, China. Patients with COVID-19 develop multiple neurological symptoms, including headache, disturbed consciousness, and paresthesia, in addition to systemic and respiratory symptoms.

Case presentation: We presented a 57-years-old woman admitted to the emergency department (ED) - in December 2020 - with complaints of slurred speech, confusion, and left upper limb weakness after one week of positive nasopharyngeal swab sample for SARS-CoV-2.

Conclusion: This case report concludes that unilateral acute basal ganglia infarction may be a unique neurological manifestation after COVID-19 infection in an elderly patient.

Background

Coronavirus disease 2019 (COVID-19) is a novel disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). SARS-CoV-2 has spread rapidly worldwide since the first cases were observed in December 2019 in Wuhan, China [1]. Patients with COVID-19 develop neurological symptoms, including headache, disturbed consciousness, and paresthesia [2], in addition to systemic and respiratory symptoms. Stroke is one of the most typical neurological manifestations associated with COVID-19 [3], [4]. Also, basal ganglia haemorrhage [5], [6], and altered mental status are neurological manifestations of coronavirus disease 2019 [5]. Basal ganglia infarction is a relatively rare type of cerebral infarct with unique clinical manifestations [7]. We describe a case of basal ganglia infarction associated with COVID-19 in a female elderly patient.

Case Presentation

A 57-years-old woman presented to the emergency department (ED) - in December 2020 - with complaints of slurred speech, confusion, and left upper limb weakness. Her medical history included suffering from a persistent fever, severe headache, cough, fatigue, anosmia, dysgeusia, sore throat, vomiting, dizziness, fatigue, bony pain, and the reverse transcription-polymerase chain reaction (RT-PCR) assay of nasopharyngeal swab sample was positive for SARS-CoV-2 from one week before presentation in ED. The patient also has diabetes mellites and hypertension in her medical history. All routine diagnostic tests were done, and the patient's blood analysis showed that she had an increase in red blood cells (RBCs), lymphocytes count, a marked increase in C-reactive protein (CRP), and D. Dimer due to infection. She had a slight decrease in mean corpuscular haemoglobin concentration and a marked increase in fasting blood glucose (FBS) as she has diabetes (see Table 1). The patient weight: 70 kg; height: 150 cm; body mass index (BMI): 31 kg /m²; and the blood pressure: 140/100 mmHg sitting. The pulse was 90/min, and oxygen saturation of 90%. Chest computed tomography (CT) and magnetic resonance imaging (MRI) on the brain were done for the patient. CT on the lung showed few right-side apical small ground glass

consolidation patches with bilateral mild subpleural lower lobar ground-glass haze more accentuated on the right side that scientifically reefed to right-side viral pneumonia because of COVID-19. Few scattered sub-centimetric emphysematous bullae were noted with fine scattered subpleural atelectatic bands. Mediastinal structures are normal with a patent tracheobronchial tree. There is no mediastinal, hilar adenopathy, or pleural effusion (see Fig. 1). The scanned arterial tree, including the coronary vessels, involved advanced atherosclerotic changes and mild to moderate cardiac chamber enlargement. Visualized cuts of the upper abdomen revealed well defined right adrenal lesion with internal fat density measuring about 5.2 x 4 cm, primarily representing fat-rich adenoma with few bilateral simple cortical renal cysts (see Fig. 1).

Table 1
Laboratory tests and examinations

Laboratory Tests	Patient-level	Normal Level	Unit
Complete Blood Count (CBC)			
Hemoglobin (Hb)	13.2	12–16	g/dl
RBCs	5.39	3.8–4.8	X 10 ⁶ /UI
HCT	45.1	36–46	L/L
MCV	83.7	80–101	Fl
MCH	26.5	26–32	Pg
MCHC	29.3	31–34	g/dl
Platelet count	337	150–400	X 10 ³ /uL
WBCs	6.5	4–11	X 10 ³ /uL
Differential leucocyte count			
Neutrophils	45	40–80	%
1. Staff	3	0–8	%
2. Segmented	42	40–75	%
Lymphocytes	45	20–40	%
Monocytes	8	2–10	%
Eosinophils	2	1–6	%
Basophils	0	0–1	%
INR	1.02	1–3	
<i>Serum</i> Creatinine	0.9	0.6–1.10	mg/dl
S.G.O.T (AST)	32	Up to 40	U/L
S.G.P.T (ALT)	38	Up to 40	U/L
FBS	238	99 or lower	mg/dL
CRP	31.7	below 3.0	mg/L
D.Dimer	0.720	below 0.500	ng/mL
Ferritin	109.9	12 to 263	ng/mL

The patient's blood analysis showed an increase in RBCs, lymphocyte count, a marked increase in CRP, and a slight increase of D. Dimer due to infection. In addition, she had a slight decrease in mean corpuscular hemoglobin concentration and a significant rise in FBS as she has diabetes.

Abbreviations: RBCs: Blood Red Blood Cells (Erythrocytes); HCT: Hematocrit; MCV: Mean Corpuscular Volume; MCH: Mean Corpuscular Hemoglobin; MCHC: Mean Corpuscular Hemoglobin Concentration; MPV: Mean Platelet Volume; WBCs: White Blood Cells; INR: The International Normalized Ratio; SGOT: Serum glutamic oxaloacetic transaminase; AST: Aspartate aminotransferase; SGPT: Serum glutamic pyruvic transaminase; ALT: Alanine aminotransferase; FBS: Fasting blood glucose; CRP: C-reactive protein.

MRI of the brain shown acute infarction of right basal ganglia (see Fig. 2). Intravenous recombinant tissue plasminogen activator (rt-PA) was given to patients within 3 hours after onset. In addition to starting the COVID-19 therapeutic course, the decision was taken to admit the patient to an intensive care unit (ICU) until stabilizing O₂ saturation. We treated the patient with intravenous ceftriaxone (2 g/day for 14 days), methylprednisolone (60 mg daily over six months), and anticoagulation over three months. Symptoms resolved entirely within 72 h. The patient was discharged after two weeks of antibiotic therapy. During a follow-up period of two weeks, no new symptoms occurred, and the second nasopharyngeal swab by RT-PCR assay was negative for SARS-CoV-2.

Discussion

Basal ganglia infarction is a rare type of cerebral infarct with unique clinical manifestations [7]. Many factors may lead to basal ganglia infarction as diabetes mellites [8] and recently COVID-19, as in this Report. Among patients with diabetes, the risk of vascular events is significantly increased compared to nondiabetics [8]. The patient was a confirmed case of SARS-CoV-2 Infection, which agrees with the evidence that says that elderly patient is more susceptible to infection [9]. Our patient developed right-side viral pneumonia, and pneumonia is a significant cause of death in patients with cerebral infarction. Nakagawa et al. has shown that the mortality rate due to pneumonia in patients with basal ganglia infarcts was significantly higher than in patients with or without cerebral hemispheric strokes in other locations [10].

Due to right-side viral pneumonia, the decision was taken to admit the patient to ICU to protect her life. The last shreds of evidence shown that COVID-19 may cause many neurological conditions [4] as stroke [3], facial nerve palsy [11], Guillain-Barré syndrome [12], and basal ganglia haemorrhage [5], [6]. However, a more recent study conducted the incidence was relatively lower at 0.9% [13]. Tan et al. report that the pooled incidence of acute ischemic stroke (AIS) in COVID-19 patients was about 1.2%, with a high mortality rate [3]. However, the underlying stroke mechanism of COVID-19 remains debatable [3]. Elevated d-dimer is to be prominent in COVID-19 patients with concomitant ischemic stroke, but further mechanistic studies are required to elucidate their role in the pathogenesis of AIS. However, the multiple

studies described neurological complications of COVID-19; no previous evidence presented the association between basal ganglia infarction and COVID-19 infection.

Conclusion

This case report concludes that unilateral acute basal ganglia infarction may be a unique neurological manifestation after COVID-19 infection in an elderly patient. The most predicted mechanism is depending mainly on d. dimer changes. The learned Lesson of this case report is the rapid bring of the patient if he/she has any of the following symptoms (FAST): F: Facial drooping, A: Arm weakness, S: Speech difficulties, and T: Time to call for an emergency. The learned Lesson for doctors is accurate medical history taking and rapid diagnostic test performance.

Abbreviations

COVID-19: Coronavirus disease 2019, ED: Emergency department, SARS-CoV-2: severe acute respiratory syndrome coronavirus 2, RT-PCR: Reverse transcription-polymerase chain reaction, RBCs: Red blood cells, CRP: C-reactive protein, FBS, Fasting blood glucose, BMI: Body mass index, CT: Chest computed tomography, MRI, Magnetic resonance imaging, rt-PA: Intravenous recombinant tissue plasminogen activator, ICU: Intensive care unit, AIS: acute ischemic stroke, FAST: F: Facial drooping, A: Arm weakness, S: Speech difficulties, and T: Time to call for an emergency.

Declarations

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Authors' contributions

MAK is the only author in this case report, and the author collected data from the patient and written the case.

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Availability of data and materials

Not applicable.

Ethics approval and consent to participate

Informed consent was obtained orally from the patient's husband in this study.

Competing interests

The authors declare that they have no competing interests.

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Figures

Figure 1

Computerized tomography (CT) on the lung Multiple axial contiguous thin cuts were taken through the chest and shown few right-side apical small ground glass consolidation patches with bilateral mild subpleural lower lobar ground-glass haze more accentuated on the right side. In addition to mild to moderate cardiomegaly and right adrenal lesion with fat-rich adenoma.

Figure 2

Magnetic Resonance Imaging (MRI) on the brain Magnetic Resonance Imaging (MRI) on the brain shown acute right basal ganglia infarct. A) Fluid-attenuated inversion recovery (FLAIR). B) Diffusion-weighted imaging (DWI). C) Perfusion-weighted imaging (PWI).