| Case Report |

Acute Ischemic Stroke- A presenting feature of SARS-CoV-2 infection

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Article Info

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Abstract

The ongoing pandemic caused by coronavirus disease (COVID-19) is now a global concern. Although SARS-CoV-2 primarily involves lung, there are emerging data on involvement of heart, brain, kidney, gastrointestinal tract, liver and others. Amongst neurological manifestations, acute stroke, encephalitis and GBS are reported. Here we describe two RT-PCR confirmed SARS-CoV-2 infected patients presented with acute ischemic stroke. The possible background mechanisms are arterial thrombosis due to hypercoagulability, direct and immune-mediated neuronal damage, viral vasculopathy, cardio-embolism etc.

Introduction

The ongoing pandemic caused by SARS-COV-2 infects more than eight million people and killed more than tweleve thousand life during writing of this report in Bangladesh since the first case was diagnosed on 8th March, 2020.[1] Clinical manifestations of COVID-19 are variable. It is already established that it is a multisystem disease. SARS-CoV-2 primarily involves lung, there are emerging data on involvement of heart, brain, kidney, gastrointestinal, liver and others.[2] Amongst neurological manifestations, acute stroke, encephalitis and GBS are reported.[3-5] Till now there are very few case reports of COVID -19 patients presented as acute stroke. Here we described two cases of COVID-19 primarily presented as acute stroke.

Case 1

67-year-old male with a past medical history of hypertension, obesity and asthma presented to the outpatient department of Bangabandhu Sheikh Mujib Medical University (BSMMU) with acute confusional state. He was suffering from fever, dry cough, anosmia for five days, vomiting and diarrhea for two days before checked in to our OPD. Vital signs on presentation were temp 101 ℉, heart rate-76 bpm, BP-150/90mmhg, Respiratory rate-30 bpm, hypoxemia with 90% saturation on room air. Neurological examination revealed right sided hemiplegia and aphasia. Muscle power was MRC grade-2 in right upper and lower limbs with right sided planter extensor. We referred the patient to National Institute of Neuroscience (NINS) hospital for CT scan of brain and further management. CT scan showed acute left Middle cerebral artery (MCA) ischemic stroke (Fig-1A). The patient was also tested for COVID-19 infection with RT-PCR and report came positive. Subsequently he was transferred to Dhaka Medical College Hospital (DMCH) as NINS is a non-COVID hospital. His laboratory profile is summarized in to Table-1. Important findings are lymphopenia (0.42 K/µl), hyponatremia (123 mmol/L), high CRP (116 mg/ml), elevated D-dimer (4500ng/ml) and very high ferritin (2415.7ng/ml). Chest X-ray shows bilateral pneumonia involving both the periphery of the lungs.

Patient was immediately put on 15L/min Oxygen by non-re-breather bag (NRB). He also received Antiplatelet (Aspirin+ Clopidogrel), Inj LMWH 60 mg BD, Antiviral (Favipiravir), Inj. Dexamethasone 5mg 06 hourly, Sodium replacement and antibiotics. He was referred for immediate ICU admission, however unfortunately no bed was available. On the next day of admission to DMCH his saturation dropped to 70% (on NRB) and sudden convulsion developed. There were no NIVs available to use due to

limited resources and unfortunately we lost the patient after several hours of resuscitation.

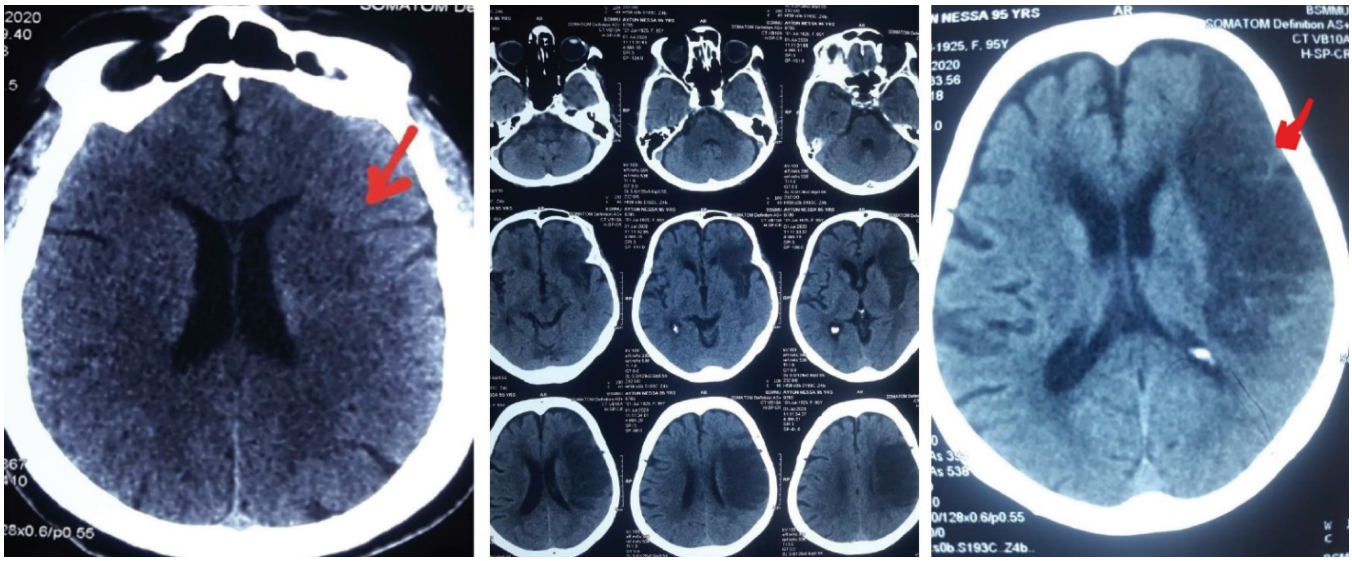
Case 2

95-years-old female hypertensive, non-diabetic patient presented to outpatient department of our hospital (BSMMU) with the complaints of sudden onset of weakness of right side of the body with slurring of speech for one day. Her attendant gave history of an episode of high grade fever with body ache, malaise and cough for five days preceding the current presentation. There was no breathlessness, chest pain, altered level of consciousness. During that time one of her family member was suffering from COVID-19 infection. On examination her GCS was 15/15, vitals were normal except blood pressure (160/90 mm of hg). On neurological examination there were features of upper motor neuron lesion in the right upper and lower limbs. Left side was absolutely normal. We referred the patient to COVID unit of BSMMU with advice for RT-PCR for COVID-19 and other routine investigations. The next day her RT-PCR reports came positive. Other investigations showed lymphopenia, high D-Dimer (Table I) done on 8th day of illness. CT scan of brain was also done which showed a large hypo dense lesion in the middle cerebral artery territory in left cerebral hemisphere without any perilesional edema and ventricular effacement (Figure 1 B &C). Patient developed respiratory distress in subsequent days and was died a week after despite standard treatment (steroid, enoxaparin, oxygen and antibiotic).

Table-I

Description of available laboratory reports

Laboratory Investigation	Case 1	Case 2
Hemoglobin (13-17 g/dl)	11	9.8
White blood cell (4-11 K/µl)	6	8.8
Neutrophils (1.4–6.5 K/µL)	5.4	7.3
Lymphocytes (1.2–3.4 K/µL)	0.42	1.14
Platelet Count (130–400 per mm3)	241	266
Neutrophil to Lymphocyte ratio (<3.5)	12.9	6.4
Lymphocyte to CRP ratio (<0.1)	0.003	0.087
SGPT (0–41 U/L)	180	66
SGOT (0–41 U/L)	102	
S. Creatinine (0.7–1.5 mg/dL)	1.2	1.5
RBS (3.5-7.8 mmol/l)	6.32	7.8
S. Electrolytes	Na-123, K- 3.9	Na-134, K-3.8
Hs CRP (0-6 mg/ml)	116	13
D-dimer (0–230 ng/mL)	4500	5800
S. Ferritin (15–150 ng/ml)	2415.7	865
Chest X-ray P/A view	Bilateral pneumonia	Bilateral pneumonia



(A) (B) (C)

Figure 1: (A, B, C) CT scan of brain demonstrating acute left Middle Cerebral Artery stroke (Shown as arrow)

Discussion

Neurological involvements are not uncommon in COVID-19 infection. A report of large case series from China showed that about 36.4% of patient had neurological presentation.[6,7] Amongst them headache, loss of smell and taste were the common presentation. Good quality clinico-epidemiological studies are lacking in Bangladesh. An online based study showed that in Bangladesh, 19.4% patients presented with neurological symptoms.[8-10]

The pathophysiology behind the COVID-19 associated neurological injury including cerebrovascular accident remains to be explored. SARS-CoV-2 has been shown to induce a hypercoagulable state, thus increasing the risk of arterial thrombosis.[11] Direct virus and immune mediated neuronal damage may also occur.[12,13] Vasculitis or viral vasculopathy may be an important pathogenesis.[12,13] SARS-CoV-2 may induce antiphospholipid antibodies, so early detection and prophylactic anticoagulation may reduce the ischemic event.[12,14] Another potential mechanism may be cardio-embolism e.g- from marantic (nonbacterial thrombotic) endocarditis or from virus associated myocardial injury.[15] Moreover, hypoxia can also induce inflammatory responses, including inflammatory cell infiltration and cytokine release, leading to further tissue ischemia.[16]

In this report, in both patients hyper coagulability could be the possible reason of this acute ischemic stroke as evidenced by elevated D-dimer level. In addition hypoxaemia further aggravated the condition.

Conclusion

These cases generated further evidence of neurological involvement in COVID-19 infection. Clinician should be vigilant of extra-pulmonary involvement of SARS-CoV-2 while receiving a case during this pandemic. An early and prompt intervention could be lifesaving. These cases also point out the limitation of resource (NIVs, ICU beds) in low and middle Income countries. Policy makers need to focus on these lifesaving issues by allocating more budget on health sector and speed up the process of capacity development.

Conflict of interest

none declared

Funding

None.

Ethical consideration

Written informed consent was taken from the patient's son (both) for publishing the history and pictures. Utmost respect and sympathy were shown to the patients during the course of treatment.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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