

## PREDICTORS OF EARLY SEIZURES AFTER STROKE

### Prevalence and Predictors of Early Seizure and Status Epilepticus after First Stroke

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**BACKGROUND:** Early seizure (ES) has been reported in 2 to 6% of strokes and is a predictor of recurrent seizures. Acute stroke has been reported to cause 22% of all cases of status epilepticus (SE) in adults. The determinants of ES and SE after stroke, however, are not well understood.

**METHODS:** An incidence study was conducted to identify all cases of first stroke in adult residents of northern Manhattan. Cases of ES and SE within 7 days of stroke were identified through medical record review. Statistical analyses were performed by using univariate and multivariate logistic regression models.

**RESULTS:** The cohort consisted of 904 patients; ES occurred in 37 (4.1%). The frequency of ES by stroke subtype and location was deep infarct in two (0.6%) of 356, lobar infarct in 20 (5.9%) of 341, deep intracerebral hemorrhage (ICH) in four (4.0%) of 101, lobar ICH in seven (14.3%) of 49, and subarachnoid hemorrhage in four (8.0%) of 50. SE occurred in 10 (1.1%) patients, representing 27.0% of patients with ES. Diabetes, hypertension, current smoking, alcohol use, age, gender, and race/ethnicity were not significant determinants of ES. In a subgroup of patients who had a National Institutes of Health (NIH) stroke scale (NIHSS) score recorded, NIHSS score was not an independent predictor of ES in multivariate analysis. After accounting for stroke severity, ES was not a predictor of 30-day case fatality.

**CONCLUSIONS:** Lesion location and stroke subtype are strong determinants of ES risk, even after adjusting for stroke severity. ES does not predict 30-day mortality. SE occurs in more than one fourth of patients with ES.

### COMMENTARY

This study describes the prevalence and determinants of seizures or status epilepticus (SE) occurring within 7 days of first stroke, in a prospectively identified population-based cohort. A recent study (reviewed in *Epilepsy Currents*) followed up first-time stroke patients for an average of 3.7 years and found that seizures developed in 15% and SE in 1.4% (1). In contrast, here Labovitz et al. focused only on early seizure (ES), occurring within 1 week of stroke, and thus dealt with a much smaller group of patients. ES occurred in 37 (4.1%) of 904 new stroke patients, and although more than one fourth of the ES patients had SE, the absolute number of SE patients was only 10, limiting statistical analysis of this important subgroup. ES is a significant condition that is associated with recurrent seizures and may predict in-hospital fatality (2).

The study is the first to consider simultaneously the effect of stroke subtype [intracerebral hemorrhage (ICH), subarachnoid hemorrhage (SAH), or infarct and location (lobar vs. deep)] to determine odds ratios for developing ES. In multivariate analysis, lobar ICH, SAH, and infarction all had significantly increased risk of ES compared with deep infarction. Together these two parameters had a higher predictive value for ES than did stroke severity as measured by the National Institutes of Health Stroke Scale (NIHSS) score, which was available for 60% of the patients.

Thirty-day case fatality rate (CFR) was 14.7% overall, and was much higher in patients with SE (30% CFR) or ES (37.8% CFR). The relations between variables contributing to this increased mortality are complex. Whereas ES predicted increased 30-day CFR in a multivariate analysis including stroke subtype and location, addition of the NIHSS score to the model confounded this association.

This methodologically sound study demonstrates that stratification by stroke subtype and location *simultaneously* is essential in assessing risk of ES after acute stroke. It raises interesting theoretical questions regarding the different mechanisms that lead to ES and late seizures. Deeper understanding of the complex interaction of risk factors for these conditions may lead to future searches for reduction in the development of epilepsy and mortality in these patients.

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## References

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