

# Stroke and depression in very old age

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### Abstract

**Background** The prevalence and incidence of stroke are known to increase with age, which, combined with demographic change, means that very old stroke patients are a growing patient group. The aim of this thesis was to investigate the risk factors for stroke, depression associated with stroke, and consequent mortality in very old age.

**Methods** A randomly selected half of 85-, all 90-, and all ≥95-year-olds in chosen municipalities in Västerbotten County, Sweden, and Pohjanmaa County, Finland were targeted in a population-based cohort study from 2000-2012. The 65-, 70-, 75-, and 80-year-olds in all the rural and random samples from the urban municipalities in the same counties were also surveyed in 2010. In the cohort study patients were tested in their homes, including assessment scales and blood pressure measurements, and their medical charts were reviewed. Incident stroke data were collected from medical charts guided by hospital registry records, death records, and reassessments after 5 years. Depression was defined as a GDS-15 score ≥5. A clinical definition of all depressive disorders, based on assessments and medical charts, was also used. A specialist in geriatric medicine evaluated the diagnoses. The survey included questions about stroke and depression status, and the GDS-4.

**Results** In ≥85-year-olds examined in 2005-2007 (n=601), the stroke prevalence was 21.5% and stroke was independently associated with depressive disorders (odds ratio 1.644, p=0.038). The prevalence of depression according to GDS-15 scores was 43.2% in people with stroke compared with 25.0% in people without stroke (p=0.001). However, in ≥85-year-olds examined in Sweden from 2000-2012 (n=955), depression was not independently associated with incident stroke.

In ≥65-year-old survey participants in 2010 (n=6098), the stroke prevalence increased with age from 4.7% among the 65- to 11.6% among the 80-year-olds (p<0.001). Depression was 1.77 times more common in people with stroke. In the group with stroke, depression was associated with dependence in personal activities of daily living and having a life crisis the preceding year, while in the non-stroke group, it was independently associated with several additional factors.

In ≥85-year-olds examined in 2005-2007 with valid GDS-15 tests (n=452), stroke was associated with increased 5-year mortality [hazard ratio (HR) 1.53, 95% confidence interval (CI) 1.15-2.03]. Having had a stroke and depression was associated with increased 5-year mortality compared with having only stroke (HR 1.90, CI 1.15-3.13), having only depression (HR 1.59, CI 1.03-2.45), and compared with having neither stroke nor depression (HR 2.50, CI 1.69-3.69). Stroke without depression did not increase mortality compared with having neither stroke nor depression.

In ≥85-year-olds examined in Sweden from 2000-2012 (n=955), atrial fibrillation (HR 1.85, CI 1.07-3.19) and higher systolic blood pressure (SBP; HR 1.19, CI 1.08-1.30 per 10-mmHg increase) were associated with incident stroke overall in a comprehensive multivariate model. In additional multivariate models, diastolic blood pressure (DBP) ≥90 mmHg (HR 2.45, CI 1.47-4.08) and SBP ≥160 mmHg (v. <140 mmHg; HR 2.80, CI 1.53-5.14) were associated with incident stroke.

**Conclusion** Among very old people the prevalence of stroke was high and was independently associated with a higher depression prevalence. However, depression was not independently associated with a higher stroke incidence. Stroke was associated with increased mortality among very old people, but only among those who were also depressed. High SBP (≥160 mmHg), DBP (≥90 mmHg) and atrial fibrillation were the only consistent independent risk factors for incident stroke among very old people.

### Keywords

stroke, depression, very old, epidemiology, risk factor, prevention, blood pressure, atrial fibrillation, all-cause mortality

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