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The second hip fracture

An epidemiologic study

We studied a group of 151 patients who were treated for various types of fractures and who all had a history of a previous hip fracture. A subgroup with new hip fractures had few of their second fractures on the same side as the initial fracture. It appears that a hip fracture reduces the risk of a subsequent hip fracture on the same side to one fourth and that cervical fractures reduce this risk to one sixth. A tendency was found for the hip fracture to be of the same type as the previous one. The time between the first and the second hip fracture was twice as long in those with a previous cervical fracture as in those with a previous trochanteric fracture.

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During a study of the incidence of hip fractures (Finsen & Benum 1987), the impression was that although the frequency of second hip fractures was high, only a few of these fractures seemed to affect the same hip. We therefore examined the relationship between the first and the second hip fracture.

Patients and methods

We studied 2,338 consecutive patients (1,803 women and 535 men) above the age of 50 who were treated for fractures in the orthopedic and casualty departments of our hospital during a 25-month period. Fractures caused by traffic accidents or similar high energy trauma were not included in the study. The patients were questioned about previous fractures, and two groups were selected:

Group A: 1,024 patients (769 women and 255 men) who were not aware of any previous fracture. The proportion in each age-group treated for hip fractures was calculated (Figure 1).

Group B: 151 patients with a previous hip fracture – 116 women with a past history of 28 trochanteric and 88 cervical fractures and 35 men with 11 trochanteric and 24 cervical fractures. The current fracture involved the hip in 76 instances. The time interval between the two fractures was recorded, and it was noted whether the current fracture was on the same or the opposite side from the original fracture. The expected number of trochanteric and cervical fractures was calculated for each group on the basis of age and the frequencies estimated for the patients without previous fractures (Table 1). Finally, the expected number of hip fractures in the 116 women and 35 men with previous hip fractures was calculated on the basis of age-corrected incidence data for hip fractures in our area (Finsen & Benum 1987).

For statistical evaluation, the Student's t test and the chi-square test were used.

Results

In Group A there were more than three times as many women as men. The proportion of fractures involving the hip was approximately equal in men and women of the same age-group (Figure 1). In both men and women over the age of 80, more than half of all fractures affected the hip.

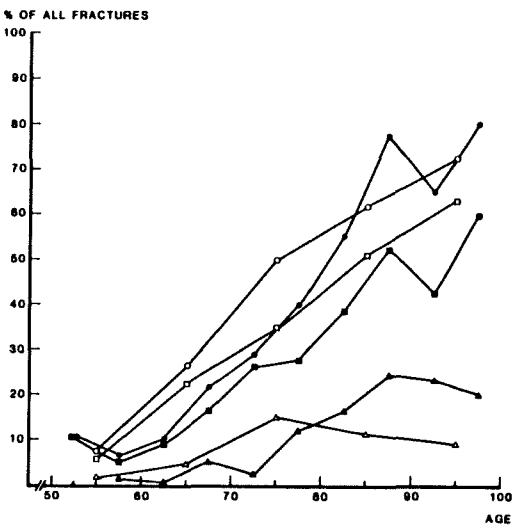

Figure 1. Hip fractures as a percentage of all fractures sustained by patients without known previous fractures. (Women: Closed symbols. Men: Open symbols. Trochanteric fractures: △. Cervical fractures: □. Cervical and trochanteric: ○).

Table 1. Observed distribution of hip fractures in patients with previous hip fracture. (Expected number on the basis of fracture patients without previous fractures in parenthesis) C = Cervical, T = Trochanteric.

Previous fracture	Present fracture								
	Women			Men			Women + Men		
	Total	C	T	Total	C	T	Total	C	T
C Total	42	32	10	12	11	1	54	43	11
	(38)	(28)	(10)	(9)	(7)	(2)	(47)	(35)	(12)
Ipsilateral	6	4	2	3	3	0	9	7	2
Contralateral	36	28	8	9	8	1	45	36	9
T Total	16	6	10	6	1	5	22	7	15
	(8)	(4)	(4)	(4)	(3)	(1)	(12)	(7)	(5)
Ipsilateral	5	2	3	2	1	1	7	3	4
Contralateral	11	4	7	4	0	4	15	4	11
Total	58	38	20	18	12	6	76	50	26
	(46)	(32)	(14)	(13)	(10)	(3)	(59)	(42)	(17)

In Group B, 58 new hip fractures were found among women and 18 among men. The expected numbers based on the age-corrected general incidence data for the city of Trondheim were 4.4 and 0.3, respectively. When the calculation of expected numbers of fractures was based on the age-corrected distribution of fractures in patients without a previous fracture (Group A), it was found that 46 hip fractures were to be expected among the women and 13 among the men (Table 1).

Only 11 of the current fractures among the women and five among the men were on the same side as the previous one, whereas 47 ($P < 0.001$) of the women and 13 of the men had fractured the opposite hip (Table 1). Sparing of the previously fractured hip was most marked in the women with previous cervical fractures; only 6 had their subsequent fracture on the same side, whereas 36 fractured the opposite hip ($P < 0.001$).

Patients with a previous cervical fracture had comparatively more new cervical fractures, whereas patients with previous trochanteric fractures had more new trochanteric fractures (Table 1).

The ratio of men to women did not vary significantly between the subgroups. Therefore, patient age at the time of the first and second fractures and the time between the fractures were calculated for both sexes together.

The average age of patients with repeated hip fractures was 72 ± 12 years at the time of the first fracture irrespective of the fracture type. The mean age at the time of the second fracture was 80 ± 8 years. There was no significant variation from these averages when the mean ages in the subgroups in Table 1 were calculated except for the 7 patients who had had an earlier trochanteric but currently a cervical fracture. These patients had a mean age of 89 ± 6 years at the time of the second fracture ($P < 0.001$).

The mean interval between the two fractures was 7 ± 8 years. The mean interval between a cervical fracture and a second hip fracture was 8 ± 9 years and between a trochanteric fracture and a second hip fracture 3 ± 4 years ($P < 0.001$).

Discussion

Of the total number of fractures sustained after a previous hip fracture, only slightly more than were expected affected the hip. Unless the previous hip fractures and their treatment have caused a change in the strength of the bone, one would expect the second fractures to be evenly distributed between the two hips. Therefore, in the women one would expect 23 of the calculated 46 fractures to occur on the previously unaffected side, but 47 fractures were observed. The incidence of hip fractures

on the previously unaffected side was thus twice that found in patients without previous fractures.

A previous cervical fracture reduced the risk of a subsequent fracture of the same hip to approximately one sixth, whereas a previous trochanteric fracture reduced this risk to one third. This protection of the previously fractured hip may be due to increased strength because of bone produced by the healing process and/or because of residual osteosynthetic material.

We have found that in Trondheim cervical fractures are approximately twice as common as trochanteric fractures (Finsen & Benum 1987). Our finding of a ratio of 4 to 1 after a previous cervical fracture ($P < 0.2$) and of 1 to 2 after a previous trochanteric fracture ($P < 0.05$) confirms the observations of Alffram (1964) and Drekatis et al. (1981) that a previous fracture of one type predisposes to a later fracture of the same type. This suggests that the two fracture types may have different etiologies. Recently, Elabdien et al. (1984) have shown that the ratio of cervical to trochanteric fractures in Uppsala has changed with time from 2 to 1 in 1965 to 1 to 1 in 1980. Our finding of a difference in elapsed time between the first and second hip fracture, depending on whether the first fracture was trochanteric or cervical also indicates that the predisposing factors may be different in these two types of fracture.

Acknowledgement

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