

# Identifying risk factors following ICH strokes

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A new study led by University of Cincinnati researchers provides new insights on how different risk factors following one of the most severe types of stroke can affect patient outcomes.

Daniel Woo, MD, said intracerebral hemorrhages (ICH) are caused when

a blood vessel bursts inside the brain and causes bleeding in the brain. ICH strokes are often deadly and can cause high neurological disability.

Up to this point, many different factors have been generally reported to be associated with a higher likelihood of disability or death following an ICH stroke, but Woo said there was a need for more specific data.

To learn more, Woo led a [cohort study](#) analyzing outcome data three months after an ICH event from one of the largest-ever prospectively recruited group of patients, which included 1,000 non-Hispanic white, 1,000 non-Hispanic Black and 1,000 Hispanic patients. The results of the study were recently published in *JAMA Network Open*.

## **New insights**

One of the avenues researchers used to assess [risk factors](#) were two clinical grading scales that have been previously developed.

Woo said both grading scales are easy to calculate and take several variables like age and hemorrhage size, location and severity to assign a point value to the patient, with one of the scales additionally considering whether a patient had cognitive impairment before the hemorrhage. A higher point value using the scales is designed to correlate with a prediction of higher death rates.

In this study, Woo said [high scores](#) on both scales were confirmed for the first time to be correlated with increased mortality rates in Black and Hispanic populations after previously being verified in a predominantly white patient dataset. Each individual variable that makes up each score, as well as certain markers found on brain scans, were also found to be associated with poor outcomes for all patient ethnicities.

"Scores like these are easy to learn and to apply but they obviously don't

capture the wide variation among patients," said Woo, vice chair of research in UC's Department of Neurology and a UC Health physician at the UC Gardner Neuroscience Institute. "For me, adding in a few baseline variables from the CT scan at admission would greatly enhance these scores."

Although the grading scales are useful to compare large numbers of patients to predict outcomes, Woo said physicians should use more than just the scores to predict outcomes and guide care decisions. The researchers analyzed a total of 76 separate risk factors for association with good or poor results for patients to provide a fuller picture.

The researchers found that a previous history of ischemic stroke, when a vessel supplying blood to the brain is obstructed, or atrial fibrillation, an irregular heart rhythm, nearly doubled the likelihood of serious disability or death.

The study found that larger hemorrhages were correlated with a greater likelihood of death, but Black and Hispanic patients were even more likely to die than white patients with similar hemorrhage sizes. Woo said further study needs to be conducted to find the reason for this disparity.

## **Clinical applications**

Woo said some of the most fascinating results from the study were the effect of events that occurred after patients had been admitted to the hospital.

"Most previous findings were reported based on when the patient first reached the hospital, but we found that many complications occurring during the hospitalization had a marked impact on outcomes," he said.

Researchers found patients who developed infections during a [hospital](#)

[stay](#) were more than three times more likely for serious disability or death. Patients whose hematoma, or collection of blood within the brain, expanded during their hospital stay were 1.6 times more likely to have poor results.

"These had very strong effects and may be things that we can intervene on to improve outcomes," Woo said.

With the correlation between these variables and outcomes now better understood, Woo said physicians can take the knowledge from this study to make more informed decisions when caring for individual patients.

"Our research provides a wide variety of past history, signs and subsequent events that can affect outcomes after ICH that clinicians can now incorporate into their assessment," he said. "It also provides the relative strength of each variable which they can incorporate into their assessments. In addition, many of these may be targets we can design treatments for through research to improve outcomes in the future."

**More information:** Daniel Woo et al, Risk Factors Associated With Mortality and Neurologic Disability After Intracerebral Hemorrhage in a Racially and Ethnically Diverse Cohort, *JAMA Network Open* (2022). [DOI: 10.1001/jamanetworkopen.2022.1103](https://doi.org/10.1001/jamanetworkopen.2022.1103)

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