SHORT REPORT

Characteristics of falling in patients with stroke

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Abstract

***Objective*—To identify the risk factors for falling after stroke, to establish the relation with lesion localisation, and to evaluate the incidence of falling.**

***Methods*—The falling history and the mood of 293 patients with stroke were investigated by a standard questionnaire. Other information (time since stroke, risk factors, and CT) about patients was obtained from their hospital records.**

***Results*—Increasing age, depression, and heart disease were significant risk factors for falling (heart disease had a negative influence). A right hemispheric infarct was significantly more common among the falling group.**

***Conclusion*—This study suggests clues for possible modifications of the management of patients with stroke during the recovery period.**

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Keywords: stroke; cerebrovascular disease; falling

Patients who have had a stroke are under the risk of a wide range of secondary complications.[1–5] A very high incidence of falls (15.9/1000 patients/day) has been reported from a geriatric unit for stroke rehabilitation.[6]

The aim of this study was to investigate the incidence of falling, to identify the risk factors for falling after stroke, and to evaluate the relation between lesion localisation and falling.

Materials and methods

The participants of the study were patients with ischaemic or haemorrhagic stroke who were followed up in our stroke unit between the years of 1992–6.

The exclusion criteria were history of a transient ischaemic attack, epilepsy, orthopaedic problems, major psychiatric problems, and intracranial operations. Two hundred and ninety three patients were eligible for the study. A standard questionnaire was posted to the patients or their relatives to obtain information about falling. Questions were asked about the number of falls, and the patient's psychiatric status and functional capability. Falling was described as losing balance under conditions such as during standing up from a lying position, walking, changing position, or descending stairs, without any change of consiousness.

On the questionnaire form, patients were asked to fill out the Montgomery and Asberg rating scale and Barthel index functional status forms to evaluate their mood and functional status. Other information about stroke type and severity, CT and MRI findings, and risk factors for stroke were screened from their hospital recordings. A neurologist checked all questionnaire forms and the patients were separated into two groups; falling patients and non-falling patients.

DATA ANALYSES

Data were collected on standard proformas for analyses using SPSS version 7.5 for Windows 95 (SPSS Inc). We used χ^2 tests (categorical variables) and Student's t test as appropriate (continuous variables) to investigate the relation between each question and demographic variables and outcomes. Results are reported as arithmetic mean and simple SD. Variables considered for questions were Barthel index, Montgomery and Asberg rating scale, age, and sex. Each patient's risk factors, age, and the hemisphere involved in ischaemia were assessed. Statistical significance was accepted at the 0.05 level.

Results

We registered 131 falling (44% of all patients, mean (SD) age 62.5 (10.3)) and 162 non-falling (56%, 59.9 (11.4)) patients. The mean age of the falling group was significantly higher ($p<0.05$). Seventy men (45.5%) and 61(54.5%) women had a falling history. There was no significant sex difference in number of falls. Falling occurred significantly more often in the oldest age interval group (60–80; $p<0.001$).

Forty eight (36.6%) falling patients had a right hemispheric infarct compared with 39 (24.1%) non-falling patients. The difference was significant ($p<0.05$).

CORRELATION BETWEEN FALLING AND DEPRESSION

The mean (SD) Montgomery and Asberg rating scale score of falling patients was 19.55 (12.85) and it was significantly higher than that of non-falling patients (8.96 (9.62), $p<0.001$). There was a positive linear correlation between falling and degree of depression.

CORRELATION BETWEEN FUNCTIONAL DISABILITY AND FALLING

The Barthel index scores of falling patients were lower (14.91 (4.76)) than those of non-falling patients (17.50 (4.25), $p<0.001$).

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Characteristics of the falling and non-falling patients with stroke

	Falling patients n=131	*Non-falling patients n=162*
Sex:		
Women	61	78
Men	70	84
Age:	62.54 (10.31)*	59.88 (11.41)
21–40	7	9
41–54	15	35
55–69	74	85**
70+	35	33
Barthel index	14.91 (4.76)**	17.50 (4.25)
Depression scale	19.55 (12.87)**	8.96 (9.62)
Risk factors:		
Diabetes	16	21
Hypertension	48	60
Heart disease	14	32*
Operation	13	10
Trauma	3	7
Gastrointestinal diseases	6	8
Urinary disease	5	3
Right hemisphere	48*	39
Left hemisphere	38	57

*p<0.05; **p<0.005.
Student's *t* test was used to assess the statistical significance of difference in ages between falling and non-falling patients and was used to determine the statistical significance of the value of Bartel and Montgomery and Asberg rating scale between two groups.
χ^2 was used to asses the statistical significance of categorical variables among the ages, risk factors, and hemisphere involved in ischaemia.

CORRELATION BETWEEN ESTIMATED RISK FACTORS AND FALLING

There was a significant reverse relation between heart disease and falling;

The existence of heart disease halved the chance of falling (table, p<0.05).

Discussion

This study showed that the risk of falling was similar between men and women. These results are controversial. Some studies among patients with cerebrovascular disease who were under rehabilitation reported that women fell more often than men,[7] but others reported that there was no difference.[8–13] Comparing age as a risk factor for falling, with functional impairment after a cerebrovascular incident, the risk of falling increased more with age.[10] The mortality risk from falling also increased with age. Our results suggest that older patients with stroke fall more often than younger patients. Some researchers accept 60 years of age as a limit and suggest an increase of falling frequency after that age[14]; 75 year old patients fall 5–10 times more often than those 70 years old.[5]

Depression has been shown to be a risk factor for falling in several studies.[15–18] This is probably because of secondary depression after the illness. According to Wiart, in the first 2 years after cerebrovascular disease, depression was seen in about 30%-50% of all patients.[19] Alhough there were contradictory results about the relation between depression and cerebral localisation of the lesions, the interrelation between depression and falling has been clearly shown.[19] When the mean Montgomery and Asberg rating scale scores of falling patients were compared with those of non-falling patients, the scores were significantly higher in the falling patient group. The falling incidence was greater with increasing depression. Depression was an important risk factor for falling during the 1 year follow up period for patients with stroke.

The comparison of mean Barthel index scores between the groups showed that the scores of falling patients were lower. As an explanation, frequency of falling was increased by the functional impairment. This suggests that falling patients had a lower functional capacity. Our results concord with the previous studies.[7] The frequency of neurological complications of cerebrovascular disease has a significant relation with the disease severity and Barthel index scores.[1]

A study among 720 patients with stroke determined that heart disease; mental dysfunction, and urinary incontinence are risk factors for falling.[6] Especially, during the exacerbation periods of a chronic disease in patients without cerebrovascular disease, such as pneumonia or heart failure, the risk of falling increases.[4] In our study, when we compared the two groups for diabetes mellitus, hypertension, heart disease, surgery, trauma, gastrointestinal or urinary system disease, and rheumatological disease, the only significant relation was found between heart disease and not falling; in agreement with previous studies.[8] This may be because of a decreased functional capacity in patients with heart disease. Larger studies are necessary, however, because in our study only 46 of the 293 patients had heart disease.

In a previous study, wheelchair accidents were found to be more frequent in patients with right hemispheric lesion than patients with left hemispheric lesion.[16] The hemiparesia, proprioceptive impairment, neglect phenomena, and attention deficit could be the reasons for increased risk in patients with right hemispheric lesion. It has been reported that right handed males with a right hemispheric parietal lesion had visuospatial neglect and difficulty in identifying objects and people.[20] In our study, patients with right hemispheric lesion had twice the risk of falling. Our results agree with the previous studies. Also, there was no significant relation between the frequency of fallings and right hemispheric haemorrhage, probably because of smaller parenchymal destruction at the haemorrhagic lesion than that caused by ischaemia; right hemispheric ischaemic lesions were a risk factor for falling.

We conclude that patients with stroke have a relative high risk for falling. Increased knowledge of incremental risk factors for falling and the assumption that some of the identified risk factors can be modified may lead to the development of interventions to reduce the number of falls.

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