Study finds wide disparities in use of EMS and hospital arrival time for recurrent strokes

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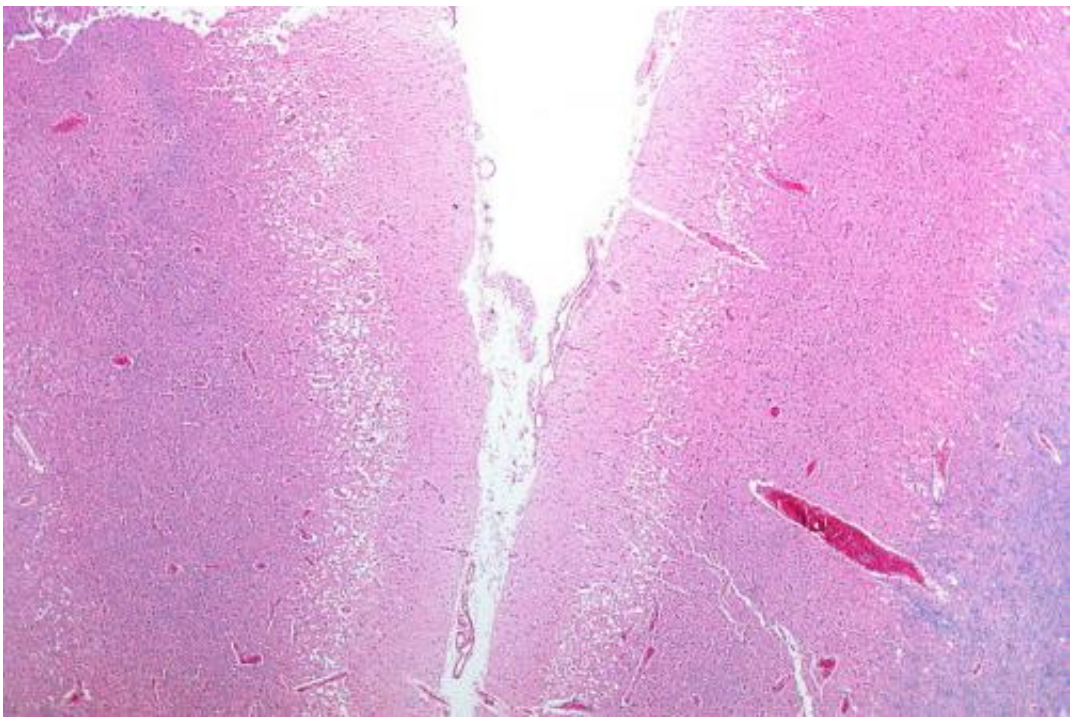

Micrograph showing cortical pseudolaminar necrosis, a finding seen in strokes on medical imaging and at autopsy. H&E-LFB stain. Credit: Nephron/Wikipedia

Time to arrival at the hospital after recurrent stroke appears to vary according to stroke history, age, race and marital status, according to preliminary research to be presented at the American Stroke Association's International Stroke Conference 2022.

The faster patients receive stroke treatment, the better the odds of recovery because, on average, 1.9 million brain cells die every minute that a stroke goes untreated, according to the American Stroke Association, a division of the American Heart Association. Patients who used Emergency Medical Services (EMS) arrived at the hospital sooner and received quicker evaluations and stroke treatment. The causes for delayed hospital arrivals were not specifically examined in this study, however, they may include limited awareness of stroke signs and symptoms, the urgency of immediate care and the need to call 911, as well as social determinants of health and structural racism.

Researchers analyzed first-time and recurrent stroke cases from the Brain Attack Surveillance in Corpus Christi (BASIC) project between January 1, 2000 to January 1, 2020. Patients were categorized by first-ever strokes (more than 5,600 adults); recurrent stroke within one year of the first event (nearly 260 patients); and recurrent stroke, happening more than one year after the first one (more than 2,000 individuals).

Researchers examined hospital arrival within three hours of the start of stroke symptoms and whether patients arrived at the hospital by EMS. Individual electronic health records were reviewed closely to find key factors that may have played the strongest role in how quickly stroke patients arrived at the hospital.

"We then determined if there was a difference in hospital arrival within three hours and EMS usage among the people in the first and recurrent stroke groups, after considering variables such as stroke severity, marital status, race/ethnicity and gender," said lead study author Braydon Dymm, M.D., a fourth-year neurology resident at the University of Michigan in Ann Arbor, Michigan.

Researchers found:

- Among people experiencing stroke, they were more likely to arrive at the hospital earlier if the stroke was more severe, if the person having the stroke was married or living with a partner, or if EMS provided transportation to the hospital.
- Black adults experiencing stroke had 34% lower odds of hospital arrival within 3 hours of symptoms compared to non-Hispanic white adults, even though Black adults were about twice as likely to call EMS compared to white adults.
- Across all study participants, including first stroke or recurrent stroke patients, those who were married and living with a partner had 18% lower odds of using EMS compared to peers who were single.

"After accounting for several variables, most importantly the size and severity of the stroke, there were no notable differences in early hospital arrival time or use of EMS, even for strokes that happened within a year of the first stroke," Dymm said. "These results suggest the need for more information about stroke signs and symptoms may be a factor, along with various others, facing adults from all racial and ethnic backgrounds. We need to investigate this further so we can develop appropriate supports to improve hospital arrival and stroke outcomes."

A limitation of the study is that these findings are from one research location, Corpus Christi, Texas and may not be generalizable across the U.S. Other limitations are the relatively small number of recurrent strokes within a year and knowledge about stroke symptoms and emergency care were not specifically measured.

"Once a stroke has occurred, timely arrival to the hospital is the single-most important factor that can improve outcomes and reduce disability," said Mitchell S.V. Elkind, M.D., M.S., FAHA, FAAN, immediate past president of the American Heart Association and professor of neurology and epidemiology at Columbia University in New York City. "Improving

equity in stroke care includes understanding the many barriers that may impact EMS use. Health care costs, community and cultural barriers to receiving health care and emergency services, and factors related to social determinants of health and structural racism may also influence people, particularly those who are from diverse racial and ethnic backgrounds, in ways that are not currently measured or are difficult to measure. The results of this study confirm a significant gap in use of EMS, which is the best option when a stroke is suspected. We need to help get stroke patients to the hospital as quickly as possible for treatment, and therefore, they will be more likely to have better recovery and quality of life."

In the U.S., stroke is the fifth leading cause of death and a leading cause of disability, according to the latest data from the American Heart Association. To recognize stroke symptoms requiring immediate treatment, the American Stroke Association recommends everyone remember the acronym F.A.S.T. for **F**ace drooping, **A**rm weakness, **S**peech difficulty, **T**ime to call 9-1-1.

Provided by American Heart Association

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