

## Self-Reported Stroke Symptoms: A Powerful New Risk Factor for Stroke

A history of stroke-like symptoms appears to be a powerful risk factor for future stroke, and clinicians should ask patients not only about a history of stroke or transient ischemic attack (TIA) but also about stroke-like symptoms. Previously, within the Reasons for Geographic and Racial Differences in Stroke (REGARDS) cohort, it was noted that 18% of stroke-free and TIA-free participants had at least one stroke-like symptom in the past. These individuals also had more vascular risk factors, increased risk of cognitive impairment, and lower health-related quality of life [Howard VJ et al. *Arch Intern Med* 2006; Wadley VG. *Stroke* 2007]. Dawn Kleindorfer, MD, University of Cincinnati, Cincinnati, OH, reported results from a subanalysis of data from the REGARDS study, which assessed the risk of incident stroke among REGARDS participants with self-reported stroke-like symptoms but with no diagnosis of prior stroke or TIA. The aim of the subanalysis was to determine if a previous undiagnosed stroke or TIA could be an independent predictor of stroke risk.

The REGARDS trial, funded by the National Institutes of Health NINDS division, is a national cohort of 30,239 Caucasian and African-American (AA) participants who were recruited by mail and telephone. Computer-assisted telephone interviews were performed to assess history of cardiovascular disease and stroke symptoms. In-home visits were conducted to obtain blood samples, ECG, and physical measurements. Stroke surveillance with central adjudication of suspected events was performed at 6-month intervals.

At baseline, participants with no history of prior stroke or TIA were asked if they had ever experienced any of the following events: the sudden onset of painless hemibody weakness or numbness, difficulty understanding, difficulty speaking, loss of vision in one or both eyes, or loss of hemifield vision. Framingham Stroke Risk Scores (FSRS) were used for stroke risk prediction after adjustments for the following baseline variables: diabetes, elevated systolic blood pressure (BP), use of BP medication, atrial fibrillation, left ventricular hypertrophy on ECG, heart disease history, current smoking, age, gender, and race.

Of the 24,412 participants included in this analysis, 381 experienced an incident stroke event during the median

4.4 years of follow-up. These individuals were older and more likely to be AA men and have more vascular risk factors. Age, AA race, age-by-race interaction, systolic BP, current smoking status, diabetes, atrial fibrillation, and heart disease history were all future predictors of stroke risk. Having any stroke symptoms had an HR of 1.36 (1.08 to 1.72) and a percentage of predictive information of 1.4%. Each individual stroke symptom reported at baseline increased the HR by 1.21 (1.09 to 1.35)/symptom and the percentage of predictive information of 2.7%. When assessed individually, difficulty speaking and difficulty understanding were significant predictors, but weakness, full vision, and half vision were not. The percentage of predictive information that was contained within the model is shown in Table 1.

**Table 1. Risk Factors for Future Stroke.**

Parameter	Hazard Ratio (95% CI)	% of Predictive Value
Age (per decade)	2.11 (1.81, 2.45)	
AA Race (at age 65 years)	1.41 (1.12, 1.77)	26.8%
Age-by-race interaction	0.74 (0.60, 0.91)	
Systolic BP (per 10 mm Hg)	1.14 (1.08, 1.20)	4.1%
Current smoking (vs nonsmoking)	2.05 (1.62, 2.59)	3.6%
Diabetes	1.40 (1.12, 1.75)	1.4%
Atrial fibrillation	1.43 (1.08, 1.89)	0.9%
Heart disease history	1.46 (1.18, 1.81)	2.7%
Any stroke symptom	1.36 (1.08, 1.72)	1.4%
# of stroke symptoms per symptom	1.21 (1.09, 1.35)	2.7%
Difficulty speaking	1.75 (1.20, 2.55)	1.8%
Difficulty understanding	1.87 (1.27, 2.75)	1.8%
Weakness	1.32 (0.92, 1.89)	0.9%
Numbness	1.36 (1.02, 1.82)	0.5%
Full vision	1.37 (0.94, 2.00)	0.9%
Half vision	1.53 (0.95, 2.45)	0.9%

Among subjects without a prior diagnosis of stroke or TIA, any stroke symptom increased risk of future stroke by 36%, and having any symptom was as predictive of future stroke as diabetes (HR, 1.40) and atrial fibrillation (HR, 1.43). Having four or more symptoms (HR 2.11) presented a higher risk than any other single risk factor.

These data emphasize the importance of stroke-like symptoms as powerful risk factors for future stroke. Future studies are needed to characterize events, based on timing, duration, and associated symptoms.