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26th Annual Research Day

May 5th, 12:00 AM

Evaluating the Relationship and Outcomes of Ischemic Stroke in Patients with COVID-19 While Also Reviewing Overall Incidence and Mortality of Stroke in Vulnerable Populations in the US

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Dougherty, Jaime, "Evaluating the Relationship and Outcomes of Ischemic Stroke in Patients with COVID-19 While Also Reviewing Overall Incidence and Mortality of Stroke in Vulnerable Populations in the US" (2022). *Stratford Campus Research Day*. 56.

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Background

- COVID-19 has affected the worldwide population since early 2020 and has remained a health issue since. Among the various symptoms and outcomes people are encountering when infected with COVID, this virus has also been connected to severe vascular insults involving large vessel occlusions.
- Current stroke statistics indicate a nearly twice as high risk of stroke in African Americans when compared to whites⁶.
- This brings into question how social determinants of health are affecting COVID-19 and stroke incidence.
- The purpose of this review is to investigate the relationship between COVID-19 and ischemic stroke while advocating for a more robust primary prevention approach of stroke in vulnerable populations¹⁻³.

Methods

From September 2021 to November 2021, I searched the following databases: PubMed, CDC, NIH, National Stroke Association, New England Journal of Medicine, to investigate research studies related to COVID's pathophysiology, the relationship between COVID and the incidence of large vessel occlusions, minority populations and the effect COVID has had on them, the various vaccines available for COVID, and lifestyle changes to reduce the risk of stroke.

Types of studies. I included studies that evaluated meta-analyses, case reports, clinical trials, retrospective and prospective chart reviews, or efficacy-based models. Qualitative methods and mixed method evaluations were conducted throughout studies included.

Types of participants. Studies reviewed included reviewed participants who met the following criteria: COVID-19 positive; diagnosed with an LVO, ischemic stroke; English speaking; African American; Hispanic; low SES; living in the U.S.; and individuals determined to be at a higher risk for COVID-19 and ischemic stroke.

Types of outcome measures. Results for participants of the study were reviewed in all studies as all populations were included in this review. Studies evaluating the vulnerable and at-risk populations were also reviewed.

Results

COVID pathophysiology includes utilization of angiotensin converting enzyme 2 (ACE2) to enter cells where downstream effects include thrombosis, microangiopathy, endothelial activation and angiogenesis 4,5.

A multistate analysis which included 417 hospitalized adults 65 years of age and older, was performed to evaluate vaccine effectiveness in reducing disease severity. Effectiveness was shown to be 94% for full vaccination with either the Moderna or Pfizer vaccine. This data continues to highlight the importance of vaccination in high-risk populations including those affected by COVID-19 with ischemic stroke as a severe outcome. 7

The underlying physiological damage inflicted by the COVID-19 virus includes a cytokine storm which ensues continued endothelial damage. Widespread severe inflammation allows for fibrin clot formation, micro thrombus, DIC, and multi organ failure. 4,5

Economic and social disparities, unequal access to healthcare, and genetic factors which have been linked to a more severe inflammatory response and are seen in Latinos and African Americans. 8

In 2019, a Global COVID-19 Stroke registry was created amongst 28 hospital systems and 16 countries. From the analysis, an increase in stroke severity on admission was observed. Additionally, the findings suggested ischemic strokes are associated with a higher mortality and more severe outcomes. 6

References

1. Centers for Disease Control and Prevention. Underlying Cause of Death, 1999-2019 Request. Accessed March 12, 2020.
2. Hamouda D, Jillella DV, Bhatt N, Koneru S, Frankel MR, Nogueira RG. Intraluminal carotid thrombosis and acute ischemic stroke associated with COVID-19. *J Neurol.* Apr 29 2021;doi:10.1007/s00415-021-10562-1
3. Mattioli F, Stampatori C, Righetti F, Sala E, Tomasi C, De Palma G. Neurological and cognitive sequelae of Covid-19: a four month follow-up. *J Neurol.* May 1 2021;doi:10.1007/s00415-021-10579-6
4. Siddiqi HK, Libby P, Ridker PM. COVID-19 - A vascular disease. *Trends Cardiovasc Med.* 2021;31(1):1-5. doi:10.1016/j.tcm.2020.10.005
5. Libby P, Lüscher T. COVID-19 is, in the end, an endothelial disease. *Eur Heart J.* Sep 1 2020;41(32):3038-3044. doi:10.1093/eurheartj/ehaa623
6. Naeimi R, Ghasemi-Kasman M. Update on cerebrovascular manifestations of COVID-19. *Neurol Sci.* Dec 2020;41(12):3423-3435. doi:10.1007/s10072-020-04837-0
7. Tenforde MW. Effectiveness of Pfizer-BioNTech and Moderna Vaccines Against COVID-19 Among Hospitalized Adults Aged ≥65 Years. Accessed November 8, 2021.
8. Akhtar N, Abid FB, Kamran S, et al. Characteristics and Comparison of 32 COVID-19 and Non-COVID-19 Ischemic Strokes and Historical Stroke Patients. *Journal of Stroke and Cerebrovascular Diseases.* 2021/01/01/ 2021;30(1):105435. doi:<https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.105435>

Discussion

- Strengths of this research do show an association between disparities in the population and worse outcomes of COVID-19.
- This review highlights the significance of vaccine distribution as the efficacy of both the Pfizer and Moderna vaccines prove to reduce contraction of the virus.
- Access to adequate living situations, fresh fruits and vegetables, and healthcare are all factors to take into consideration when evaluating SES status and implementing preventative health measures.
- Racial disparities need be considered when evaluating a targeted approach to reducing the incidence of ischemic stroke and COVID-19 cases.

Conclusion

- The findings from the literature review aids physicians in recognizing the importance of management of COVID-19 patients with the possibility of developing a large vessel occlusion
- This review also aids in directing a more targeted preventive healthcare approach to vulnerable populations to reduce the risk of ischemic stroke.
- To continue vaccination encouragement amongst at risk populations by reviewing current literature in layman's terms with their patients.
- Policies directed at preventative health is an area which should continue to be a conversation.