Rehabilitation at home after hip fracture

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Two series of patients with a hip fracture, sustained at home, were assessed regarding utilization of rehabilitation resources before and after adoption of an active policy favoring rehabilitation at home. Out of 86 consecutive patients in 1985 (Series I), 22 were discharged directly to their home versus 44 out of 84 in 1986 (Series II). Four months after the fracture, 57 and 63 of the surviving patients in Series I and II, respectively, were at home. Twenty of the 77 surviving patients in Series I were permanently institutionalized compared with 14 of 77 in Series II. We conclude that an active attitude towards home rehabilitation after a hip fracture benefits patients and the community alike.

A previous study from Stockholm County (SC) has reported great variation between different hospitals regarding utilization of institutional care for rehabilitation of patients following femoral neck fracture (Holmberg 1985, Holmberg et al. 1987). Many factors might be responsible for such differences: the age and sex distribution of the population in the different catchment areas, social situations or health profiles of the patients, and the attitude among hospital staff as to the form of postoperative rehabilitation.

In the beginning of 1986, we decided at our department to change our attitude towards a more active form of rehabilitation of patients with a hip fracture. This meant that patients who were admitted from their own home would be discharged to their own home for rehabilitation instead of to a rehabilitation hospital.

The purpose of the present study was to analyze the impact of the changed attitude on the consumption of hospital resources and treatment costs.

Patients and methods

Approximately 247,000 persons lived in the catchment area of the orthopedic department at Danderyd Hospital in 1985–86. Most of these persons lived in the suburbs of Stockholm, but 56,000 lived in the city proper, i.e., Stockholm East (SE; Table 1). The proportion of elderly persons (65 years and older) and the incidence of hip fracture per 1,000 elderly persons were higher in SE than in the rest of the catchment area ($P < 0.0001$; Table 1). Forty-two percent of the patients with a hip fracture treated at our department were admitted from SE, where only 23 percent of the population of our catchment area live.

The proportion of patients living alone was also higher in SE than in the rest of the catchment area (Table 1). We thus considered SE to be our heaviest district as regards hip fractures. This district was selected for the present study because we felt that if the changed policy for home rehabilitation of these patients was to be successful we should feel confident before applying it in the remainder of our catchment area. The follow-up time of 4 months was selected because previous studies have shown that the maximal result of social function of the patient has been reached within that time (Ceder 1980).

Our orthopedic department decided in the beginning of 1986 that all the patients admitted from their homes from SE with a hip fracture should be discharged directly to their own home after mobilization at the department provided medical or mental problems did not interfere with the discharge. Before the project was started, the planned design of the study was introduced to the the primary health care staff, as well as to those engaged in the community home service in SE. Patients in Series II were tested regarding their ability to cope with the activities of daily living (ADL) around the 10th postoperative day. All the patients that passed this test were qualified for discharge to their own home. The home rehabilitation program was the same for the patients in both series. It comprised physiother-

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Table 1. Distribution of populations and hip fractures in the catchment areas of the orthopedic department at Danderyd Hospital in 1985–86. SE = Stockholm East (central city)

	Total	All except SE area (%)	SE area (%)
Population	247,000	191,000 (77)	56,000 (23)
> 65 years old	39,000 (16%)	23,000 (12)	16,000 (29)[a]
No. of hip fractures	418	242 (58)	176 (42)
Admitted from own home	330	189 (78)	141 (80)
Living alone	246 (75%)	136 (72)	110 (78)
Incidence/1000/ > 65 years old	1.67	1.27	3.14[a]

[a] $P < 0.001$.

Table 2. Discharge of patients with hip fracture admitted from their homes in 1985–86

	Series I		Series II	
	n	Mean age	n	Mean age
Admitted from own home	86	78	84	80
Living alone	68	–	66	–
Discharged directly to own home	22	73	44	79
Discharged to rehabilitation unit	61	81	39	83
Died at the orthopedic department	3	81	1	84

apy supervised by a district physiotherapist on an outpatient basis. A part-time occupational therapist performed the ADL tests and acted as the coordinator between the hospital and the district level. No extra resources were allocated at this level.

The present study (Series II) was conducted February through October 1986. All the patients admitted to the orthopedic department with a hip fracture sustained at home in SE during the study period were included. Historic controls (Series I) were used from consecutive patients admitted from their homes in SE with the same type of fracture and the same kind of treatment during the period February–October 1985.

Series I: Eighty-six patients (19 men and 67 women) with a mean age of 78 years. The proportion cervical/trochanteric fractures was 47/39, and 68 of these patients were living alone before the fracture (Table 2).

Series II: Eighty-four patients (18 men and 66 women) with a mean age of 80 years. The proportion cervical/trochanteric fractures was 43/41, and 66 of these patients were living alone before the fracture (Table 2).

All the patients (Series I and II) were treated with internal fixation of the fracture. Femoral neck fractures were treated with either a single nail (Rydell 1964) or two hook-pins (Hansson 1982). Trochanteric fractures were treated with a sliding nail-plate (Pugh 1955). All the patients, except 2 patients in Series I with unstable trochanteric fractures, were encouraged to undertake full weight bearing the day after the operation.

During 1985 and 1986, the average daily cost per bed was 1,800 SEK at the orthopedic department and 900 SEK at the rehabilitation department.

Results

In 1985, 22/86 of the patients were discharged directly to their homes (Series I), whereas 44/84 ($P < 0.001$) re-

Table 3. Follow-up at four months after the hip fracture and bed-day consumption of surviving patients. All the patients admitted from their own home. LOS=Length of stay, LSH=Long stay hospital

	Discharged home								
	Directly		Via rehab. unit			Total bed-day consumption		Permanent LSH	Died
		Mean LOS		Mean LOS					
Series	n	Acute	n	Acute	Rehab	Acute	Rehab	n	n
I	22	16	35	17	45	947	1575	20	9
II	44[a]	15	19	17	34	983	646	14[b]	7

[a] $P < 0.001$, [b] $P = 0.3$.

turned directly to their own home in 1986 (Series II; Table 2). The hospital mortality was 3 patients in 1985 and 1 patient in 1986. The remaining patients were discharged to rehabilitation units (Table 2).

Another 35 patients in Series I and 19 in Series II were discharged to their own home through the rehabilitation unit within 4 months of the fracture (Table 3). Thus, 57 and 63 of the surviving patients in Series I and II, respectively, were at home 4 months after their fracture (Table 3). The difference in the total number of discharged patients to their own homes was explained by a higher proportion of patients admitted to permanent long-stay care in Series I (20/77; $P = 0.3$) than in Series II (14/77; Table 3).

The average stay in the acute ward was 1 day longer for patients in Series I than Series II as regards patients discharged directly to their own homes. This stay was similar in both series for patients who were discharged to their own home through a rehabilitation unit (Table 3). Patients in Series I stayed on the average 11 days longer in the rehabilitation unit than those in Series II (Table 3). Calculated on the total bed-day consumption of the surviving patients within 4 months of the fracture, those in Series I consumed almost the same number of acute bed days but 2.5 rehabilitation bed years (!) more than the patients in Series II. The total gain in bed days costs for the patients in Series II was approximately SEK 0.8 million.

Discussion

The most important goal for patients who have sustained a hip fracture is to reestablish their gait; otherwise, they will lose their independence (Devas 1974). After postoperative mobilization of these patients, final rehabilitation may be implemented through two different models. One is to use rehabilitation units; the other is to mobilize the patients at the orthopedic ward for rehabilitation at home (Ceder 1980). The patients admitted from their homes comprise the best group to monitor the latter model.

Because we used historic controls, it was necessary to closely inspect the comparability of the two series. The number of fractures, age distribution, sex, and fracture type were similar. The only important difference between the series was the changed attitude to rehabilitation, which was possible to implement without extra resources. The series thus seemed fully comparable. The load on the acute department due to the increasing number of hip fractures has partly been coped with through improved osteosynthetic technology (Rydell 1964, Frandsen and Andersen 1981, Hansson 1982, Holmberg et al. 1987), early weight bearing (Borgquist 1974), and reduced hospitalization (Ceder 1980, Jensen et al. 1979). However, because of the increasing number of fractures, these advances may not balance the need of hospital resources.

The satisfactory result of Series II in terms of direct discharge of patients back to their homes was similar to previous reports (Jensen et al. 1979, Jarnlo et al. 1984, Sikorski 1985). Our patients were, however, somewhat older than those of previous reports. The proportion of patients admitted from their homes also differed. Eighty percent of our patients were admitted from their own home compared with 62 and 63 percent, respectively, in previous studies (Jarnlo et al. 1984, Sikorski et al. 1985). Moreover, 79 percent of our patients lived alone. All of these components may interfere with an early discharge of the patients to their own home.

The main benefit of this small study, however, was the substantial reduction of rehabilitation bed-day consumption. Because the proportion of elderly people is increasing in Sweden, it is important to use rehabilitation beds effectively.

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