The incidence of hip fracture in Uppsala County

Change of time trend in women

Samwel Nungu, Claes Olerud and Lars Rehnberg

The incidence of hip fracture in the population over 55 years in Uppsala County was calculated for the years 1980–1991. Specific incidences were calculated for each age, sex, and fracture type group. The time trend for the change in incidence was calculated for each group with linear regression using an exponential model. The overall incidence of hip fracture in both sexes over 55 years, standardized to the 1985 population, remained steady at 6/1000 during the study period. The incidence of cervical fractures in women showed a decrease in all age groups except over 85 years of age, where the incidence was constant. The corresponding incidence in men did not change over time. The incidence of trochanteric fracture increased in men 65–74 years of age and in women over 85 years of age. The incidence of trochanteric fracture in the rest of the age and sex groups remained unchanged.

Department of Orthopedics, Uppsala University Hospital, S-751 85 Uppsala, Sweden. Tel +46–18 66 30 00. Fax –18 50 94 27
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When we reported the incidence of hip fractures between 1980 and 1987 we found that the specific incidence in a few age, sex, and fracture type groups was declining (Rehnberg and Olerud 1990). The specific incidences for 1988–1991 have now been added, and the time trend over the entire 12-year period 1980–1991 has been established.

Patients and methods

Hip fractures were defined according to the Swedish version of the international classification of disease, ICD-9 (International classification of diseases 1986). The fractures were divided into cervical fractures, ICD-9 classes 820.A and 820.B, and trochanteric fractures ICD-9 classes 820.C and 820.D. Subtrochanteric fractures, where the main component of the fracture extended distal to the lesser trochanter, and pathological fractures due to metastases, were not included.

Patients

In Uppsala County only two hospitals admit and treat patients with hip fractures. All patients over 55 years of age treated for hip fracture were registered prospectively at the operation theaters of these two hospitals. The number of fractures were counter-checked by comparison with the official hospitals' discharge records. Patients from the catchment area who were injured and treated at other hospitals outside the area and transferred to the two hospitals for after-treatment were included, whereas residents from other counties who sustained their injury while visiting Uppsala were not. As virtually all patients with hip fracture seek hospital care, we assume that all fractures that have occurred in the catchment area population also have been included in the study.

Demographic data concerning the population was obtained from the County Administration (National central bureau of statistics 1980–1991). The total population over the age of 55 increased from 59,654 in 1980 to 62,648 in 1991. The population also grew older as the number of individuals in the older age groups increased, whereas it decreased in the younger age groups.

Statistics

To establish the specific incidence (the number of fractures per 1000 inhabitants in each age, sex, and fracture type group), the number of fractures in each group was divided by the population at risk for that particular group.

The time trend for the incidence of both types of hip fractures in the entire population over 55 years of age was calculated after a direct age adjustment had been performed to the population of 1985 (Armitage and Berry 1987). For each year the incidence of hip fracture in each age group was multiplied by the 1985 population in that age group, the factors were then added together and the sum divided by the total population over 55 years of age in 1985.

Table 1. The specific hip fracture incidence (per 1000 inhabitants) in the various age, sex, and fracture type groups in Uppsala County during the years 1980–1991

	55–64 years				65–74 years				75–84 years				>85 years			
Year	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1980	0.5	1.3	0.3	0.6	0.9	2.7	0.4	1.4	3.9	10	2.3	7.9	12	21	13	16
1981	0.6	1.3	0.3	0.6	1.2	2.9	0.8	2.0	6.2	11	3.8	5.9	6.8	25	7.7	18
1982	0.4	0.8	0.3	0.7	1.9	3.4	0.6	1.3	5.1	12	2.9	6.0	15	23	4.6	16
1983	0.8	1.1	0.2	0.5	1.4	2.4	1.4	1.4	5.3	10	2.5	7.0	15	24	5.5	18
1984	0.3	1.1	0.2	0.2	2.1	2.7	0.6	1.5	5.0	10	2.1	6.8	19	26	4.4	19
1985	0.4	0.8	0.4	0.5	1.7	3.0	0.8	1.7	6.5	8.6	3.8	6.9	15	18	6.2	16
1986	0.1	0.8	0.5	0.2	0.6	2.7	0.9	1.2	2.7	9.1	2.8	6.3	9.4	15	9.4	17
1987	0.7	0.7	0.4	0.5	1.2	2.7	0.9	1.8	3.9	8.7	2.9	5.3	16	24	8.6	18
1988	0.5	0.5	0.2	0.5	0.5	1.6	0.8	1.4	4.3	8.2	1.9	6.4	7.8	17	9.4	22
1989	0.2	0.5	0.2	0.3	1.3	2.5	1.5	1.9	2.6	7.5	3.5	6.5	9.7	24	11	18
1990	0.2	1.0	0.5	0.4	1.3	1.2	1.8	1.2	5.2	7.7	3.6	7.5	14	20	7.9	24
1991	0.2	0.8	0.4	0.5	1.7	1.5	1.5	1.7	6.0	7.7	3.4	6.3	9.7	21	7.6	22

A cervical, men; B cervical, women; C trochanteric, men; D trochanteric, women.

Table 2. The time trends of incidences in the various age, sex, and fracture type groups from the years 1980–1991 in Uppsala County. The trends are calculated with exponential regression $y = e^{a+bx}$. 95 % CI = 95 percent confidence interval

	55–64 years				65–74 years				75–84 years				≥85 years			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Annual change (%)	−10	−6	2	−3	−1	−7	9	0	1	−4	2	0	−1	−1	2	3
95 % CI (%); lower	−20	−10	−5	−10	−8	−10	4	−3	−7	−5	−2	−2	−6	−4	−3	1
upper	−1	−2	9	4	6	−3	14	3	4	−3	6	1	5	1	8	4
P	0.07	0.02	0.5	0.5	0.8	0.005	0.004	0.9	0.6	<0.001	0.4	0.7	0.7	0.3	0.5	0.01
r^2 (percent)	–	45	–	–	–	56	57	–	–	84	–	–	–	–	–	52

A cervical, men; B cervical, women; C trochanteric, men; D trochanteric, women.

To estimate the time trend from 1980–1991, a regression analysis was performed using an exponential model, $y = e^{(a+bx)}$. The time trends for the specific incidence in the age, sex, and fracture type groups were calculated in the same way but without the age adjustment.

A significant slope of the fitted line was taken as an indication of a true trend over time, and the 95 percent confidence interval for the annual change was calculated. If, on the other hand, no significant slope was present, the incidence was considered to be stable over the studied years.

Results

The average annual number of hip fractures was 382. There was a trend towards a decreasing number of cervical fractures and an increasing number of trochanteric fractures. The over-all incidence after standardization to the 1985 population remained fairly constant at 6 per 1000 inhabitants over 55 years of age.

The time trend of specific incidence showed a decrease for cervical fractures in women in all age groups except over 85 years of age, where the incidence did not change (Table 1). The incidence of cervical fractures in men also showed a tendency towards a decrease, which was not significant. There was an increasing trend in trochanteric fractures in men between 65 and 74 years of age and in women over 85 years of age (Table 2).

Discussion

The incidence of hip fractures in the elderly has been reported to increase dramatically according to several authors (Alffram 1964, Lewis 1981, Frandsen and

Kruse 1983, Swanson and Murdoch 1983, Wallace 1983, Johnell et al. 1984, Zain Elabdien et al. 1984, Zetterberg et al. 1984, Boyce and Vessey 1985, Cummings et al. 1985, Falch et al. 1985, Finsen and Benum 1987, Mannius et al. 1987, Schröder et al. 1988). Some publications, however, have suggested that the trend has shifted and the incidence is constant, or even declining in some specific age, sex, and fracture type groups (Jensen 1980, Lüthje 1985, Melton et al. 1987, Rehnberg and Olerud 1990).

An increase in the absolute number as well as incidence of hip fractures has been reported in studies from Sweden and other European countries during the last decades (Frandsen and Kruse 1983, Johnell et al. 1984, Zetterberg et al. 1984, Boyce and Vessey 1985, Cummings et al. 1985, Falch et al. 1985, Finsen and Benum 1987, Mannius et al. 1987, Schröder et al. 1988, Maggi et al. 1991). This was also the case in our own catchment area until 1980 (Zain Elabdien et al. 1984). This increase continued in men also after 1980. In women under 85 years, however, a decrease can now be detected in cervical fractures.

Is the observed change in time trend in cervical fractures in women under 85 years of age a true change in the population or is it merely reflecting a normal fluctuation in the steadily increasing trend? We do not know. Such fluctuations in hip fracture incidence have been observed previously: Nilsson and Obrandt (1978) reported that the previously observed increase in incidence of hip fractures seemed to have halted in Malmö, a finding that later proved to be only a temporary event (Johnell et al. 1984).

There are, however, two factors that support our observations. Firstly, Naessén et al. (1989) reported the hip fracture rates during the years 1965–1983 in a larger area, including Uppsala County. In cervical fractures in women they found an annual decrease in incidence of 1.6 percent, whereas the incidence in trochanteric fractures was constant. In men the incidence in both cervical and trochanteric fractures increased: 1.8 and 2.6 percent, respectively. Secondly, Hedlund et al. (1986) from a neighboring area of Sweden, also documented a decrease in the incidence of cervical fractures in women. However, they found an overall increase in hip fracture incidence.

As both these findings are in agreement with ours we conclude that the decrease in incidence of cervical fractures in women in our catchment area has continued throughout the 1980s.

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