

# Risk model based on Get with the Guidelines analysis can help

September 27 2010

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Using data from more than 270,000 hospital stroke admissions, scientists have identified how to predict which patients are at greatest risk of dying in the hospital after stroke. Before their study, well validated models to predict in-hospital death risk after stroke were lacking, the researchers reported in *Circulation: Journal of the American Heart Association*.

"A mortality risk assessment tool for hospitalized [stroke](#) patients is important to clinicians, hospitals and patients," said Eric E. Smith, M.D., M.P.H., lead author of the study and assistant professor of neurology at the Hotchkiss Brain Institute at the University of Calgary in Alberta, Canada.

"Doctors can use this information to find out who is at highest risk and try to help prevent them from dying," he said. "Patients and families can benefit from this information by understanding their prognoses better. Hospitals can use our mortality risk score to calculate the mortality rate that they would expect to see, based on the characteristics of their own patients, and compare that to their actual observed mortality."

Smith and colleagues used the American Heart Association/American Stroke Association Get With The Guidelines-Stroke registry to analyze hospital stroke admissions from 2001-07.

"This enormous database offers an unparalleled opportunity to learn more about stroke and how stroke care is delivered," Smith said.

They divided patients by those who died and those who survived, analyzed the characteristics of each group and then identified the characteristics that predicted in-hospital death post-stroke.

"We used these results to make a risk score," Smith said. "One of our findings was that a measure of stroke severity, called the NIH [National Institutes of Health] Stroke Scale, was a very strong predictor of [mortality risk](#). Unfortunately, this scale is only recorded about 40 percent of the time; we separately derived a risk score in patients whose NIH Stroke Scale score was recorded. This results in two risk scores that a hospital may use — one for patients where the NIH score was recorded and one where it was not."

The researchers found that 5.5 percent of patients admitted for stroke died in the hospital. Being older, arriving by ambulance and having atrial fibrillation (irregular heartbeat) were individually associated with the largest increased risk of dying.

Less impactful independent predictors of death risk were previous stroke history, known carotid stenosis (artery narrowing), high blood pressure, high cholesterol and current smoking.

Using the risk score that didn't include the NIH stroke scale, the researchers predicted that the risk of death was 0.7 percent in the lowest category of risk, while the risk of death was 16.2 percent in the highest category of risk. With the NIH Stroke Scale score, they predicted that risk of death in the lowest category was 0.4 percent, versus 26.8 percent in the highest risk category.

"We showed that the risk score that included the NIH Stroke Scale score made more accurate predictions," Smith said. "Clearly, stroke severity is the most important predictor of outcome — even more important than the person's age and medical history."

These findings should encourage more care providers to assess their [stroke patients](#) using the NIH Stroke Scale, said Ralph Sacco, M.D., president of the American Heart Association. Information and training materials for the NIH Stroke Scale are available for free, including on the American Heart Association website at <http://learn.heart.org/ihtml/application/student/interface.heart2/nihss.html>.

"In addition to helping in the decision-making process of each stroke patient's care, this mortality model helps in the big picture of Get With The Guideline data collection and benchmarking by adjusting for differences in patient mix across hospitals," Sacco said.

One limitation of the study is that researchers only examined data on patients with ischemic stroke, caused by a blockage of blood flow to the brain, which accounts for about 85 percent of all strokes. They don't know whether the predictions are valid for patients with other types of stroke.

Provided by American Heart Association

Citation: Risk model based on Get with the Guidelines analysis can help (2010, September 27) retrieved 3 May 2024 from <https://medicalxpress.com/news/2010-09-based-guidelines-analysis.html>

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