

## Prognosis

### Fracture risk was increased after stroke with a marked increase immediately after stroke

Kanis J, Oden A, Johnell O. Acute and long-term increase in fracture risk after hospitalization for stroke. *Stroke* 2001 Mar;32:702-6.

**QUESTIONS:** Does risk of fracture increase after stroke? What is the time course of any increase in fracture risk?

#### Design

Inception cohort followed up for  $\leq 10$  years (mean 2.5 y).

#### Setting

Sweden.

#### Patients

273 288 patients (mean age 74 y, 50% men) admitted to hospital with a first ever stroke identified using the National Swedish Register.

#### Assessment of prognostic factors

All hospital records were examined to identify people who were admitted to hospital for stroke during a 10 year period. Age, sex, and duration of hospital stay were recorded.

#### Main outcome measure

Subsequent admission to hospital for fracture.

#### Main results

24 666 people (9%) had a fracture subsequent to stroke, of which 14 263 (58%) were hip fractures. The incidence of all fractures and hip fractures in patients with stroke was compared with the general population. For any fracture requiring admission to hospital, the relative risk (RR) was greatest in the younger age groups (RR 2.38 to 4.69). RR declined with age but was still increased in the population  $\geq 95$  years of age (RR 1.43 to 2.64). The RR was higher in women than in men. The increase in risk was most marked immediately after stroke, intermediate at 6 months, and lowest at 4 years.

For hip fractures, the pattern was similar to that for all fractures, but the RRs were higher. For example, the risk of any fracture requiring admission to hospital immediately after stroke was 3.7 in women aged 50-54 years whereas the risk of hip fracture was 11.8.

At all ages and in both sexes, there was a marked increase in the risk of fracture within the first year of stroke compared with the general population. Thereafter, the risk decreased but did not attain the level of the general population except in men and women  $\geq 80$  years of age. The association between fracture risk and duration of hospital stay differed between the sexes. In men the risk for any fracture increased by 2.3% for every additional 10 days in hospital, and the risk for hip fracture increased by 4.0%. For women the risk decreased with duration of hospital stay by 1.1% for all

fractures; risk of hip fracture was not associated with duration of hospital stay.

#### Conclusions

The risk of fracture was increased after stroke with a marked increase immediately after stroke. Women and younger age groups had the greatest increase in risk.

#### COMMENTARY

This study by Kanis *et al* provides the reader with details of a large cohort study, the findings of which are strengthened by the size of the study and the use of a national register known to have high validity. It is important, however, to note that although the cohort is comprehensive, no detail is provided about the severity of the stroke or the degree of disability. This is an important consideration for clinicians who may be working with individuals who are not admitted to hospital after a stroke or who are working with patients who may have other health problems that may alter their risk of fractures. Other study limitations include lack of verification of fractures by x rays or other independent assessments, exclusion of fractures that did not require admission to hospital (eg, forearm or vertebral fractures), and inclusion of strokes that did not result in hemiplegia.

Despite these difficulties, this study identifies that patients have an increased risk of fracture in the months after stroke and thus raises awareness of the need for preventative care. It is of note, however, that the study does not clarify if all, or just some, patients are at increased risk; thus preventative work cannot be targeted at particularly high risk groups. Moreover, although the RR of fracture after stroke decreases with age, in reality, older people have a higher overall risk by virtue of their age and as such should be offered preventative care for fractures. Clinicians who work with stroke patients or older people at risk of falls should use various interventions to reduce falls. A Cochrane review of interventions for preventing falls in the elderly has identified the importance of health screening for at risk groups.<sup>1</sup> Preventative measures should be targeted to environmental risk factors as well as intrinsic factors such as a recent stroke. The study by Kanis *et al* provides a timely reminder of the importance of considering preventative as well as curative care.

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1 Gillespie L, Gillespie W, Cumming R, *et al*. Interventions for preventing falls in the elderly. *Cochrane Database Syst Rev* 2001;(2):CD000340.

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