

SEIZURES AND EPILEPSY AFTER ISCHEMIC STROKE

Early and late seizures after cryptogenic ischemic stroke in young adults

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Neurology 2003;60(3):400–404

OBJECTIVES: To assess the incidence and predictive factors of early and late seizures after ischemic stroke in young adults.

METHODS: A total of 581 patients (aged 18 to 55 years) with recent cryptogenic ischemic stroke were prospectively enrolled at 30 neurology departments and followed for 37.8 ± 9.7 months. Early seizures (occurring within 7 days of stroke) were assessed by chart review and late seizures were prospectively recorded at each follow-up visit. Clinical and brain imaging findings were reviewed by two neurologists and two neuroradiologists who were blinded to the occurrence of seizures.

RESULTS: Fourteen of the 581 patients (2.4%) developed early seizures, 71% of which occurred within the first 24 hours. Rankin scale ≥ 3 (odds ratio [OR] 3.9, 95% CI 1.2 to 12.7) and cortical involvement (OR 7.7, 95% CI 1.0 to 61.1) were independently associated with early seizures. Late seizures occurred only in patients with hemispheric stroke ($n = 20$). The risk of first late seizure was 3.1% (95% CI 1.4 to 4.8) within 1 year and 5.5% (95% CI 3.1 to 7.9) within 3 years. The mean delay between stroke and first late seizure was 12.9 months (0.3 to 33.9). Late seizures were associated with early seizure (hazard ratio [HR] 5.1, 95% CI 1.8 to 14.8), cortical signs (HR 4.5, 95% CI 1.6 to 13.1), and size of infarct superior to one-half hemisphere (HR 9.7, 95% CI 3.1 to 30.8). Eleven of the 20 patients with late seizure experienced recurrences (multiple in eight) on antiepileptic drug treatment. Most of them were seizure free at the end of the follow-up.

CONCLUSION: Epilepsy is rarely a major problem in young cryptogenic ischemic stroke survivors. Early seizures are associated with stroke disability and cortical involvement. Early seizures, cortical signs, and

large infarct are independent risk factors for late seizures.

COMMENTARY

Stroke is an important cause of symptomatic epilepsy. Most work on poststroke epilepsy has focused on older individuals; however, strokes can affect people of all ages. The study by Lamy and colleagues is a welcome addition to the literature. In their prospective cohort study of seizures following ischemic stroke in young adults (age 18–55), the authors carefully distinguished early from late seizures. The former represent provoked seizures, occurring during the acute phases of the stroke and its immediate aftermath (up to 7 days), whereas the latter are seizures that occur after the brain has stabilized and physiological homeostasis, presumably, has been restored. Late seizures are not “provoked” by the acute events and reactions surrounding the stroke, rather they are considered unprovoked but are secondary to the static residual pathology remaining after the stroke (1). Repeated, unprovoked late seizures indicate epilepsy and can potentially become a life-long problem and source of disability.

A key finding in the Lamy et al. study, which could potentially help identify those patients at greatest risk for late seizure, is that none of the noncortical strokes (about a quarter of localizable strokes) was followed by a late seizure. In a multivariable proportional hazards analysis of all patients with hemispheric stroke, three risk factors—early acute seizures, cortical signs, and large ($>1/2$ hemisphere) strokes—were independently associated with a 4.5- to almost 10-fold increase in the risk of late seizures. The overall risk of late seizures occurring one year after the initial stroke was 3.1% but varied considerably, depending on the number of risk factors identified in the patient. Risk of late seizures ranged from 0% in those subjects with none of the three risk factors to 4.6% in those individuals with one factor present, and to 33.3% in those patients with two or three factors. Four years after the initial stroke, the risk of late seizures rose to 5.5% (overall), 0.4% (no factors) 7.4% (1 factor), and 58.3% (2–3 factors). The findings of Lamy et al., fit well with results from other recent studies of hemorrhagic stroke (2) and with results from a recent large study of all stroke types

combined, which did not distinguish early- from late-onset seizures (3).

Although the *overall* risk of late seizures was modest, the higher rates of late seizure in individuals with two or more risk factors begs the question of whether prophylactic antiepileptic treatment should be recommended for these patients. Numerous trials, however, have suggested that early treatment of acute insults, while reducing the risk of acute seizures, does not translate into a reduction of later, unprovoked seizures (4). Those studies, however, were conducted with older and standard antiepileptic agents. It remains to be seen whether newer agents may offer the necessary neuroprotective effect to prevent later seizures in some patients. Early identification of those at high risk for later seizure is an important step that eventually may allow investigators to identify mechanisms involved with poststroke and possibly other forms of secondary epilepsy as well. Ultimately, this could lead to the development of neuro-

protective or other types of treatment to prevent stroke-related epilepsy.

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References

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