Including stroke severity in risk models improves mortality prediction

July 20 2012, By Keith Herrell

(Medical Xpress) -- Adding stroke severity to a hospital 30-day mortality model based on claims data for Medicare beneficiaries with acute ischemic stroke was associated with improvement in predicting the risk of death at 30 days and changes in performance ranking regarding mortality for a considerable proportion of hospitals, according to a new study whose authors include two University of Cincinnati (UC) neurologists.

The study is published in the July 18, 2012, issue of *JAMA*: *The* Journal of the American Medical Association. Authors include Joseph Broderick, MD, Albert Barnes Voorheis Chair and professor of neurology at UC, and Dawn Kleindorfer, MD, professor and division director of cerebrovascular disease at UC. Both are members of the UC Neuroscience Institute. The study was led by Gregg Fonarow, MD, of the University of California, Los Angeles.

Background information in the article notes that "increasing attention has been given to defining the quality and value of health care through reporting of process and outcome measures," including 30-day mortality rates. Stroke, the authors add, is among the leading causes of death, disability, hospitalizations and health care expenditures in the United States.

The researchers conducted a study to evaluate the degree to which hospital outcome ratings and the ability to predict 30-day mortality are altered after including initial stroke severity in a claims-based risk model

for hospital 30-day mortality for acute ischemic stroke. For the study, data were analyzed from 782 Get With The Guidelines–Stroke participating hospitals from April 2003 to December 2009 on 127,950 fee-for-service Medicare beneficiaries with ischemic stroke.

The patients had a score documented for the National Institutes of Health Stroke Scale (NIHSS), a 15-item neurological examination scale developed at UC in the 1980s with scores from 0 to 42 (higher scores indicate more severe strokes). The median (midpoint) age was 80 years, 57 percent were women, and 86 percent were white. Performance of claims-based hospital mortality risk models with and without inclusion of NIHSS scores for 30-day mortality was evaluated and hospital rankings from both models were compared.

There were 18,186 deaths (14.5 percent) within the first 30 days, including 7,430 deaths during the index hospitalization (in-hospital mortality, 5.8 percent). The median hospital-level 30-day mortality rate was 14.5 percent. The researchers found that the hospital mortality model with NIHSS scores had significantly better discrimination than the model without. Also, other index scores demonstrated substantially more accurate classification of hospital 30-day mortality after the addition of NIHSS score to the claims model. The model with NIHSS exhibited better agreement between observed and predicted mortality rates.

Analysis of data indicated that more than 40 percent of hospitals identified in the top or bottom 5 percent of hospital risk-adjusted mortality would have been reclassified into the middle mortality range using a model adjusting for NIHSS score compared with a model without NIHSS score adjustment. "Similarly, when considering the top 20 percent and bottom 20 percent ranked hospitals, close to one-third of hospitals would have been reclassified," the authors write.

"Inclusion of a validated measure of stroke severity is critical for any model of mortality after stroke," says Broderick. "Government and private health insurers who are moving toward public reporting of hospital-based mortality rates and value-based purchasing must include measures of stroke severity in their models to provide accurate comparisons of [mortality](link) between hospitals."

Adds Kleindorfer: "Health care systems that treat stroke patients must work to ensure that stroke severity is consistently measured and recorded on all hospitalized stroke patients. This currently doesn't occur at most hospitals, yet we know that how bad a stroke is when you come to the hospital is the most important predictor of outcome later on. Without knowing this information, hospitals will not be fairly judged regarding the quality of care they provide."

The Get With the Guidelines–Stroke program is provided by the AHA/American Stroke Association. The program is supported in part by a charitable contribution from Janssen Pharmaceuticals Inc., a pharmaceutical company of Johnson & Johnson. Neither Broderick nor Kleindorfer report receiving funding from Janssen Pharmaceuticals, Inc.

In an accompanying editorial, Tobias Kurth, MD, of the University of Bordeaux, France, and Mitchell S.V. Elkind, MD, of Columbia University write that the study's results "clearly highlight the importance of incorporating information on stroke severity when conducting health outcomes research in stroke."

"The particular characteristics of stroke have to be taken into consideration by clinicians, insurance companies, and policy makers when comparing disease-specific health outcomes."

Provided by University of Cincinnati

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