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Collage of medicine

stroke and covid 19

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Introduction

Coronavirus disease 2019 (COVID-19) might also additionally increase the threat of acute ischemic stroke, much like the increased threat of 3.2-fold to 7.8-fold visible withinside the first three days after different respiration tract infections.

Numerous papers over the recent times have stated upon the clinical traits, problems and result of patients infected with COVID-19. Between the varied symptoms of COVID-19, neurological features have been underlined by numerous authors.

Stroke is one of the popular comorbidities that has been termed. Ischemic stroke (IS), intracerebral haemorrhage (ICH), and cerebral venous thrombosis (CVT) have all been stated with variable frequencies. However, no clarity occurs whether COVID-19 is relevant or just co-exists or activates the occurrence of stroke.

It is important to glean from the published data, stroke qualities like type, severity, primary vascular risk factors, biochemical and prothrombotic abnormalities and outcome. Combining this data will give a clearer outline and may help understand the relative between stroke and COVID-19. This systematic review aims to analyze the info described among available studies of stroke in COVID-19.

Patients and methods

Method

The systematic review has been brought out in harmony with the suggestions of the Ideal Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement . However, the protocol was not pre-listed in view of time limitations

Data extraction

The following information was removed from the included studies anywhere available: study author(s), study design, individual patient information including age, sex, severity of COVID-19, occurrence or absence of COVID-19 symptoms at the onset or diagnosis of stroke, type of stroke, days from the diagnosis of COVID-19 to onset or diagnosis of stroke, imaging, comorbidities, laboratory values, treatment, and outcome. Experimental of ORG 10172 in Acute Stroke Treatment (TOAST) categorization for stroke subtype was obtained if specifically mentioned and based on radiological and other data available. All patients conceded in the intensive care unit (ICU) were considered “critically sick” in the current review. The clinical results variably stated in articles were categorized into three categories; ‘survivors,’ ‘still hospitalized at the time of publication,’ or ‘non-survivors’ for whom such data was available.

Statistical analysis

Categorical variables are stated as incidences. Constant variables which had a regular or near regular dissemination are expressed as mean±standard deviation (SD) and those which did not have regular distribution are expressed as medians with interquartile ranges (IQRs). Similarities between categorical variables was done by chi-square test and continuous variables was done by independent t-test or Mann-Whitney U-test wherever appropriate. Logistic regression was applied to determine independent analysts of persistence and odds ratio calculated wherever applicable. A two tailed P-value of ≤ 0.05 was taken as significant.

Results

A sum of 115 patients with acute or subacute stroke contaminated with SARS-CoV-2 from the 30 researches included were studied in this systematic review. Bulk of the variables had lost data and those patients with the missing data for a particular variable were prevented from analysis of the given variable

The mean±SD age of the patients was 62.5±14.5 years. Bulk of the patients were males (42 [62%]). IS (101 [87.8%]) was the most frequent category of stroke then ICH (6 [5.2%]) and CVT (3 [2.6%]). 2 patients had together ICH and subarachnoid haemorrhage (SAH) (1.7%), one patient (0.9%) each had SAH and transient ischemic attack (TIA) and one patient (0.9%) had together SAH and IS. Nearly one-third of all strokes happened within an additional 10 days from the diagnosis of COVID-19.

The most mutual risk factor recognized was hypertension (HTN, 42 [42%]), followed by dyslipidaemia (24 [26.1%]), diabetes mellitus (23 [23.2%]), atrial fibrillation (AF, 11 [11.2%]), coronary artery disease (10 [10.2%]), previous stroke (7 [7.1%]), heart failure (4 [4.1%]), alcoholism (3 [5.2%]), smoking (9 [14.3%]), and pacemaker (1 [1%]). Five patients got malignancies including lung (two patients), prostrate (one patient), stomach (one patient), and nasopharyngeal cancer (one patient). One patient each had chronic kidney disease and chronic obstructive lung disease. The most common subtype of IS was large artery atherosclerosis (LAD) (25 [35.2%]) followed by cryptogenic (23 [32.4%]), cardioembolic (CE, 10 [14.1%]), other determined causes (7 [9.9%]), and small vessel disease (6 [8.4%]) respectively. As each from the data, five patients got positive anticardiolipin antibodies with immunoglobulin M (IgM) in two and IgA in three patients. Among these patients, anti-β2-glycoprotein I IgA and IgG were present in three patients as well. No absolute titres were available from the studies. Five patients had lupus anticoagulant (LA) positive

Computed tomography (CT) scan of brain and CT angiography were the main mechanical and vascular imaging modes used for stroke, one-to-one. Brain imaging models of ischemia were available for 39 patients (33.9%). Most observed pattern was uni-hemispheric, anterior circulation infarct confined to a single vascular territory (19 [48.7% of 39]) with majority (14 [73.7%]) of them having large artery disease.

The mean age of those who were symptomatic for COVID-19 at the time of stroke was considerably more (64±17 years) than that were asymptomatic (55±17 years; *P*=0.05). The C-reactive protein (CRP) was substantially higher in those who have symptoms particular to COVID-19 at the time of stroke (mean±SD of 129.9±14.3 mg/L) than those who don't (55.3±67.1 mg/L; *P*=0.02). Rest of the laboratory factors did not differ between symptomatic and asymptomatic patients.

Treatment notes were available in 96 (83.4%) patients. Twenty patients got reperfusion therapy. The mean age was 59.1±14.21 years. Intravenous or intraarterial recombinant tissue plasminogen activator (rTPA) was provided to 13 patients

Clinical result was offered for 90 patients (78.2%). Including them, 17 were yet hospitalized at the time of article journal. Among the outstanding 73 patients for whom complete results in terms of survival was available, death was noted in 35 (out of 73) patients (47.9%) and final reason of death was not available in all patients. Of note, bulk (33 [94.3% of 35]) of them were seriously sick. In five patients, serious stroke was the immediate cause of death. In four patients, removal of care was demanded by the family. In 21 patients, no particular reason was mentioned, but it is probable that a mixture of severe COVID-19 as well as comorbidity with stroke caused death, as these patients were seriously sick as per the facts available. Other reasons of death involved pneumonia in two patients, severe hemodynamic instability in one, septic shock in one, and systemic thromboembolism in one patient. The clinical and laboratory information was contrasted between survivors and nonsurvivors. Patients who died had more severe disease at the onset. They were more likely to be smokers and to have two or more vascular risk factors, , CRP, and LDH, higher levels of D-dimer as compared to survivors. Factors associated with mortality in this scenario were ICU admission, dyslipidemia, presence of two or more vascular risk factors, high levels of serum ferritin, CRP, D-dimer, and LDH.

Discussion

There is yet an uncertainty in the connection between stroke and COVID-19. It is uncertain whether it is causative or just accidental. The median time to get stroke in the present review was 10 days from the identification of COVID-19 and was very much longer in the seriously-ill patients. Furthermore, many of these seriously-ill patients had a late diagnosis of stroke based on neuroimaging results because of a absence of clinical suspicion in attendance of multisystem dysfunction and/or likely struggle in measuring the neurological status, chiefly in sedated and ventilated patients. This may indicate an effect of infection, inflammation and severe cytokine activity on systemic and neurological deterioration. Even Though cytokine levels were not calculated in most of the studies, levels of CRP, ferritin, LDH, and D-dimer were observed to be very high-level and more so among ill patients.

Evidence of unusual coagulation factors related to COVID-19 appeared in early articles from China. the primary report of ninety nine hospitalized patients in wuhan showed that inflammatory biomarkers of interleukin-6, erythrocyte ESR, CRP, D-dimer, and different coagulation parameters were increased or deranged. High levels of D-dimer were determined within the gift review which could be due to COVID-19 associated inflammation and therefore the resultant downstream triggering of coagulation cascade

Higher age and CRP degrees had been discovered amongst patients symptomatic for COVID-19 on the time of analysis of stroke. Reports elucidating variations among COVID-19 positive and COVID-19 negative strokes have additionally observed better degrees of inflammatory biomarkers most of the former. Though this evaluation centered on patients with COVID-19 and stroke, one of the research covered withinside the present evaluation had as compared characteristics of stroke in patients with and with out COVID-19. The patients with COVID-19 had been more youthful and frequently had cryptogenic, excessive and deadly strokes. These findings advise that there can be critical variations withinside the pathophysiology of the stroke with and with out COVID-19

Although traditional risk factors had been now no longer stated in element amongst all of the studies, higher age, HTN, diabetes, smoking, dyslipidaemia, and AF had been typically observed. Interestingly, comorbidity with most cancers became additionally reported, albeit in few patients. Presence of vascular risk factors could be independently related to incidence of stroke amongst patients with COVID-19. This is supported via way of means of the statement that the most common imaging sample of IS withinside the present overview became infarcts in a single vascular territory with majority of them having LAD. C. humans with underlying vascular risk factors had been additionally in all likelihood to have worse results with COVID-19, suggesting a complicated relationship among COVID-19, vascular comorbidity, and stroke incidence

The pattern of the stroke in addition to imaging findings in some patients with multifocal infarcts, haemorrhage and venous thrombosis hints at a spread thrombosis or inflammatory vasculitis, reinforced by high D-dimer levels, pulmonary thromboembolism in addition to evidence of endothelial inflammation and target organ injury.

High death was seen in the current review. Smoking, having two or more vascular risk factors, ICU stay, high D-dimer, CRP, and LDH levels increased the chances of death substantially. Prophets of death seen in the previous studies were pneumonia, multiorgan failure, critically ill state, high CRP, D-dimer, presence of vascular risk factors, and other co-morbidities

Conclusion

The current systematic review indicates that stroke in COVID-19 is most likely multifactorial. This is aided by occurrence of vascular risk factors, a high inflammatory marker response, D-dimer levels and presence of APLAs in these subjects. Results of patients with COVID-19 and related stroke may be poor, particularly among patients with serious COVID-19 and high levels of inflammatory markers. Prospectively collected comparative data on stroke phenotypes, treatment lists and results among patients with and without COVID-19 is very much wanted to enhance our understanding regarding this emerging association.

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