

# Mortality after cervical hip fracture

## 3002 patients followed for 6 years

In 3002 patients with a femoral intracapsular neck fracture occurring during a 3-year period in the Stockholm area, 79 per cent were admitted from home and the remainder from different types of institutions. The mortality among these fracture patients was higher than in the general population. Patients admitted from institutions had a three to four times higher mortality rate than those coming from home. After 6 years, 54 per cent of the patients admitted from home were still alive compared with only 16 per cent of those admitted from institutions.

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It has long been known that patients with hip fracture have a higher mortality than the general population. Earlier reports are based on two types of investigation: studies on hip fractures from a single hospital (Alffram 1964, Beals 1972, Honkonen 1975, Colbert & O'Muircheartaigh 1976, Dolk & Westerborn 1977, Jensen & Tøndevold 1979, Jensen 1984) and studies analyzing mortality in relation to a special type of primary treatment in a limited number of patients (Raine 1973, Lindholm et al. 1976, D'Arcy & Devas 1976, Søreide et al. 1980).

Our investigation was based on a large population from a major city and its suburbs.

### Material and methods

This study comprised all the 3002 patients with a cervical hip fracture treated in the Stockholm County Council (SCC) area during the period January 1975 through December 1977. 2378 patients were admitted from home and the remaining 624 from various institutions, such as psychiatric hospitals, long-stay hospitals, and old peoples' homes (Table 1).

Hospital mortality was checked by reviewing the inpatient records and late mortality through the Central Personal Register in SCC's computer centre (L-Data) and through the National Central Bureau of Statistics (SCB). The last check for mortality was made in March 1984. The follow-up study then covered more than 6 years. Age- and sex-matched life tables for the population above 40 years of age in

Table 1. Age and sex distribution of 3002 patients admitted from home and from institutions

Age	From home		From institutions	
	Male	Female	Male	Female
<50	35	21	2	1
50-64	152	255	14	15
65-79	258	882	54	141
>80	163	612	78	319
Total	608	1770	148	476

SCC were computed based on data furnished by SCB, and weighted survival curves were constructed.

Internal fixation was performed in 2790 fractures as reported previously (Holmberg & Thorngren 1985, 1986). In 99 displaced subcapital fractures, primary hemiarthroplasty was performed. 65 impacted fractures had closed treatment and the remainder miscellaneous or no treatment.

The causes of death were analyzed for patients admitted from home during their stay in acute or rehabilitation hospitals; all were diagnosed by autopsy.

The chi-square test with Yates's correction was used.

### Results

An increased mortality in the total material was recorded during the first 3 months after fracture when compared with the general population. The cumulative mortality during the first 3 weeks after fracture was 4.4 per cent in

Table 2. Cumulative mortality (per cent) after femoral neck fracture correlated with treatment. Patients admitted from home.

	No.	Mean age	Time after fracture						
			1 wk	3 wk	1 mo	3 mo	1 yr	3 yr	6 yr
Primary osteosynthesis	2241	74	1	3	4	6	14	26	44
Primary arthroplasty	95	78	3	6	11	14	19	37	53
Reoperation	641	75	1	2	2	5	11	21	37

Table 3. Cumulative hospital mortality (promille) among patients with femoral neck fracture admitted from their homes.

Cause of death	Time after fracture		
	1 wk	2-4 wk	3 mo
Pneumonia	2.5	6	12
Cardiac ischemia	0.8	2.5	6
Heart failure	5	12	19
Arteriosclerosis	0.8	1.3	6
Cerebrovascular	1.3	3	7
Pulmonary embolism	1.4	9	14
Sepsis	0.5	1.3	4
Malignancy	0.8	1.7	7
Miscellaneous	1.3	3	7

the total material. Most of these deaths occurred among patients admitted from institutions, 9.6 per cent compared with patients admitted from their own homes, 3.1 per cent ( $p < 0.001$ ). At 3 months, the corresponding cumulative mortality was 27 and 8 per cent, and at 1 year, 46 and 16 per cent. At 6 years after fracture, more than half of the patients admitted from home were alive compared with only 16 per cent of patients admitted from institutions. Among patients coming from home, the mortality was the same as in the general population already 12 months after fracture (Figure 1). No difference in mortality was found for various types of residency (central city, suburban, or rural areas).

Among females, mortality was increased up to 9 months after fracture compared with the general population. Not until 12 to 18 months after fracture did the male mortality equal that of the general population (Figure 1). The mortality rate increased more rapidly with increasing age among males than among females. This pattern was most marked among patients admitted from home and prevailed during the 6-year observation period for different age groups (Figure 2). Mortality rate in fe-

males above 65 years of age admitted from home paralleled the graph of expected survival at about 1 year after the fracture. In persons above 80 years of age, a higher mortality rate in the general population was recorded than in the fracture groups from about 1 year after the fracture and onwards.

There was no difference in mortality when the four most common methods of internal fixation (von Bahr, Thornton, Hessel/Nyström and Rydell) were compared. Mortality after reoperations was lower than after the primary procedures (Table 2).

Cardiovascular and pulmonary diseases were the predominant causes of death within the first 4 weeks after the fracture; 1.4 per cent died from pulmonary embolism (Table 3).

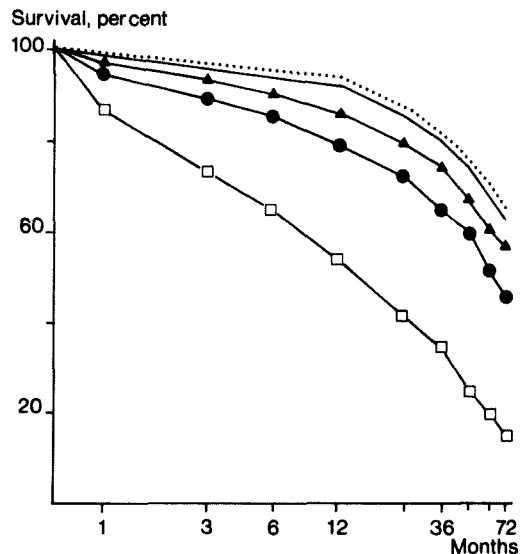


Figure 1. Post-fracture survival rates within 6 years for 3002 patients with femoral neck fracture. Mean death risk among the general SCC population: Females ... and males —. Among fracture cases: females ▲ and males ● admitted from own home. Patients admitted from institutions □.

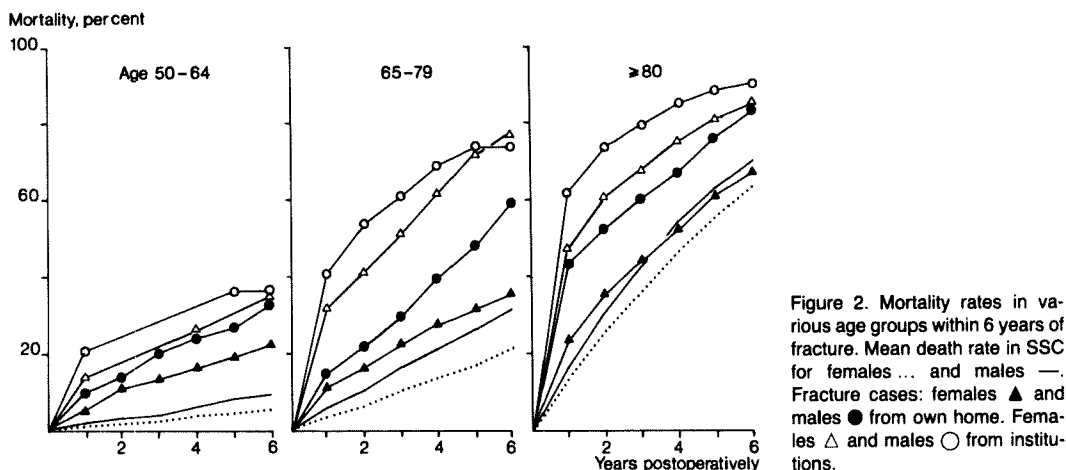


Figure 2. Mortality rates in various age groups within 6 years of fracture. Mean death rate in SSC for females ... and males —. Fracture cases: females ▲ and males ● from own home. Females △ and males ○ from institutions.

## Discussion

Our investigation comprised 18 per cent of the Swedish population. The mortality rate was 12 per cent within 3 months, which agrees with the reports by Alffram (1964), Öhman et al. (1969), Beals (1972) and Jensen & Töndevold (1979). In a recent study (Nilsson 1984) on trochanteric fractures from a single hospital in Stockholm, the mortality was 6 per cent at 3 weeks and 11 per cent at 3 months. The 5-year mortality after cervical hip fracture has been reported by Öhman et al. (1969) to be 49 per cent; Jensen & Töndevold (1979) found 56 per cent 5-year mortality for a combined material of cervical and trochanteric fractures; we found the mortality to be 35 per cent after 3 years and 54 per cent after 6 years.

The mortality pattern among femoral neck fracture patients has clearly not changed during the last 2–3 decades.

Alffram (1964) found that the cumulative mortality after 3 months in patients with hip fracture became the same as that of the general population. In their Copenhagen material (Jensen & Töndevold 1979), this did not occur until after 20 months. In our total material the mortality equaled that of the age- and sex-correlated general population at 12 months. Patients admitted from institutions have the highest mortality because they have a higher morbidity than patients living in their own homes (Boalt et al. 1982, Jensen 1984).

The higher death risk among males compared with females admitted from their own

homes was most marked above 80 years. This is a common finding not only after cervical hip fracture, but also in rheumatoid arthritis (Allebeck 1984) and myocardial infarction (Ahlbom 1978). The reason for this is unclear. A low mortality rate was noted at all time periods for the patients reoperated after a complication related to the femoral neck fracture. Emergency operations have been shown (Cogbill 1967, Vakanti et al. 1970) to result in a higher overall mortality than elective surgery (Hägglund et al. 1984). Further, patients who depend on institutional care often have other diseases, making them a high risk group. The reoperations include selected patients in better general condition and are performed as elective procedures at a considerably later time after fracture. By that time, many disabled patients have already died from concurrent diseases.

In conclusion, age, sex, and prefracture residency are indicators of the general medical condition which determines the mortality after femoral neck fractures. When planning the primary treatment and hospital resources required for patients with femoral neck fractures, knowledge of the mortality pattern of these patients is of value.

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