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Increasing incidence of hip fractures in Finland

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Summary. The incidence of hip fracture in Finland was studied for the year 1988. During 1988, 6139 patients were treated for a fresh hip fracture. Three out of four hip fracture patients were women, and the occurrence of cervical fractures was 2.8 times and that of trochanteric fractures 2.5 times more common in women than in men. The incidence rates of hip fractures per 100000 were 174 in women, 70 in men and 123 in the whole population. The mean hospitalization time for fresh hip fractures was 33 days for cervical fractures and 38 days for trochanteric fractures. The costs of primary hospitalizations due to fresh hip fractures in 1988 were estimated at US $ 66 million.

Alffram [1] indicated an increasing incidence of hip fractures in Sweden nearly three decades ago. This tendency has been later confirmed by several population studies [3–6, 8]. Both nationwide and regional monitoring continue to be important since these fractures increasingly burden the health care. In Finland, these fractures cause more hospital care costs than any other injuries [7].

In this study, we report the incidence of hip fractures for the whole population of Finland (5 million) in 1988, and compare the results to an earlier Finnish nationwide investigation from the year 1968.

Materials and methods

All patients admitted to general hospitals in Finland in 1988 for primary treatment of a fresh hip fracture were selected from the National Hospital Discharge Register. On the basis of their unique personal identification number, those who had been treated more than once during the same year for the same injury were identified and only the first admission was included.

The hospital discharge records include data on age and sex, five-digit diagnosis codes according to the 9th revision of the International Classification of Diseases (ICD) indicating type of fracture, type of hospital (university, central, regional or municipal hospital), and data on duration of stay in hospital. The following five-digit codes were used: 8200A and 8201A for cervical fracture and 8202A, 8203A, 8203B, 8203C, 8208X and 8209X for trochanteric fracture. Subtrochanteric fractures were included in the group of trochanteric fractures.

The fractures were classified according to both main and secondary diagnosis. The main diagnosis was the patient's first diagnosis in the hospital discharge records. According to the directives given by the National Board of Health, the first diagnosis describes the main reason for the patient's hospital stay. The second, third and fourth diagnoses indicate other possible diseases or injuries. In this study "secondary diagnosis" included the second, third, and fourth diagnoses. The increase in the hip fractures since 1968 was counted based on an earlier study [2], in which the hip fractures were not divided in subtypes.

The costs of hip fracture treatment were calculated on the basis of the average daily costs for surgical patients in general hospitals in 1988.

Results

During 1988, 3727 patients with acute cervical fractures and 2412 with acute trochanteric fractures attended Finnish hospitals for primary treatment (Table 1). Table 1 does not include 13 patients with cervical and 10 patients with trochanteric fractures, whose sex was unknown. The occurrence of cervical fractures was 2.8-fold higher in women than in men, while the corresponding female-male ratio for trochanteric fractures was 2.5. Eighty-five percent of women and 63% of men with cervical fractures were over 69 years of age, while the percentages for trochanteric fractures in women and men were 88 and 57, respectively. Of all the patients with a hip fracture, 72% were women.

The incidence of cervical fractures increased abruptly in both sexes after 49 years of age (Table 1). In trochanteric fractures, the incidence in women increased after 49 years of age and in men after 39 years (Table 1). The total incidence rates were $174/10^5$ in women, $70/10^5$ in men and $123/10^5$ in both sexes together.

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Table 1. Sex- and age-specific incidences[a] of hip fractures in Finland in 1988

Fracture type	Age (years)	Women				Men				Ratio of fractures women/men
		Population[b]	Cases	[%]	Incidence	Population[b]	Cases	[%]	Incidence	
Cervical	0– 9	310806	4	0	1	324787	6	1	2	0.7
	10–19	306708	5	0	2	321108	30	3	9	0.2
	20–29	363062	9	0	2	378449	38	4	10	0.2
	30–39	394332	9	0	2	415044	32	3	8	0.3
	40–49	348074	21	1	6	360397	39	4	11	0.5
	50–59	271161	78	3	29	259555	76	8	29	1.0
	60–69	262031	276	10	105	197690	142	15	72	1.9
	70–79	200796	968	35	484	108623	271	28	251	3.6
	80–89	86531	1162	43	1351	33235	292	30	885	4.0
	90–	8690	205	8	2384	2105	51	5	2429	4.0
	Subtotal	2552194	2737	100	107	2400990	977	100	41	2.8
Trochanteric	0– 9		3	0	1		3	0	1	1.0
	10–19		5	0	2		14	2	4	0.4
	20–29		4	0	1		16	2	4	0.3
	30–39		5	0	1		30	4	7	0.2
	40–49		16	1	5		51	7	14	0.3
	50–59		37	2	14		75	11	29	0.5
	60–69		130	8	50		114	16	58	1.1
	70–79		547	32	273		177	26	162	3.1
	80–89		800	47	930		177	26	536	4.5
	90–		161	9	1872		37	5	1850	4.4
	Subtotal		1708	100	67		694	100	29	2.5
Total			4445		174		1671		70	

[a] Number of cases per 100000 population per year
[b] Central Statistical Office of Finland 1989

Table 2. Mean duration of hospitalization (days) in cases of main diagnosis

Type of hospital	Cervical fracture	Trochanteric fracture
University	19	37
Central	15	19
Regional	27	30
Municipal	72	72
Total	33	38

In the analysis of the hospital discharge data for 1988, the hip fracture was recorded as the main diagnosis in 89% of cases. The total of hospital inpatient treatment days for patients with hip fracture as the main diagnosis was 188592. In 1988, in cases with a hip fracture as the main diagnosis, the mean duration of hospital stay was 33 days in patients with an acute cervical fracture and 38 days in patients with an acute trochanteric fracture (Table 2).

In 1988, the total costs of primary hospitalizations for the treatment of fresh hip fractures in Finland were FIM 275 million of US $ 66 million (in 1988 the exchange rate was FIM 100 = US $ 24), with an average of FIM 54400 or US $ 13056 per hip fracture.

Discussion

The Hospital Discharge Register kept by the National Board of Health covers all Finnish hospitals since 1967, except mental hospitals. It is the oldest nationwide discharge register in the world [10]. Since all fresh hip fractures, with a very few solitary exceptions, are treated and operated on in acute-stage hospitals, the data provided by this register serve well for epidemiological purposes.

The coverage of this register has constantly improved, being above 90% in the 1980's according to Honkanen [7]. Comparison of the information on hip fracture as main diagnosis on the three-digit level in the hospital discharge register with patient records in 1980 revealed that the specificity of the hospital discharge register was 99.9% and its sensitivity 98.8% (Honkanen, unpublished data).

The rate of increase in the total number of fresh hip fractures between 1968 [2] and 1988 on the basis of the numbers in the present study was 4.2 (327%). In 1968, 1442 hip fractures were treated in Finland [2]. Of those, 1025 were in female patients and 417 in male [2]. In 1968, the incidence rates of hip fracture were $42/10^5$ person-years in women and $18/10^5$ person-years in men, and the total incidence was $31/10^5$ person-years [2]. The corresponding rates in the present study are 174, 70 and 123.

The quadrupling in numbers of fresh hip fractures in Finland during 1968 to 1988 is high compared to corresponding data reported from other countries. In epidemiological studies in other countries, the increase in hip fractures has quite obviously been slower than in Finland. Population-based epidemiological studies have been published from other Scandinavian countries as well [3–6, 8]. Most of these suggest a two- to three-fold increase during a next 20-year period [3–5, 8]. Although researchers in Scandinavia agree in their views that the increasing incidence of hip fractures is an indisputable fact [4, 5], a recent study from Rochester (Minnesota, USA) reported no significant change in the age-standardized incidence of hip fractures during the past 50 years [9].

In the present study, remarkable differences were found between hospitals in the mean duration of hospitalization, although the policy in the treatment of hip fractures should be generally similar. Many acute-care hospitals have to hospitalize hip fracture patients for an unnecessarily long period just like long-term care hospitals, since they are unable to discharge the patients early enough to long-term care hospitals. The longest mean duration of hospitalization was found in municipal hospitals. These hospitals operate as long-term care hospitals. The reason for the much longer hospitalization time in university hospitals compared to central hospitals in patients with trochanteric fractures is unknown.

Repeated epidemiological analyses of the occurrence of hip fractures are important for effective health care planning, since these fractures are one of the main burdens on health care systems, and their incidence is continuing to increase in industrialized countries.

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