

Hip Fractures—Patient Background

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ABSTRACT

A consecutive series of 282 patients with hip fractures, with a mean age of 76 years, was studied. Two-thirds of the patients (182) lived in their own homes, half of them alone and one-third of the 182 requiring regular help. Widows were more common in the age group 75 - 84 years and widowers and single men in the age group 65 - 74 years.

Thirty % of the patients used walking aids and had previously sustained fractures of the osteoporotic type. One-fourth of the patients were confused on arrival at hospital. Laboratory tests differed little from values in the normal population. Chest X-ray was of value and cardiac decompensation was diagnosed in a small group. Time aspects of the hip fracture accident are discussed. No increase in incidence in the age group over 70 years was found during the period 1971 - 1981.

INTRODUCTION

Patients with hip fractures constitute a major problem in the northwestern parts of Europe, and many centres report that the incidence of fractures is increasing.

In Sweden the national welfare authorities are aware of the problem and the present investigation was initiated by SPRI (the Swedish Planning and Rationalization Institute of the Health and Social Services) in 1973 as part of a "production control" study (37).

The aim of this part of the investigation was to study the incidence, the patient and the accident.

PATIENTS AND METHODS

The study comprised 282 consecutive patients with hip fractures (femoral neck or trochanteric) who were treated during a one year period from 1973 - 1974 at the surgical and orthopaedic departments of the Regional Hospital in Örebro. This hospital has a primary catchment population of 163,000.

The patients were interviewed by a special nurse, usually on the day after arrival. The nurse collected and registered all data concerning the patient, which were entered on preformed data sheets and subsequently analysed (37, 38).

Official statistics were used for information regarding marital status. The incidence figures for the period 1971 - 1981 were obtained from official statistics and a manually kept register of operatively treated fractures.

RESULTS

INCIDENCE. The incidence of hip fractures based on our material was calculated for different age groups and for patients from institutions (Table 1). The most afflicted age group is that over 70 years, to which 78 % of our patients belonged. The incidence in this age group is 12.7 per thousand (men 8.0, women 16.1).

Table 1. Incidence of hip fracture (per thousand) among different age groups and among patients from different institutions.

Age(years)	Men	Women	Total
40 - 49	0.6	0.6	0.6
50 - 59	0.5	0.8	0.7
60 - 69	1.1	2.6	1.9
70 - 79	4.6	10.2	7.7
80 - 89	14.8	30.5	24.2
90 -	54.6	30.8	39.4
Old people's homes			54.0
Mental hospital			32.5
Geriatric department			25.0

During the period 1971 - 1981 the number of operations for hip fractures in this age group followed the increasing number of elderly people in the population, and no actual increase in the incidence was found (Fig. 1) Analyses of sex and fracture type did not provide any further information.

PATIENT MATERIAL AND HABITATION. There were 202 women and 80 men (2.5:1). Their mean age was 75.9 years (women slightly older than men), with a range of 32 to 99 years. The women sustained 97 trochanteric and 105 femoral neck fractures and the men 34 trochanteric and 46 femoral neck fractures. No significant age differences were found between Garden groups in patients with femoral neck fracture (11). Nor did we find any age differences relating to the number of fragments in trochanteric fractures.

However, the patients with trochanteric fractures were slightly older than patients with femoral neck fractures. Thirty % of the patients were married (men 46 %, women 24 %), and the rest were either unmarried, divorced or widowed (Table 2). Widows were more

common than in the total population in the ages 75 - 84 years and single men were more frequent in the younger age groups.

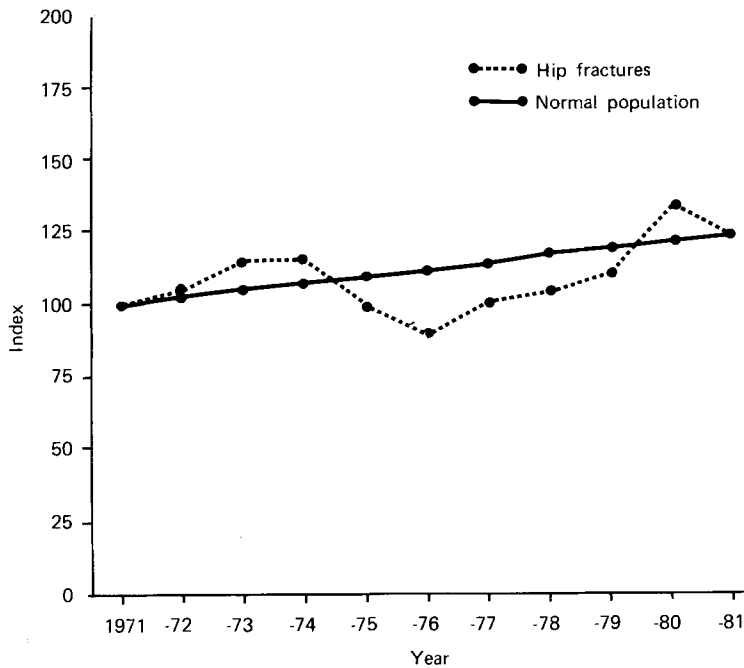


Fig.1 Operatively treated hip fractures in 1971-1981 in people over 70 years of age, compared with the population curve for this age group (1971 = index 100).

Seventy-eight % of the patients had retired from active work for reasons of age and 13 % for other reasons, and only 9 % were still gainfully employed.

Sixty-five % of the patients lived in their own homes, 19 % came from old people's homes, 9 % from a mental hospital and 6 % from geriatric clinics. The fracture types were equally distributed among these groups.

Table 2. Sex, age and marital status of the patients in the study compared with the expected values for the total population.

	Age,Yrs	Married	Unmarried	Divorced	Widowed
Men	32 - 64	6/10	3/2	3/1	0/0
	65 - 74	8/17	8/3	2/1	5/2
	75 - 84	18/17	2/4	1/1	9/8
	85 -	5/4	0/2	2/0	8/9
Women	32 - 64	16/20	3/2	3/1	3/2
	65 - 74	17/23	9/6	4/2	15/12
	75 - 84	11/22	17/17	2/3	60/49
	85 -	5/3	5/10	3/1	29/29

Of the people who lived in their own homes, 51 % were living alone (slightly more women than men). Thirty-four % of these patients needed some regular help at home. Forty-seven % of the patients had to be able to manage stairs in order to go out-of-doors.

PAST MEDICAL HISTORY AND CLINICAL FINDINGS. On admission, 26 % of the patients were reasonably healthy, apart from their hip fracture. Most of the patients had one or two other disorders and 6 % had more than two. The most common problems were heart and lung disease, and psychiatric and neurological aberrations. The number of known alcoholics in this material was small.

The history of previous fractures was studied in order to see whether the patients were accident-prone or showed signs of osteoporosis. Of the 282 patients, 67 % had had no previous fractures, but 7 % (9 % of the women, 1 % of the men) had had more than two fractures. Colles' fractures were most commonly encountered (18 % of the fractures in women, 6 % of those in men). No age difference was noted between patient groups with and without previous fractures ($p = 0.70$). Nor were cardiac arrhythmias found to be more frequent in the multifractured group ($p = 0.084$). Seven % of the 282 patients had previously sustained hip fractures, with no clear preponderance of the same fracture type.

Sixty-four % of the patients had good walking ability before the fracture and used no walking aids. Thirty % used walking aids of different kinds and 6 % were unable to walk without help. Women with trochanteric fractures were not such able walkers as the other patient groups. Seventy-four % of the patients who lived in their own homes walked unaided. This figure was 35 % among the patients from old people's homes and 84 % among those from a mental hospital.

Table 3. Percentage of patients taking medication in the present study compared with two other materials and a normal 70-year-old population.

	Psychopharmaceutical preparations	Diuretics	Digitalis	Antidiabetic
H-70 Gothenburg, Sweden (randomly selected 70-year-olds)	40	30	14	5
Stefanson, Gothenburg, (204 women over 70 years with hip fractures)	33	29	26	9
Høivik, Akershus, Norway (168 patients with hip fractures)	39	29	18	6
Own material	17	21	17	6

Fifty-five % of the patients were taking regular medication. The most frequent preparations were diuretics (21 %), digitalis (17 %) and psychopharmaceutical preparations (17 %). Antidiabetic drugs were used by 6 % and cortisone by 4 %. A comparison with other materials is made in Table 3.

Sixty-four % of the patients had no history of cardiovascular dysfunction. Twenty-seven % had slight dysfunction and 2 % severe cardiac decompensation. Seven % could not be classified. No differences with respect to sex or fracture type were found.

On arrival at the hospital 71 patients (25 %) were confused and most of them had had previous psychiatric or neurological disorders, but in 13 patients the confusion apparently had no other explanation than the fracture situation.

In most patients (69 %) the physical findings on arrival at the hospital were normal. Nineteen patients, however, were considered to be dehydrated and in need of fluids.

The blood pressure values and the results of some laboratory tests on admission are shown in Table 4, where they are compared with those in the Gothenburg Health Survey patients (39, 41). Sixty-three patients (22 %) were estimated to be overweight and 27 patients (10 %) underweight (weight in kg/(height in cm - 100) > 1.1 and < 0.8 respectively).

Table 4. Comparison of blood pressure values and results of some laboratory tests with those in a normal 70-year-old population (H-70). Mean values with SD in parentheses.

	H-70, Gothenburg		Own material	
	Men	Women	Men	Women
Syst blood pressure (mm Hg)	160(25)	170(24)	156(27)	164(30)
Diast blood pressure (mm Hg)	95(13)	97(12)	87(13)	87(13)
B-Haemoglobin (g/l)	149(13)	139(11)	128(17)	124(15)
B-Erythrocyte(%)	43(4)	41(3)	40(4)	38(5)
volume fraction				
S-Creatinine (micromol/l)	88(20)	79(20)	117(45)	105(40)
S-Potassium (millimol/l)	3.8(0.4)	3.7(0.4)	4.2(0.5)	4.1(0.6)

Ecg (281 patients) showed no abnormalities in 55 % of the patients. Old myocardial changes were observed in 22 %, some form of arrhythmia in 12 %, myocardial ischaemia in 7 % and myocardial ischaemia + arrhythmia in 4 %.

Arrhythmia was not more frequent in patients with a past history of fractures. The frequency of arrhythmia on admission was not higher in patients with fractures caused by fainting or such conditions ("medical cause of fracture") than in those with a history of an accidental fall ($p = 0.46$). No relation was found between the occurrence of arrhythmia and the type of fracture or sex.

Chest X-rays (278 patients) showed normal conditions in 80 %, probably insignificant abnormalities in 6 % and signs of cardiac decompensation in 14 %. No differences were found with respect to sex or the type of fracture.

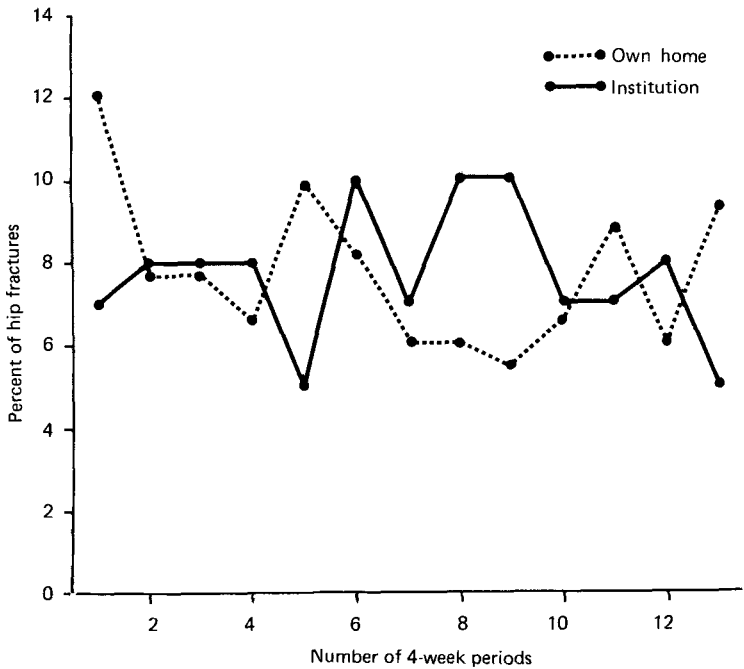


Fig.2. Percent of hip fractures occurring during the year, January through December, split into 13 four-week periods in patients from their own homes and from institutions.

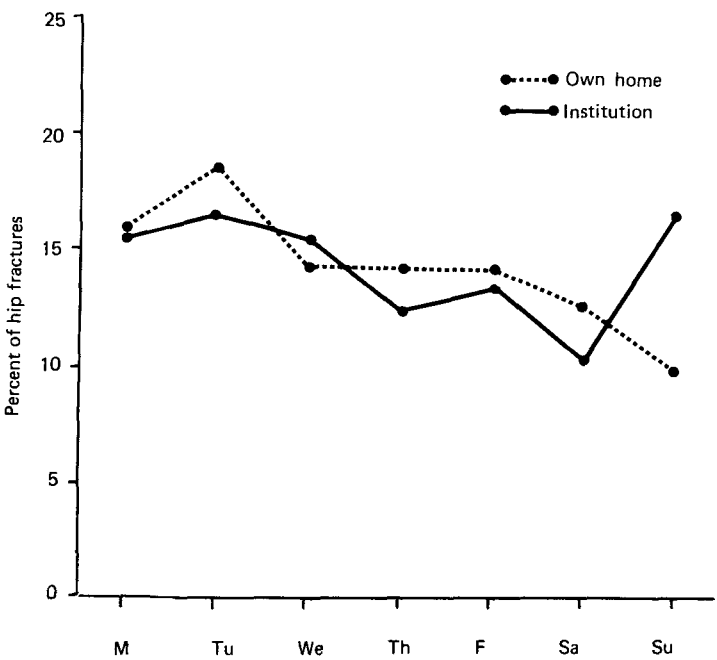


Fig.3. Percent of hip fractures per weekday occurring in patients from their own homes and from institutions.

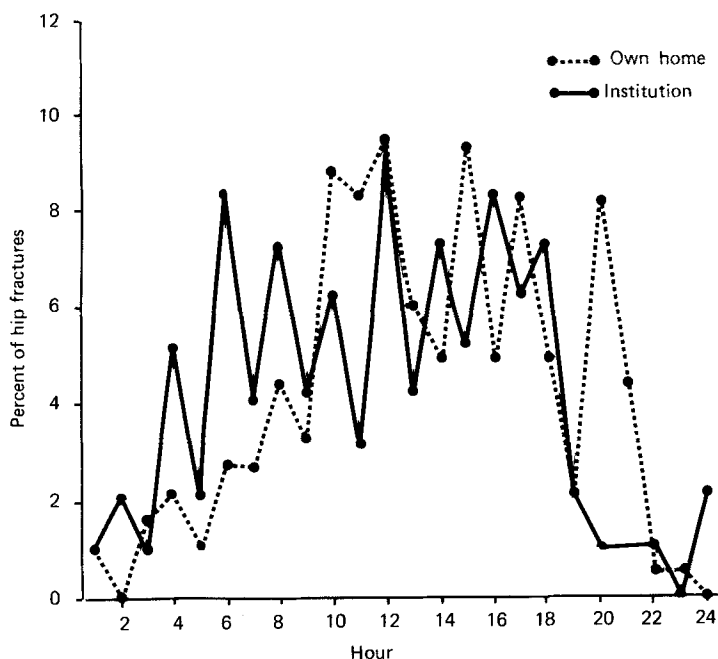


Fig.4. Percent of hip fractures occurring per 24 hours in patients from their own homes and from institutions (12 denotes noon and 24 midnight).

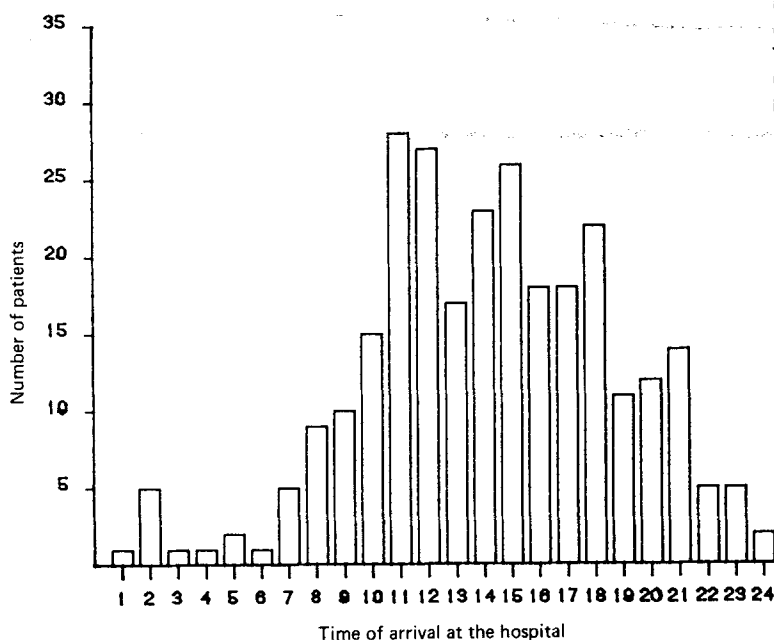


Fig. 5. Time of arrival at the hospital of hip fracture patients (12 denotes noon and 24 midnight, n=282)

HIP FRACTURE HISTORY. Most patients fractured their hips indoors (72 %) and only one-fourth (25 %) out-of-doors. In 3 % the location was not known. No relation between the location of the accident and sex or the type of fracture was found.

Accidental falls were the most frequent causes (74 %). Medical causes of fractures include drop attacks, fainting or other circulatory disturbances and occurred in 13 %. However, many of these patients did not give a very clear history of the fall, and therefore in spite of a careful interview by the nurse the causes of 9 % of the fractures remained uncertain. Four % were considered to be spontaneous, i.e. occurred without trauma.

Fifty-two patients (18 %) were alone in their homes when the accident took place. Thirty-two of them were able to call for help, whereas the others were found by chance. To investigate whether the patients might have suffered psychological trauma by being alone at the time of the accident, patients who were alone at home and those who had immediate help were compared, but no significant difference was found between the two groups regarding the length of hospital stay or aftercare ($p = 0.94 - 0.42$).

The fractures were distributed equally over the year, but patients living in their own homes tended to fracture their hips more often in the winter, and those from institutions more often in the summer (Fig. 2).

There was a slight tendency for more fractures to occur in the beginning of the week, and a "Sunday fracture" was observed in the institution group (Fig. 3).

In most patients the accident occurred during the day. Patients living in institutions sustained their fractures mainly in the morning or afternoon and in patients living in their own homes the fractures occurred mainly at mid-day or in the evening (Fig. 4).

Transportation to the hospital for confirmation of the diagnosis was made within 2 hours in 57 % of the patients, and within 3 - 8 hours in 22 %. Only 10 % had a delayed diagnosis (> 24 hours), mostly due to doctor's delay.

The time of arrival at the hospital is seen in Fig. 5. Most patients arrived during office hours and in the early evening.

DISCUSSION

The incidence figures for hip fracture in our study are in good accordance with those in other published Scandinavian materials (7, 8, 9, 17, 29, 46) and also with those in Swedish materials from the main cities of Gothenburg and Stockholm (14, 30, 47). They are higher than figures found in small materials in the United States (10, 25).

The incidence among patients from a mental hospital was about ten times as high as that in the group of patients from their own homes, a finding similar to that in a material from Lund (13). Patients from old people's homes showed the largest risk of hip fracture, a relationship which could, of course, have been related to age.

This difference between patients from their own homes and institutions is currently diminishing, as a result of various social measures such as the establishment of service flats and the provision of advanced medical treatment at home, and its future magnitude is uncertain. We found no significant increase in incidence in patients over 70 years of age over an 11-year period. The total number of hip fracture patients will rise as a result of an

increased age in the population. This rise could be managed with better rehabilitation in the patient's own homes and in old people's homes (4).

The age and sex of our patients did not differ from those in recently published Scandinavian materials (4, 16, 48). The marital status and working conditions are also in good accordance with findings by Høivik and Karlsen (23).

Hip fracture is not mainly a disease of widows (3), but we also found that widowers and other persons living alone are overrepresented. Social factors are of importance for the rehabilitation of hip fracture patients (4, 6, 18, 19, 45). They are also to a certain extent related to the cause of the accident (23).

The cause of the fracture is of interest both from a prognostic and a preventive aspect. Alffram (2) considered that the hip fracture is a combination of illness, age and trauma. Some fractures occur spontaneously, through normal stress in the osteoporotic bone. The frequency of spontaneous fractures in our material was low (4 %). Sloan and Holloway reported a figure as high as 24 % for spontaneous fractures (36). Experimentally there is evidence that spontaneous fractures occur during normal stress (12, 27).

The frequency of falls in the aged has been analysed by Rappe in a clientele from old people's homes in Sweden (32). He found that one-third of the patients fell every year and that 10 % of the falls led to a hip fracture. Rodstein studied an aged material from New York and found that 90 % fell every year and that 3 % of the falls caused a hip fracture (33). Lucht reported that 20 % of the falls led to a hip fracture (26). Johnell and Nilsson concluded that hip fracture patients are accident prone (21).

The cause of the fall has been investigated by Sheldon (35). He found that accidental falls were most common, as in our material. So called drop attacks (loss of tonus) frequently occur and can be triggered by cerebrovascular changes. The reflexes are diminished and "once you go you have got to go". Other central circulatory impairments are common and Ceder found that more than half of the patients had a pathological EEG (5).

Stumbling was a frequent contributory cause of the fracture in our material and can be diminished by environmental measures. Accidents on stairs are an important hazard for the aged. Jones & Watt (22) found that a lack of tonus in the lower extremities could occur as a result of very short unexpected falls under the height of 15 cm. Stumbling outdoors has relatively little importance as a cause, at least in the south of Sweden (20).

The medication used by our patients previous to the fracture did not differ from that in other hip fracture materials and in the normal aged population in Gothenburg (24). However, it was noted that fewer psychopharmaceutical preparations were used by our patients.

The code number E 888,5 (fall on level ground) was the number most commonly used for the accidents. It is probably used casually and the official statistics will give an uncertain picture of the cause of the accidents (43).

Ecg abnormalities are common in older patients, and in a normal population over 65 years of age Nilsson & Strömberg (28) found pathological changes in over 60-65 % of the patients.

In comparison with these figures the proportion of patients with pathological Ecg changes in our material is low (45 %). Stefanson (40) found pathological Ecg's in 78 % of his material and Ceder et al (5) reported that the Ecg was pathological in half of the patients from their own homes and in 80 % of those from institutions. Høivik (16) found a pathological Ecg in 43 % of his patients. We did not find that cardiac arrhythmias were correlated with the hip fracture accident. Cardiac arrhythmia is perhaps not a common cause of hip fracture (44).

Roentgenography of the heart and lungs showed cardiac decompensation in 14 % of our patients. This compares well with the figure of 15 % reported by Stefanson (40).

The laboratory test results did not differ significantly from those in the Gothenburg material and the changes were expected (blood loss, dehydration) (42). The values on admission are perhaps not as important as, for example, changes in blood haemoglobin during the treatment, which has a prognostic value (15).

Time aspects of hip fractures have been studied by some authors. Aaron et al (1) found a clear seasonal variation in histological osteomalacia in Leeds, with a peak during February - April. Shapiro et al (34) did not find seasonal variations in hip-fracture-related mortality in the United States in two 5-year periods. Pogrund et al (31) noted three fracture maximums during the year in connection with religious activities in Jerusalem, but only among the women!

We have not found any other analysis of fractures occurring during the week, but our observation of a "Sunday fracture" in patients from institutions could perhaps be related to the shortage of staff on duty.

Zetterberg et al (49) found in a Gothenburg study that hip fractures occurred mainly during the day-time and in the evening, as in our material.

The time of arrival at the hospital is important with respect to the possibility of "acute" hip fracture surgery, which requires operative resources in the evening.

If at least 6 hours are required to prepare the patient for operation and the estimated operating time is one hour, it may be calculated, from the numbers in Fig.5, that one-third of the patients (32.7 %) can be operated upon on the day of arrival, assuming that operations are performed until 5 p.m.

Under the same conditions, two-thirds of the patients (59.7 %) can be operated upon on the day of arrival if operative facilities are available until 9 p.m.

If the preparation of the patients can be shortened to 4 hours, the corresponding figures will be 48.6 and 73.7 respectively.

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