Case Report of 78-Year-Old Man With Meningitis, Pulmonary Thromboembolism and SARS-Coronavirus-2 Infection

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Abstract- The novel coronavirus infection involves both the Central and Peripheral Nervous systems. Some of the presentations include acute cerebrovascular disease, impaired consciousness, transverse myelitis, encephalopathy, encephalitis, and epilepsy. Our patient was a 78-year-old man with dementia and diabetic nephropathy who was admitted two times for possibly COVID-19 infection. At the first hospitalization, the patient is treated with hydroxychloroquine and Kaletra based on clinical symptoms and initial laboratory findings due to suspicion of COVID-19. After the negative RT-PCR test of the nasopharyngeal sample for COVID-19 and evidence of aspiration pneumonia in CT scan, the patient was discharged with oral antibiotics. Five weeks later, he was rehospitalized with loss of consciousness, fever, and hypoxemia in the physical exam; he had neck stiffness in all directions, So the central nervous system (CNS) infection was suspected, the cerebrospinal fluid (CSF) sample was in favor of aseptic meningitis and second RT-PCR test of nasopharyngeal sample for COVID-19 was positive, but Brain MRI just showed small vessel disease without evidence of encephalitis. In the second hospitalization, he had acute renal failure, which was treated with supportive care, and also suffered from pulmonary embolism with cavitary lesions in his lungs. Meningitis with pulmonary embolism and acute renal failure have not yet been reported. Our patient is the first one, so we decided to share it. This case showed a different presentation of COVID-19 without typical lung involvement. So, we must pay attention to any signs and symptoms in a patient suspected of having a COVID-19.

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Keywords: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection; Meningitis; Pulmonary thromboembolism

Introduction

The coronavirus disease due to SARS-CoV-2 emerged in Wuhan city, China, in December 2019 and rapidly spread worldwide (1-3). World Health Organization (WHO) declared it a pandemic on 11 March 2020 (4). According to WHO reports, globally, there are more than 87 million confirmed cases and about 2 million deaths reported on 9 January 2021 (4). The primary manifestation is respiratory, but neurological features are also being reported, such as headache, acute cerebrovascular disease, impaired consciousness, transverse myelitis, encephalopathy, and encephalitis (3,5,6). Brain edema and the resulting degeneration of neural tissues in death patients have also been documented in autopsy findings (7). Also, a novel case of

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viral encephalitis caused by SARS-CoV-2 affecting the CNS was confirmed by the Beijing Ditan Hospital in China on 4 March 2020 for the first time (8). Although, Meningoencephalitis was just reported in two case reports (9,10). Meningitis with pulmonary embolism and acute renal failure have not yet been reported. This brief report describes the first case of the patient, so we decided to share it.

Case Report

A 78-year-old man with a history of type 2 diabetes from 10 years ago and CKD from two years ago due to diabetic nephropathy with creatinine in the range of 1.5-2 mg/dl. He was treated with insulin glargine. One year ago, he was diagnosed with dementia and had been hospitalized several times in a recent year due to high blood sugar and aspiration pneumonia. His last hospitalization was about 35 days ago in the infectious diseases ward, where he was hospitalized due to fever, sweating, vomiting, and lung involvement and suspicious for COVID-19 infection. Lab test showed leukocytosis, which was associated with severe neutrophilia, lymphopenia, and thrombocytopenia; creatinine was 1.5 mg/dl (Table 1).

Table 1. Lab tests at first and second admissions of patient

Data		First admission	Second admission	Discharge day	Normal range
White blood cell		$23*10^3/\mu L$	$14.3*10^3/\mu L$	$8.1*10^3/\mu L$	4-10
Neutrophil		93%	87%	84.3%	40-60
lymphocyte		3%	3%	9.2%	20-40
RBC		$5*10^6/\mu L$	$4*10^6/\mu L$	$3.5*10^6/\mu L$	4.6-6.2
hemoglobin		13.6g/dl	11g/dl	10g/dl	12-18
hematocrit		46%	35.7%	30.6%	36-52
platelet		$52*10^3/\mu L$	$97*10^3/\mu L$	107	130-450
BUN		31mg/dl	66.5mg/dl	27.5mg/dl	7-21
creatinine		1.6mg/dl	2.8mg/dl	1.4mg/dl	0.8-1.4
CPK		22	31U/L	27U/L	<195
LDH		338 U/L	472U/L	258U/L	230-460
ESR		35	40	25	
CRP		79	30.6	4	<5 negative
D-DIMER		-	3.2mg/dl	-	<0.2 negative
fibrinogen		-	373%	-	200-400%
ferritin		-	1846ng/ml	840	4-341ng/ml
procalcitonin		-	>10/μ g/L	-	<0.5 negative
PT		14sec	14.8sec	14sec	10-14
PTT		35sec	38sec	34sec	24-40
INR		1.2sec	1.3	1	-
AST		14U/L	27	10U/L	<38
ALT		15U/L	15	12U/L	<40
ALP		120U/L	214	90U/L	98-279
CSF	**PROTEIN**	-	21mg/dL	-	21-38
	glucose	-	171mg/dl	-	-
	WBC	-	60	-	0
	Neutrophil	-	90%	-	0
	Lymphocyte	-	10%	-	0
	Troponin	0	0	0	>.02 POSITIVE

The patient was initially treated with hydroxychloroquine and Kaletra (lopinavir/ritonavir) for a possible diagnosis of COVID-19. On the other hand, because of the suspected bacterial infection, he received Imipenem and levofloxacin. After the RT -PCR for COVID-19 from the patient's nasopharynx was negative, and according to the radiologist's CT scan report, the patient was more likely to have aspiration pneumonia than COVID-19 (Figure 1), so the patient was discharged. Five weeks after discharge, again, he was brought to the emergency ward with ambulance due to fever, productive cough, hypoxemia (O_2 Saturation 80% without oxygen), and loss of consciousness. At the emergency room, the patient's vital signs were: T: 38.50c, PR: 130/min, RR: 22/min, BP: 110/70 mmHg. He was awake on neurological examination but had no visual or verbal communication and did not obey orders. The pupils are mid-size with response to light, and he did not have a

neurologic focal deficit. He had neck stiffness in all directions. Auscultation of the lungs showed crackles in the base of both lungs. There were no other significant signs. The patient was transferred to the ICU, and further tests such as blood and urine cultures as well as Lumbar Puncture were performed. We repeated the sample of the nasopharynx for the COVID-19 test. The lung CT scan revealed the patchy ground-glass opacities in the left upper lobe, accompanied by peri-bronchial thickening and mild pleural effusion on the left side (CORADS-4) (Figure 2).

Figure 1. Brain MRI

Figure 2. Pulmonary artery CT angiography

In the CSF sample, the protein and sugar were normal, but white blood cells were 60 with predominance of PMN (90%). RT-PCR COVID-19 was requested in the CSF sample which was negative. Procalcitonin was more than 10, and ferritin, D-dimer were also high. Creatinine was also increased compared to the previous hospitalization (Table 1). CT scans of paranasal sinuses showed no evidence of sinusitis, CT scan of the brain showed generalized atrophy, and only small vessel disease was reported in Brain-MRI (Figure 3). All patient's cultures were negative. CSF sample for herpes virus and tuberculosis was also negative. Therefore, patient was diagnosed with aseptic meningitis due to COVID-19 infection and pneumonia, with acute on chronic renal failure, which was treated with meropenem, linezolid, and fluid therapy. The patient's blood sugar was high at the beginning of admission, which was controlled with basal and short-acting insulin. In the course of hospitalization, the patient's fever was stopped after 48 hours, and the patient's level of consciousness increased on the fourth day of hospitalization as he made eye and verbal communication. On the 14th day of the patient's hospitalization, suddenly he became tachycardia and tachypnea; we suspected pulmonary thromboembolism, so have done pulmonary artery CT angiography and color doppler ultrasound of the veins of both lower limbs, which was normal, the CT showed thrombosis in the sub-segmental of right upper lobe branches, in the parenchymal cuttings of the lungs, a consolidation with cavity was evident in the anterior segment of the LUL. Since the thrombosis was sub-segmental, so we just continued anticoagulant (heparin) as prophylaxis. After three weeks of treatment with the improvement of general condition, he was discharged.

Figure 3. Lung CT Scan

Discussion

COVID-19 involves both the central and Peripheral Nervous systems. Some of the presentations include dizziness, headache, acute cerebrovascular disease, impaired consciousness, transverse myelitis, encephalopathy, encephalitis, epilepsy, hyposmia (1). The first case of meningitis/encephalitis associated with SARS-Coronavirus-2 was reported from Japan. A brain MRI showed hyperintensity along the wall of the right lateral ventricle and hyperintense signal changes in the right mesial temporal lobe and hippocampus (1). In our patient, he was initially treated as a possible COVID-19 infection for the six-day course, but because CT scans of the lungs were not in favor of COVID-19 and the RT-PCR of COVID-19 was negative; therefore the treatment of COVID-19 was stopped, and the patient was discharged with oral antibiotics for aspiration pneumonia. At the next visit, five weeks later, due to clinical signs and physical examinations that raised the possibility of CNS involvement and the pulmonary opacities (CORADS 4), he was hospitalized and evaluated. The second time nasopharyngeal swab sample for RT-PCR COVID-19 was positive. The acute meningitis panel and herpes simplex viruses and tuberculosis at the CSF were all negative, and the pattern was consistent with aseptic

meningitis because the sample was taken at the first 24 hours of infection. Therefore, the predominance of PMN can be explained because, in viral meningitis, PMN can predominate first, and then lymphocytes increase. Since the treatment of aseptic meningitis is usually supportive, so the patient was just treated for pneumonia. The rate of thromboembolic events in severe cases of COVID-19 is higher. In this patient presence of thrombosis is another important sign of severe disease, the coincidence of these two complications, meningitis and thrombosis, is rare and requires more studies.

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