

COVID-19 Presenting with Acute Ischemic Stroke: Case Report from Ethiopia

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ABSTRACT

COVID-19 is reported to have a wide variety of presentations and one of those is new onset stroke. Patients are presenting with neurological deficit features and the affected areas of the brain are different. Here, we presented three cases of new onset strokes in confirmed COVID-19 patients from Ethiopia, along with their laboratory and imaging findings. These patients had separate clinical and imaging findings, which goes in line with other studies globally. This calls for further study and investigation on the topic.

Keywords: COVID-19; Stroke; Ischemia; SARS-CoV-2

INTRODUCTION

Coronavirus disease 2019(COVID-19), disease caused by novel coronavirus named severe acute respiratory syndrome coronavirus 2(SARS-CoV-2) was declared a pandemic by the World Health Organization on March 11, 2020 [1]. Presenting symptoms of COVID-19 range for asymptomatic COVID-19 - mild symptoms of upper respiratory tract infection, multiorgan system involvement to overwhelming ARDS and sepsis [2].

Before this SARS-CoV-2, there were two human-tropic corona viruses known as Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS), that resulted in epidemics at different point of time [3,4]. Neurological involvement was reported to be rare phenomenon in both MERS and SARS, and only a small number of patients reported to have been presented with ischemic and hemorrhagic stroke [5,6]. In contrast, COVID-19 has been reported to present with wide variety of neurological involvement including anosmia and ageusia, encephalopathy, encephalitis and Guillain-Barre syndrome. In addition, an estimated prevalence of 2-6% of acute ischemic stroke has been reported among COVID-19 patients [7].

Despite the progressively increasing evidence that support the association between COVID-19 and stroke, some data still contradict that [8]. The World Stroke Organization reported there has been a median of 50-70% reduction in stroke admission worldwide across 100 countries. Decline in

proportion of patients seeking care for mild forms of stroke as well as greater mortality in patients with cerebrovascular risk factors may have contributed to the decrease in admissions [9]. A study from New York State healthcare system reported that the odds of COVID-19 patients having stoked compared to other patients is one-fourth [8]. This cross sectional study that was done from January to April 2020 was a period immediately before the peak of the pandemic and this may have contributed for the observed bias of stroke risk. It is also argued that most patients in the study included were during lock-down period and stroke patient were reluctant to visit hospitals [9,10].

There are several proposed pathogenetic mechanisms associated as to why stroke occurs in COVID-19 patients. These are coagulopathy, endotheliitis and inflammation, platelet activation and cardio embolism [9].

In Ethiopia, there is lack of data with respect to the association of stroke and COVID-19. Here, we report three cases of COVID-19 who also presented with stroke at EKA Generalized Hospital. This report, to the best of our knowledge, constitutes the first COVID-19 presenting with stroke in Ethiopia. We present the demographic characteristics, clinical presentation, laboratory finding and imaging with management outcomes of the patients. The current report is from a single institution only, and we believe this will alert clinicians regarding the existence of the problem and such an awareness will be relevant in early recognition of stroke among COVID-19 will help reduce morbidity and mortality.

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Received date: December 13, 2021; **Accepted date:** December 27, 2021; **Published date:** January 03, 2022

Citation: Seyoum AB, Shihur TZ, Getahun BK, Tilahun YB (2022) COVID-19 Presenting with Acute Ischemic Stroke: Case Report from Ethiopia. J Hematol Thrombo Dis. 10:438.

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CASE DESCRIPTION

Patient one

A 51 year old male patient with no prior chronic medical illness presented 14 days after COVID-19 symptoms (cough and dyspnea). At the Emergency Room (ER), his BP was 132/66 mmHg and random blood sugar (RBS) was 127 mg/dL. He was maintaining his oxygen saturation with 4 liters intranasal support. He was put on antibiotics, dexamethasone and prophylactic dose of anticoagulation and was admitted to the ward. Laboratory findings are summarized on Table 1. On 10th day of admission, he developed sudden onset of right-sided body weakness with inability to speak. On physical examination, the respiratory and cardiovascular systems had unremarkable findings. On central nervous system, motor was 0/5 on both right extremities with facial deviation to the left side. Non-contrast brain CT-Scan suggested left middle cerebral artery (MCA) territory acute infarction. He was subsequently managed for acute stroke and discharged after 6 days.

Patient two

A 40 year old female patient was referred from another hospital with 14 days duration of symptoms compatible for COVID-19. She had no previous medical illness and required 5 liters of intranasal oxygen support at admission. On the 2nd day, she complained of loss of balance and had a falling down accident. On examination, the respiratory and cardiovascular systems had unremarkable findings. On examining the central nervous

system, motor was decreased and sensation was lost on the left lower extremity. Laboratory findings were non-revealing (summarized below). Brain MRI showed left cerebellar acute infarction. She was managed for acute stroke and discharged after staying for 13 days.

Patient three

A 62 year old male patient with a known history of diabetes for 20 years, and taking Metformin 1gm orally twice daily and Glibenclamide 5 mg orally once daily with regular follow up presented with 8 hours history of failure to communicate and sudden onset of right side body weakness. In addition, he reported a history of dry intermittent cough, fatigue and loss of appetite of 7 days duration. Four days prior to his presentation at the hospital, the patient was tested for COVID-19 and the test came back with positive RT-PCR result. On examination, BP was 130/70 mmHg, pulse rate was 90-94 beats/minute regular, respiratory rate was 48-50 breaths/minute and his random blood sugar (RBS) was 349 mg/dl. The chest and cardiac examinations had unremarkable findings while on motor examination the power on both right side extremities was 0/5 with facial deviation to right side. Non contrast brain CT-scan suggested left side ischemic stroke (hyper acute), and he was subsequently managed for acute stroke and also was started on steroid and antibiotics. His O₂ requirement progressively decreased but on 14th day of admission oxygen requirement started to increase and patient was transferred to ICU, where he was intubated. He showed no improvement and died after 4 days of admission to the ICU. The cause of death was due to multiple organ failure secondary to intractable septic shock.

Table 1: Laboratory and Radiological findings.

	Patient 1	Patient 2	Patient 3
Hemoglobin (g/L)	15.5	16.3	9.26
White cell count (/mm ³)	13490↑	11300	14400
Neutrophils	12,343	9854	13594
Lymphocytes	755	1141	532
Platelet count (/mm ³)	428000	264000	342000
Alanine aminotransferase (U/L)	90		75
BUN (mg/dl)	15	21	25
Cholesterol (mg/dl)	254↑	252	
Creatinine (μmol/L)	1.11	0.65	0.78
Imaging findings	-	-	-
Brain	Non contrast CT showed left insular and parietotemporal region parenchymal hypo density with 3 mm midline shift to the right,	Brain MRI showed left cerebellar hemisphere patchy and ill-defined T2 hyper intense and T1 slightly hypo intense lesion, suggesting Left	Non contrast CT showed loss of gray-white matter differentiation on the left hemisphere following MCA territory with hyper dense MCA

suggesting a left MCA territory cerebellar acute infarction- Left sign and insular ribbon sign acute infarction. posterior inferior cerebellar artery suggesting left side ischemic stroke territory

Chest

Bilateral reticulonodular opacity with ground glass opacity more on left middle and lower lung zone, with impression of viral pneumonia

DISCUSSION

COVID-19 was found to be related with new onset stroke in some patients, with majority of the studies done describing the incidence to be less than 5% [11-13]. Patients presented with signs and symptoms of stroke after delayed duration since the onset of COVID-19 symptoms. In these reports, the most common risk factors for new onset stroke in a COVID-19 patient were older age, severe disease and other comorbidities like hypertension and diabetes. Increased inflammatory response evidenced by higher white cell count and CRP with lower lymphocyte count were found to be common laboratory findings [11-13].

In this study, our patients were found to be younger with mean age of 51 years. This is less than the average age described by Li Y, et al., which was 71.6 years [13]. Large vessel stroke was described in younger patients less than 50 years in New York, which can be compared to our study [14]. The duration from COVID-19 symptoms to stroke presentation was 15.6 days in average, which is comparable with a study done on 6 patients (8-24 days) [11]. Two of our patients had no previous risk factor for stroke, as was seen in the New York study where 2 of the 5 patients had no risk factor either [14].

Raised white cell count and neutrophil number with lower lymphocyte count was found in all 3 of our patients, which was similar to other studies findings [11,13,15]. Imaging findings described in most COVID-19 related ischemic stroke was described to occur in the large vessels and were multi territorial [11,16]. In our study, two patients had infarction in the MCA territory while the third had cerebellar involvement.

The in-hospital mortality among COVID-19 patients with acute ischemic stroke was not observed to be different from non-COVID-19 patients, but the destination other than home rate after discharge was higher according to a study done in USA [12]. Two of our patients were discharged home while the third was in-hospital death incident.

CONCLUSION

COVID-19 was associated new onset stroke in our treatment center and the clinical and investigation results were found to be comparable with the findings observed globally. Clinicians should always consider the possibility of neurological complication in any COVID-19 patient, even with no risk factor. Finally, more research is needed to better understand the relationship between these two disease entities.

ACKNOWLEDGMENT

Special thanks to our hospital Eka Kotebe General Hospital.

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