

Stroke risk, phenotypes, and death in COVID-19

Systematic review and newly reported cases

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Study question

What are the stroke risk factors, clinical phenotypes and outcomes of stroke in people with COVID-19?

What is known and what this paper adds

COVID-19 increases the risk of venous and arterial thrombotic events, and clinicians have voiced concerns about severe strokes in young people with COVID-19. This investigation's results show that strokes are relatively common and often devastating events in patients with COVID-19.

Methods

For this meta-analysis, the investigators used PubMed, medRxiv, bioRxiv, and Research Square to conduct systematic searches for studies concerning cerebrovascular events in patients with COVID-19 that came out between November 1, 2019, and May 29, 2020. The investigators applied no language restrictions. They found 10 studies that reported stroke incidence data in patients with COVID-19 and added data from an unpublished Canadian cohort. They then conducted a random-effects meta-analysis to determine the overall incidence of stroke in patients with COVID-19. For analyses of stroke outcomes and characteristics, the investigators focused on 160 patients with laboratory-confirmed COVID-19 who experienced strokes, including 125 patients described in 42 published case reports and case series studies and 35 unpublished cases from Canada, Iran, and the US. The primary outcomes were the in-hospital mortality rate and clinical characteristics of these patients.

Table Results of a cluster analysis of 124 patients with COVID-19 and stroke

Cluster	Major features	Death rate
1	Low comorbidity and risk factor burdens & diverse stroke types	23.4%
2	Ischemic strokes & middling comorbidity and risk factor burdens	31.7%
3	Older ages, high comorbidity and risk factor burdens, & severe respiratory symptoms	58.6%

Results and study limitations

The estimated incidence of stroke in patients with COVID-19 was 1.8% (95% confidence interval [CI], 0.9%–3.7%). The estimated in-hospital mortality rate for patients with COVID-19 who experienced strokes was 34.4% (95% CI, 27.2%–42.4%), with the mortality risks being highest for patients with older ages, high comorbidity burdens, and severe respiratory symptoms. The prevalence of large vessel occlusion in these patients (46.9%) was high. The present study lacked complete data due to its reliance on case reports, but the diverse data sources favor generalizability.

Study funding and competing interests

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A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The corresponding author(s) of the full-length article and the journal editors edited and approved the final version.

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