Stroke in young adults

On the rise?

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Stroke has traditionally been considered a disease of the elderly, its incidence doubling with each decade after age 50. Given the aging of the population of the developed world, prevalent stroke is projected to increase by 24.9% over the next 20 years.[1] In this light, decreasing overall stroke incidence rates in the 21st century are welcome news. The Framingham Heart Study reported a decline in age-adjusted stroke incidence per 1,000 person-years from 1950 to 2004 of 7.6 to 5.3 in men and 6.2 to 5.1 in women.[2]

As overall stroke incidence declines, there is evidence that stroke is occurring at a younger age, with the incidence increasing in younger adults. Ischemic stroke admissions in the US Nationwide Inpatient Sample increased annually from 1995 to 2008 among adults aged 14–44 years.[3]

In this issue of *Neurology*®, Kissela et al.[4] report their findings on 12-year trends in young stroke incidence in the Greater Cincinnati/Northern Kentucky Stroke Study (GCNKSS). Using 3 equally spaced, annual samples, the proportion of total first-ever stroke accounted for by those ages 20–54 years increased from 12.9% in 1993–1994 to 18.6% in 2005. In this age group, incident stroke increased from 26 per 100,000 in 1993–1994 to 48 in 2005 among white patients, and 83 in 1993–1994 to 128 in 2005 among black patients.

The finding of increased stroke incidence in this racially diverse population raises several questions. Is the increased incidence among young adults an artifact of changes in diagnostic testing, particularly MRI? The progressive adoption of MRI as a diagnostic tool during the study period challenges the validity of comparison of acute stroke diagnoses between these epochs. MRI is substantially more sensitive for the diagnosis of minor and self-resolving clinical ischemic stroke than CT.[5] The investigators attempted to account for the evolution in diagnostic practices by maintaining the diagnostic criteria—ICD-9 coding and the medical record—for ascertainment of stroke across time intervals. The use of MRI among cases with a diagnosis of stroke increased dramatically across time periods, from 18% of patients in 1993–1994 to 58% in 2005. MRI findings are likely to influence recorded ICD-9 diagnosis, since clinicians will identify patients with MRI abnormalities as having had a stroke. If the sensitivity of CT for a minor stroke is ~40%, and 80% had only CT in 1993–1994, ~50% of minor strokes would have been missed, compared with only 25% in 2005. The effect of improved diagnosis of small strokes using MRI might even be enhanced in the young population, in which alternate diagnoses for transient and minor neurologic symptoms are more likely. Preferentially improved diagnosis in the young will inflate the discrepancy in incidence between young and old.

Assuming that the incidence of stroke is increasing in the young in the GCNKSS, how generalizable are these data? The estimates in the GCNKSS among white patients are comparable to contemporary estimates from other countries and other parts of the United States. Recent young stroke incidence and magnitude of change estimates from Brazil in 1995 and 2005–2006 are similar to those of white patients in the present study.[6]

Are trends in young stroke true of all race-ethnic groups in the United States? There is an extensive literature on racial disparities in stroke, though there has been less research on disparities among the young. Among 20- to 44-year-olds in the Northern Manhattan Study from 1993 to 1997, annual total stroke incidence per 100,000 person-years was 10 in white patients, 25 in black patients, and 26 in Hispanic patients.[7] In the present GCNKSS study, there is an almost 3-fold higher burden of stroke among young black patients compared with young white patients at all time periods. These findings suggest that efforts need to be directed toward stroke awareness and education to reduce stroke incidence in young adults, particularly in minority communities.

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If strokes occur at earlier ages, as life expectancy increases, stroke-related disability will increase even more. Current approaches to estimating the burden of disease incorporate measures of life-years with disability and life-years lost. Recent data also suggest that stroke-related disability may progress beyond the acute event, associated with cognitive decline, dementia, and functional disability.[8] All of these may be expected to increase markedly when strokes occur at younger ages.

Finally, what are the mechanisms for the increased stroke incidence in younger adults? While traditional risk factors for atherosclerotic disease, such as hypertension, dyslipidemia, and smoking, have been associated with young adult stroke, it is not clear that they can fully explain the increased incidence. Rising obesity prevalence, seen for each of the 3 decades before the turn of the century, has begun to level off overall in the United States, but not in the younger population. Both obesity and diabetes are on the rise in young adults and are more common in black patients and other race/ethnicity groups compared with white patients.[9] Diabetes may particularly increase ischemic stroke risk in the young.[10] Documentation of recreational drug abuse in stroke patients also increased 10-fold from 1993–1994 to 2005 in the present study. More limited access to medical care among adults younger than 65 years may also play a role; young adults are almost twice as likely to lack health insurance coverage.

Among the young, the increase in incidence suggests an unknown and potentially daunting future trajectory. Replication of these findings in other US populations and internationally is crucial, and future studies will need to account for potential temporal trends in diagnostic testing while also teasing out causative factors. Fortunately, the American Academy of Neurology has established a Task Force for Stroke in Young Adults and Adolescents to address these issues (Aneesh Singhal, personal communication, 2012). Should the trend prove valid and widespread, timely support for other new initiatives to improve health during our prime years will be required.

DISCLOSURE

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