

EXTENDED REPORT

Occurrence and risk factors for falls in rheumatoid arthritis

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Objectives: To determine the one year period prevalence of falls by age and sex in patients with rheumatoid arthritis and the influence of concurrent medical treatment and disability on the occurrence of falls in this group.

Methods: A consecutive series of rheumatoid patients aged 35 years and over, attending hospital outpatient clinics at Hope hospital, Salford, were asked to complete an interview assisted questionnaire which asked about the occurrence and number of falls in the previous 12 months. Subjects who took part were asked about current treatment with antihypertensive agents, diuretics, sedatives or hypnotics, antidepressants, and a history of previous hip/knee surgery. They also completed the health assessment questionnaire (HAQ). Logistic regression was used to determine the association between these variables and falls in the previous 12 months.

Results: 253 men and women, mean age 62 years, were studied, and 84 (33%) reported falling in the previous year (36% of women and 26% of men). Of these, 52% had fallen on more than one occasion. There was no important increase in the frequency of falls with age. After adjusting for age and sex, those who had fallen in the previous year were more likely to report taking antidepressant treatment (odds ratio (OR) = 2.09) and to have impairment in both walking (OR = 1.37) and rising (OR = 1.41). The HAQ score was higher in those who reported a fall than those who did not, though the difference was not statistically significant.

Conclusions: In this hospital based survey, one in three patients with rheumatoid arthritis reported falling in the previous 12 months. Falls were associated with self reported impairment in lower limb function.

Rheumatoid arthritis is associated with an increased risk of osteoporotic fracture, including hip fracture.^{1–3} Osteoporotic fractures arise as a result of an interaction between increased bone fragility of which the major determinant is bone mass, and trauma, particularly falls. Data from many studies suggest that patients with rheumatoid arthritis have reduced bone mass compared to non-rheumatoid controls.^{4–6} Rheumatoid patients might be considered to be at increased risk of falls for a variety of reasons, including the presence of lower limb joint involvement resulting in impaired mobility, balance, and postural stability; however, little is known about the occurrence of falls in rheumatoid arthritis.

Our aim in this study was to determine the one year period prevalence of falls by age and sex in patients with rheumatoid arthritis, and to determine the influence of concurrent medical treatment and disability on the occurrence of falls.

METHODS

Subjects

Men and women with rheumatoid arthritis aged 35 years and over attending hospital outpatient clinics at Hope hospital, Salford—either for clinical review or for blood monitoring for anti-rheumatic treatment—were invited to complete an interviewer assisted questionnaire concerning falls. Subjects were asked about the occurrence of falls: “Have you fallen in the last 12 months?” and, if yes, “How many times?”. We did not include a formal definition of falls, though falls caused by road accidents and violence were excluded.

Subjects were asked also about the duration of rheumatoid arthritis, previous knee or hip surgery (any), and whether they were currently taking treatment that might influence their risk of falls (antidepressants/sedatives/hypnotics/anti-

hypertensives/diuretics). They were asked also to complete the health assessment questionnaire (HAQ).⁷ Ethical approval for the study was obtained from the Salford and Trafford ethics committee.

Statistical analysis

The proportions of patients who reported a fall in the previous year and who reported more than one fall (multiple falls) in the previous year were calculated by sex and by 10 year age group. Logistic regression was used to explore risk factors associated with falls, with falls in the last year as the dependent variable, and the results were expressed as odds ratios (OR) and 95% confidence intervals (CI). The analysis was repeated using multiple falls as the dependent variable. Statistical analysis was undertaken using STATA.⁸

RESULTS

Subjects

We interviewed 253 patients: 72 men, mean age 61.1 years, and 181 women, mean age 62.3 years. The mean duration of disease was 13.4 years; 17.8% reported having had previous hip or knee surgery, 32.8% were taking concurrent anti-hypertensive drug treatment, 8.3% were taking sedative/hypnotics, 17.4% were taking diuretics, and 15.4% were taking antidepressants (table 1).

Prevalence of falls

Eighty four subjects (33%) reported falls in the previous 12 months. Of these, 44 (52%) fell on more than one occasion. Falls were more common in women than in men (36% v 26%), though the difference was not statistically significant. Table 2 gives the proportion of patients who fell in the

Abbreviations: HAQ, health assessment questionnaire

Table 1 Subject characteristics

Variable	
Age (years)*	62.0 (11.2)
Duration of RA (years)*	13.4 (10.2)
HAQ score*	1.86 (0.78)
Hip/knee surgery	45 (17.8%)
Drug treatment	
Antihypertensives	83 (32.8%)
Diuretics	44 (17.4%)
Sedatives/hypnotics	21 (8.3%)
Antidepressants	39 (15.4%)

Values are *mean (SD), or n (%).
HAQ, health assessment questionnaire; RA, rheumatoid arthritis.

previous 12 months, and the proportion who fell on more than one occasion, by sex and age group. There was no significant trend towards an increased risk of falls (any or multiple) with age in either men or women. Of the 84 patients who reported a fall, four sustained a fracture (wrist, vertebra, nose, rib).

Risk factors for falls

After adjusting for age and sex, those who fell in the previous 12 months were more likely to report taking antidepressant therapy (OR = 2.09) than those who did not fall (table 3). Diuretic therapy (OR = 1.79) and sedative therapy (OR = 1.96) were also associated with an increased risk of falling, though the confidence intervals embraced unity. An increasing number of treatments taken by an individual (range 0 to 4) was associated with a significantly increased risk of falling (OR = 1.44). Previous hip/knee surgery was associated with an increased risk of falling (OR = 1.84), though the confidence intervals embraced unity. Duration of rheumatoid arthritis did not appear to influence the susceptibility to falls.

The mean HAQ score was 1.98 in fallers and 1.79 in non-fallers, though the difference was not statistically significant. In terms of the individual HAQ domains, increased difficulty in walking (OR = 1.37; 95% CI 1.02 to 1.84) and in rising (OR = 1.41; 95% CI 1.06 to 1.89) were associated with an increased risk of falls (table 4). Repeating these analyses using multiple falls (v single or no falls) as the dependent variable did not influence the results (data not shown).

DISCUSSION

In this study, one in three patients with rheumatoid arthritis aged 35 years and over reported falling during the previous year. Impaired walking and rising and concurrent antidepressant treatment were associated with an increased risk of falls in this patient group.

There are several methodological issues that need to be considered in interpreting the results. Data concerning falls were based on self report over the previous 12 month period, and poor recall (forgetting falls) may have resulted in an

Table 3 Risk factors for falls: age, sex, previous knee/hip surgery, and drug treatment

Risk factor	OR (95% CI)*
Age (years)	
35 to 45	Referent
45 to 55	1.18 (0.38 to 3.66)
55 to 65	0.85 (0.28 to 2.57)
65 to 75	0.91 (0.30 to 2.75)
75+	0.89 (0.26 to 3.07)
Sex (F v M)	1.58 (0.86 to 2.89)
Previous hip/knee surgery†	1.84 (0.95 to 3.57)
Antihypertensive agents†	1.00 (0.56 to 1.79)
Diuretics†	1.79 (0.90 to 3.58)
Sedatives†	1.96 (0.79 to 4.85)
Antidepressants†	2.09 (1.04 to 4.20)
Number of drugs (0 to 4)	1.44 (1.04 to 1.99)

*Adjusted for age and sex.
†Yes v No/Don't know.
CI, confidence interval; OR, odds ratio.

Table 4 Risk factors for falls – functional ability*

Risk factor	OR (95% CI)†
Mean HAQ (0 to 3)	1.34 (0.93 to 1.93)
Walking‡	1.37 (1.02 to 1.84)
Rising‡	1.41 (1.06 to 1.89)
Dressing‡	1.16 (0.90 to 1.51)
Hygiene‡	1.17 (0.89 to 1.54)
Reaching‡	1.16 (0.87 to 1.56)
Eating‡	1.16 (0.90 to 1.50)
Gripping‡	1.09 (0.76 to 1.55)
Activity‡	1.10 (0.85 to 1.43)

*From health assessment questionnaire.
†Adjusted for age and sex.
‡With difficulty or unable to do v no difficulty.
CI, confidence interval; HAQ, health assessment questionnaire; OR, odds ratio.

underestimation of the true occurrence of falls. In a previous study of ambulatory men and women aged 60 years and over, 13% of subjects who reported a fall during weekly reporting did not report having experienced a fall at the end of a 12 month period.⁹ Some caution is therefore required in interpreting the prevalence data. The effect of any misclassification owing to poor recall would be, however, to tend to reduce the chance of finding significant biological associations.

We studied rheumatoid patients attending a hospital outpatient department. Such cases are likely to be more severe than those managed in the primary care sector and our results should not be extrapolated outside this setting. Information about risk factors for falls, including functional impairment, was obtained by self report using questionnaires and was therefore subject to errors of recall. Objective

Table 2 Prevalence of falls by sex and age group

Age (years)	Women			Men			Both		
	n	Any fall (n (%))	> 1 fall (n (%))	n	Any fall (n (%))	> 1 fall (n (%))	n	Any fall (n (%))	> 1 fall (n (%))
35 to 44	11	4 (36.4)	3 (27.3)	7	2 (28.6)	1 (14.3)	18	6 (33.3)	4 (22.2)
45 to 54	36	16 (44.4)	9 (25.0)	17	4 (23.5)	2 (11.6)	53	20 (37.7)	11 (20.8)
55 to 64	57	19 (33.3)	13 (22.8)	20	5 (25.0)	3 (15.0)	77	24 (31.2)	16 (20.8)
65 to 74	56	20 (35.7)	6 (10.7)	17	4 (23.5)	1 (5.9)	73	24 (32.9)	7 (9.6)
75+	21	6 (28.6)	5 (23.8)	11	4 (36.4)	1 (9.1)	32	10 (31.3)	6 (18.8)

measurements would have provided a more accurate indication of functional status. Finally our study was cross sectional and it was not therefore possible to determine the temporal nature of any observed associations—it is possible, for example, that the occurrence of a fall may result in impaired walking and rising rather than the latter predisposing to falls. Prospective studies are required to confirm our findings and also to characterise the temporal nature of the observed associations.

As in most previous studies of non-rheumatoid subjects, falls were more common in women than in men.^{10–12} In contrast, however, we found no important increase in the risk of falls with age in our sample.^{11–13–14} The reason for this is unclear.

We did not include a control group of non-rheumatoid subjects and cannot therefore comment directly on whether rheumatoid arthritis per se is linked with an increased risk of falls. In a previous population based survey, however, undertaken in the early 1990s in the United Kingdom and using the same questionnaire as was used here, the frequency of falls among women aged 50 to 79 years was 26%.¹⁵ This compares with a frequency of 36% in our rheumatoid patient group at this age, suggesting that those with rheumatoid arthritis may have an increased susceptibility to falling; however, caution is needed in interpreting the data because of methodological differences (design/setting) between the studies. There are few other comparative data, though in a prospective study of 570 rheumatoid patients in California, mean age 64.9 years, the one year prevalence of falls (31%) was similar to ours.¹⁶

Previous studies have identified arthritis as a risk factor for falls in the majority of studies, though not all.^{12–17–19} In most studies, however, the nature of the underlying arthritis was not specified. In a prospective study of elderly women, those with self reported osteoarthritis were more likely to fall than those without.²⁰ An increased risk of falling was also observed in those with hip pain.²¹ In a prospective study of rheumatoid patients with evidence of functional limitation the risk of falls was increased by a factor of just over twofold compared with a group of controls without functional limitation.²² Despite the relative lack of data concerning occurrence of falls in rheumatoid arthritis, there is evidence that falls are an important concern for patients, with up to 50% reporting fear of falling and just under 40% reporting modified activities owing to fear of falls.¹⁶

Our finding of an association between impaired walking and rising and falls is consistent with impaired lower limb function as a risk factor for falls in rheumatoid arthritis. This is in keeping with studies in non-rheumatoid patients.^{10–23} Similarly previous studies in non-rheumatoid subjects have suggested that various drugs, including antidepressants, sedatives, and diuretics, have been associated with an increased risk of falls, with the risk increasing with increasing numbers of drugs.^{17–24–26} Our results are consistent with these findings, though perhaps because of relatively small numbers some of the associations did not attain conventional levels of statistical significance.

Cross sectional and prospective studies suggest that patients with rheumatoid arthritis have lower bone mass than non-rheumatoid controls and are therefore at increased risk of fracture.^{4–6} Our data highlight the relatively high frequency of falls in rheumatoid arthritis. Measures to prevent fractures in this patient group should therefore focus not just on pharmacological treatment to prevent bone loss but also on measures to prevent falls.

In conclusion, falls in rheumatoid patients are common, with one in three reporting a fall in the previous year.

Measures to prevent falls in this group should be considered, particularly among those who are at increased risk of fracture.

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