

Predictors of Readmission Stroke Type

Byron S. Kennedy MD PhD MPH
Yale University

Abstract:

Background—It is often assumed that the recurrent stroke type is almost entirely determined by the initial stroke type, which implies a predetermined pathway in the mechanism of stroke recurrence that may be genetically guided. However, data from South London and Lausanne suggest that additional factors may contribute to recurrent stroke type determination, which may reflect environmental and/or acquired risk. Strong evidence in support of this multifactorial hypothesis has been lacking, with prior investigations being limited in their ability to provide reliable estimates of stroke type concordance due to the small number of recurrent events observed over the follow-up period, especially for the hemorrhagic cases. Therefore, using a large and diverse inpatient database, this study sought to: 1) develop a risk-adjusted prediction model for readmission stroke type, with the initial stroke type as the main predictor; and 2) estimate the agreement between the initial and recurrent stroke types for blacks and whites.

Methods—For this hospital-based retrospective cohort study, inpatient administrative data were used from the Agency for Healthcare Research and Quality (AHRQ). The prediction model for readmission stroke type was developed using logistic regression. Predictors considered included the initial admission stroke type, race, other sociodemographic variables, clinical and hospital characteristics. Stroke type concordance between the initial and recurrent admissions was measured with Cohen's kappa.

Results—For blacks, 110 hemorrhagic and 658 ischemic stroke readmissions were observed; for whites, there were 1,063 hemorrhagic and 4,939 ischemic stroke readmissions. In the fully adjusted logistic regression models, the initial admission stroke type was strongly associated with the readmission stroke type (subarachnoid hemorrhage [SAH]: odds ratio [OR]=532.12, 95% confidence interval [CI]=344.50-821.95; intracerebral hemorrhage [ICH]: OR=72.67, 95% CI=57.95-91.12; ischemic: OR=109.51, 95% CI=87.62-138.86). Several patient factors, but not race, also predicted readmission stroke type. Overall stroke type concordance between the index and recurrent stroke admissions was similar for blacks (kappa=0.77, 95% CI=0.71-0.83) and whites (kappa=0.77, 95% CI=0.75-0.79).

Conclusions—The multivariate analysis showed that the initial stroke type and other patient factors were independently associated with the readmission stroke type, supporting the multifactorial hypothesis regarding the mechanism of stroke recurrence. The data also showed that the patterns of stroke type concordance were similar for both blacks and whites, suggesting a common pathophysiology for blacks and whites despite differences in risk factors for first-ever stroke. These results are relevant for identifying high-risk subgroups that are more likely to have a recurrent stroke, which could inform patient management decisions.