

Demographics, Frequency and Pattern of Stroke in COVID-19 Patients: Study from a Tertiary Care Hospital

Samar Iltaf¹, Jawwad-us-Salam¹, Salma Salman², Afshan Siddiqui¹, Saira Abbas² and Iftekhhar Ahmed²

ABSTRACT

Objective: To determine the frequency of different pattern of stroke in Covid 19 patients in a tertiary care hospital of a metropolitan city.

Study Design: Descriptive Cross-Sectional study

Place and Duration of Study: This study was conducted at the department of Neurology and Medicine, Dow university of Health Sciences Karachi, Dow International Medical College Karachi over a period of six months from January, 2021 to December, 2021.

Materials and Methods: A total of 59 patients who were admitted with the diagnosis of stroke during the study period were included in the study. Presence of COVID-19 virus were identified by PCR were included in this study, also patient highly suspicious on clinical and radiological grounds were included.

Results: COVID test was positive in 22 subjects by nasopharyngeal PCR, 30 subjects positive on oro-pharyngeal PCR and 7 patients were COVID antibody positive. Chest x ray was normal in 4 (6.8%) and abnormal in 55 (93.2%). Majority was having COVID symptoms at presentation, dominating symptom was fever in 54.2% followed by shortness of breath 33.9% and cough 11.9%.

Conclusion: We found that stroke is not so common among patients with COVID-19 virus, but patients with stroke have high morbidity and mortality. This study helps to understand the different pattern of Stroke in COVID-19 patient so that the clinician is aware of the all possibilities.

Key Words: COVID-19 infection, ischemic stroke, hemorrhagic stroke, cerebral venous sinus thrombosis (CVST)

Citation of article: Iltaf S, Jawwad-us-Salam, Salman S, Siddiqui A, Abbas S, Ahmed I. Demographics, Frequency and Pattern of Stroke in COVID-19 Patients: Study from a Tertiary Care Hospital. Med Forum 2022;33(9):2-4.

INTRODUCTION

The corona virus disease 2019 (COVID-19), is a global pandemic disorder, it is declared as a health emergency by the WHO. The Corona virus disease mostly present with upper respiratory symptoms like fever, cough, shortness of breath, it can also present with various neurological manifestations such as hyposmia, headache, vertigo, altered sensorium, meningo-encephalitis. The cerebrovascular accident is a rare and disabling feature of coronavirus. The association of stroke with COVID-19 virus was first illustrated by the case study from China^[1].

¹. Department of Neurology / Medicine², Dow university Hospital, Dow University of Health Sciences, Karachi, Sindh.

Correspondence: Dr. Samar Iltaf, Department of Neurology, Dow university Hospital, Dow University of Health Sciences, Karachi, Sindh.

Contact No: 03337523544

Email: honey.sahar79@gmail.com

Received: April, 2022

Accepted: June, 2022

Printed: September, 2022

From many such studies it has been reported that 0.9% to 3.3% incidence of stroke with COVID-19 virus^[2-6]. The morbidity and mortality rates are higher in patients with stroke due to coronavirus^[7]. The inflammatory markers are noted to be very high in patients with coronavirus^[8], it has the affinity for ACE-2 receptors which are expressed in vascular endothelial and endothelial cells, and it also activates and secretes IL-6 which propagates the platelet aggregation and formation of infarct. Significant increase in IL-6 levels, CRP and D-Dimers in the CSF and blood of patient's correlates with the increased risk of thrombosis and vascular endothelial damage after ischemic stroke^[9]. The COVID-19 may have multi-organ involvement which further increases the risk of morbidity and mortality. All patients should undergo full work up of stroke to rule out the underlying modifiable risk factors, like Diabetes, hypertension and hyperlipidemia.

MATERIALS AND METHODS

This cross-sectional study was done to determine the demography and frequency of different pattern of stroke in COVID-19 patients admitted in COVID wards/HDU/ICU in DUHS Karachi a tertiary care teaching hospital. The sample size collected during the

third wave of COVID from 1 January 2021 till 31 December 2021 over a period of a year. All patient of CoVID-19 confirmed on PCR and suspected cases on basis of radiology and antibodies were included. Children and pregnant women were excluded from the study. The patients of known documented malignancy, hematological and rheumatologic disorders like APLA were also excluded. Written consent taken from the patient and its responsible attendant.

Questionnaire was designed by the senior neurology faculty for demographic assessment and frequency of pattern of stroke. Treatment given acutely and on discharge and TOAST classification of stroke also included.

The sample size was calculated by Rao soft calculator based on 4% response distribution, confidence interval of 95% and margin of error 5 % resulting in a sample size of 59.

Statistical analysis was done using SPSS version 20. Mean and standard deviation calculated for quantitative variable and frequency and percentage was calculated for qualitative variable. Age and gender will be cross tabulated with type of stroke using chi square to check any statistical significance. p value less than 0.05 was taken as statistical significance.

RESULTS

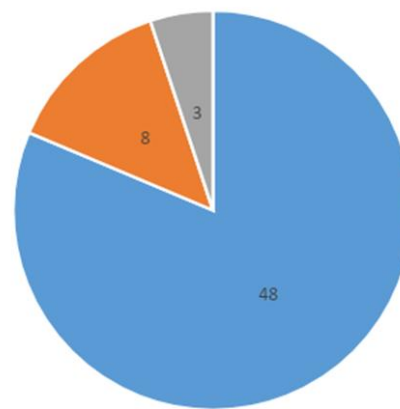
In our study we include total 59 patients included with stroke including 33 male subjects and 26 were female. Age ranges from 20 year to 85 years. The age divided into four categories, subjects within <20 year, second 20--45 year, 45--60year and > 60 year. Ten patients fall in second group i.e., between 20-45 years, 20 in 45-60yr group and 29 in >60 year age group. None of the subjects were less than 20-year-old. COVID test was positive in 22 subjects by nasopharyngeal PCR, 30 subjects positive on Oro-pharyngeal PCR and 7 patients were COVID antibody positive. Chest x ray was normal in 4 (6.8%) and abnormal in 55 (93.2%).

Table No.1: Frequency of Different Comorbidities in Covid 19 Stroke Patients

Comorbid Condition	ES	No
Diabetes	45	14
Hypertension	53	6
Atrial fibrillation	3	56
Dyslipidemia	36	23
Prior stroke	30	29
Ischemic heart disease	18	41

Table No.2: Frequency of Type of Stroke Cross Tabulated with Age Groups (P Value <0.05)

Age of patient	Ischemic stroke	Ischemic with haemorrhage stroke	CVST
20-45 yr	7	0	3
45-60	12	8	0
>60 years	29	0	0



■ ISCHEMIC STROKE ■ ISCHEMIC STROKE WITH HEMORRHAGE ■ CVST

Figure No.1: Frequency of Pattern of Stroke in COVID-19 Patients

Majority was having COVID symptoms at presentation, dominating symptom was fever in 54.2% followed by shortness of breath 33.9% and cough 11.9%. Frequency of different comorbidities in COVID-19 stroke patients is tabulated in Table 1.

The location of stroke was cortical in 53 (89.8%) and the common vascular territory involved was right MCA 34 (57.6%) followed by left MCA 15 (25.4%). Echo was done in 81 % of patient and in 76.3% it was normal. Vascular imaging most frequently done was carotid Doppler 31 (52.5%) and MRA in 24 (40.7%). Choice of antithrombotic is dual anti platelet and LMWH in 22 each (37.3%). Toast classification show large atherosclerotic in 52 (88.1%), other determined in 3 (5.1%) and undetermined in 4 (6.8%). Most patient discharge on dual antiplatelet 29 (49.2%).

DISCUSSION

The risk of ischemic stroke is around 4-5% due to COVID-19 according to the review of World Stroke Organization^[10]. Few cases have reported Intra-cranial hemorrhagic stroke due to COVID-19^[11-12]. In our study we have also found that the number of ischemic stroke was more common than hemorrhagic stroke and only three patient presented with CVST. Most of these patients were old age and have previous co-morbid illnesses which is compared with the fifty patients with ischemic stroke admitted in Wuhan, China, those have previous comorbid illness, have elevated coagulation profile/inflammatory markers for example CRP, ESR and D-dimers levels^[13]. The pathogenesis for stroke in COVID-19 patients is undetermined; the potential pathophysiologic mechanisms are thought to be binding of SARS-COV2 with ACE2 receptors in vascular endothelium^[14], activation of inflammatory cytokines like IL-6, release of tissue factor which binds with factor V11, activating coagulation and formation of thrombosis. The release of von Willebrand factor (vWF) and activation of platelets, platelets activation plays a very important role in the thrombus formation,

cardiac-embolism is also common in COVID-19 hospitalized patients. In a case study from Wuhan, China, stroke was reported in 5.0% COVID-19 patients among them 90% had ischemic stroke and 9% had hemorrhagic stroke ^[15].

In this study we included confirmed and suspected COVID-19 (RT-PCR negative cases). Real-time quantitative reverse transcriptase polymerase chain reaction (RT-qPCR) assays and antigen tests for rapid detection of SARS-CoV-2 for detecting viral antigen from nasopharyngeal and oropharyngeal swab specimens were used to detect the coronavirus. The sensitivity of PCR for COVID-19 is 85-89%, the results might be false positive or negative. In one of the case studies from John Hopkins research department, too early testing likely to give false negative test ^[16], COVID-19 cases can't be ruled out on RT-PCR negative testing, in highly suspicious cases we performed the HRCT scan and repeat testing of RT-PCR for COVID-19.

Limitations of this study are: this study is a single center study with a limited number of patients, the suspected COVID-19 cases were included in this study, the symptoms might be due to some other respiratory illness, which can't be ruled out on single RT-PCR negative testing.

CONCLUSION

In conclusion, we found that ischemic stroke is more frequent in our data. However, to establish strong association analytical studies are required. Coronavirus disease is a globally pandemic medical emergency that has added the burden on health care and stroke services, along with the traditional stroke management, the infectious control measures should be vigilantly taken by the clinicians to prevent the complications of the disease.

Author's Contribution:

Concept & Design of Study:	Samar Iltaf
Drafting:	Jawwad-us-Salam, Salma Salman
Data Analysis:	Afshan Siddiqui, Saira Abbas, Iftekhar Ahmed
Revisiting Critically:	Samar Iltaf, Jawwad-us- Salam
Final Approval of version:	Samar Iltaf

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

- Mao L, Jin H, Wang M. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. *JAMA Neurol* 2020;77: 683–690.
- Merkler AE, Parikh NS, Mir S. Risk of ischemic stroke in patients with coronavirus disease 2019 (COVID-19) vs patients with influenza. *JAMA Neurol* 2020;77:1366–1372.
- Yaghi S, Ishida K, Torres J. SARS-CoV-2 and stroke in a New York healthcare system. *Stroke* 2020; 51:2002–2011.
- Immovilli P, Terracciano C, Zaino D. Stroke in COVID-19 patients—a case series from Italy. *Int J Stroke* 2020;15:701–702.
- Rothstein A, Oldridge O, Schwennesen H, Do D, Cucchiara BL. Acute cerebrovascular events in hospitalized COVID-19 patients. *Stroke* 2020;51:e219–e222.
- Ellul MA, Benjamin L, Singh B. Neurological associations of COVID-19. *Lancet Neurol* 2020; 19:767–783.
- Ntaios G, Michel P, Georgiopoulos G. Characteristics and outcomes in patients with COVID-19 and acute ischemic stroke. *Stroke* 2020;51:e254–e258.
- Lambertsen K, Biber K, Finsen B. Inflammatory cytokines in experimental and human stroke. *J Cereb Blood Flow Metab* 2012;32(9):1677–98.
- Tuttolomondo A, Di Raimondo D, Pecoraro R, Arnao V, Pinto A, Licata G. Inflammation in ischemic stroke subtypes. *Curr Pharm Des* 2012;1(18):4289–310.
- Qureshi AI, Abd-Allah F, Al-Senani F, Aytac E, Borhani-Haghighi A, Ciccone A, et al. Management of acute ischemic stroke in patients with COVID-19 infection: report of an international panel. *Int J Stroke* 2020.
- Al Saiegh F, Ghosh R, Leibold A, Avery MB, Schmidt RF, Theofanis T, et al. Status of SARS-CoV-2 in cerebrospinal fluid of patients with COVID-19 and stroke. *J Neurol Neurosurg Psychiatr* 2020.
- Sharifi-Razavi A, Karimi N, Rouhani N. COVID-19 and intracerebral hemorrhage: causative or coincidental? *New Microbes New Infect* 2020;35:100669.
- Qin C, Zhou L, Hu Z, Yang S, Zhang S, Chen M, et al. Clinical characteristics and outcomes of COVID-19 patients with a history of stroke in Wuhan, China. *Stroke* 2020;51(7):2219–23.
- Hamming I, Timens W, Bulthuis M, Lely A, Navis GV, van Goor H. Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. *J Pathol* 2004;203:631–7.
- Li Y, et al. Acute cerebrovascular disease following COVID-19: a single center, retrospective, observational study. *Stroke Vasc Neurol* 2020;5:279.
- Lauren M. Kucirka, Stephen A. Lauer, Oliver Laeyendecker, Denali Boon, Justin Lessler. Variation in False-Negative Rate of Reverse Transcriptase Polymerase Chain Reaction–Based SARS-CoV-2 Tests by Time since Exposure. *Annals Int Med* 2020.