

Treatment of hip fracture in Finland and Sweden

Prospective comparison of 788 cases in three hospitals

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A prospective population-based study of hip fracture treatment was performed during 1989 in the regional hospitals of Oulu (Finland) and Sundsvall and Lund (Sweden). For cervical fractures hemiarthroplasty was preferred in Oulu and osteosynthesis in Sundsvall and Lund. For trochanteric fractures screw-plate was preferred in Oulu and Lund and Ender-nailing in Sundsvall. A shorter mean time at the orthopedic department in Oulu (13 days) was compensated by a

lower (14 percent) fraction of patients directly discharged to own home. A somewhat longer mean orthopedic hospitalization time in Sundsvall (19 days) and Lund (17 days) was combined with a higher discharge to own home (49 percent and 35 percent). Prospective multicenter comparisons of treatment combinations (both operation and rehabilitation) permit identification of programs that are optimal for both patient and society.

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The evaluation of the effectiveness of hip fracture treatment is hampered by lack of uniform measurements of the results and control of the productivity (Barnes et al. 1976, Jarnlo et al. 1984, Madsen et al. 1987, Thorngren et al. 1988, Nilsson et al. 1989). To meet these demands a prospective multicenter study has been started in Sweden (Thorngren 1991). This study intends more rapidly to provide awareness of the results of various modes of treatment and thereby speed up improvements in operative treatment as well as in mobilization and rehabilitation of the patients. Other countries have been invited to participate. This report exemplifies different approaches to the treatment of the hip fractures through examples from two hospitals within Sweden and one in Finland. We compared the outcome up to 4 months after fracture as regards operation methods and rehabilitation routines.

Methods

In January 1988 a prospective multicenter study of hip fractures in the elderly was started in Sweden. As the first region in Finland, Oulu joined the study in January 1989. Standardized forms are filled in with data concerning the hospital stay, the patients' resource demands and their quality of life, i.e., information concerning place of living, need for institutional care, consumption of home help as well as pre- and postopera-

tive ADL and locomotor ability. Moreover, a patient inquiry gives follow-up functional parameters at 4 months after the operation. From the registering department, data are reported on discs using special computer software.

Patients and background factors

All hip fractures (both cervical and trochanteric) were registered during 1989 in the hospitals of Lund and Sundsvall in Sweden and Oulu in Finland. Geographic as well as structural differences exist between these hospitals. Lund is situated in southern and Sundsvall in northern Sweden (about 1000 kilometers apart). Oulu is situated in the northern part of Finland. Oulu and Lund are university hospitals with regional responsibility for certain diagnoses. Sundsvall is a regional hospital. Concerning hip fractures the catchment areas are population-based and well defined. All hip fractures occurring in the catchment area are treated at these hospitals. A total of 168 fractures were registered in Oulu, 295 in Sundsvall, and 325 in Lund, corresponding per 10 000 inhabitants to 10 in Oulu, 19 in Sundsvall, and 15 in Lund. In persons above 50 years of age the corresponding figures were 38, 67, and 53 per 10 000 inhabitants in Oulu, Sundsvall and Lund, respectively. The background data for the hip fracture patients were mainly similar with a mean age

Table 1. Background variables and outcome for all hip fracture patients in 1989

Hospital	Oulu	Sundsvall	Lund
Number of patients	168	295	325
Mean age	76	78	78
Women (percent)	75	74	73
Left side (percent)	53	50	49
Living alone (percent)	24	50	52
Admitted from (percent)			
Own home	58	67	62
Old people's home	26	14	20
Independent living	84	81	82
Fracture type (percent)			
Cervical	46	52	54
Basocervical	6	2	5
Trochanteric	46	41	34
Subtrochanteric	2	5	7
Primary operation type (percent)			
von Bahr (two screws)	0	49	0
LIH (two hook pins)	0	0	51
Three screws	10	0	0
Screw-plate	27	2	37
Nail plate	1	0	0
Ender	4	44	0
Other osteosynthesis	16	2	9
Hemiarthroplasty	37	1	0
Total hip arthroplasty	4	1	2
Not operated	1	1	1
Reoperation (percent)			
During primary admission	5	5	3
Died (percent)			
During primary admission	3	6	5
Time in hospital			
Mean (days)	13	19	17
Median (days)	9	13	11
Discharged to (percent)			
Own home	14	49	35
Independent living	21	61	48
Original place of living	33	74	59
Home help before (percent)	25	21	22
hours/week	9	10	5
Home help at 4 months (percent)	50	48	27
hours/week	9	10	6
Manage ADL (percent)			
Before operation	74	70	72
2 weeks after operation	21	52	58
4 months after operation	51	63	65
Walking ability outdoors (percent)			
Before operation	67	63	64
4 months after operation	37	44	45
Walking ability indoors (percent)			
Before operation	96	95	89
4 months after operation	84	85	84
Walking with at most one cane (percent)			
Before operation	80	70	65
2 weeks after operation	3	3	5
4 months after operation	30	44	45
Walking with 2 quatraps or better (percent)			
Before operation	85	73	71
2 weeks after operation	17	22	36
4 months after operation	43	48	57
Walks equally well at 4 months as before fracture (percent)	10	22	22
Pain on weight bearing at 4 months (percent)			
Quite a lot	18	11	11
A little	54	46	48
Not at all	28	43	41
Analgesics because of hip pain (percent)	35	25	36

of 76-78 years (Table 1). In general the patients were somewhat older and lived more alone in Sweden. Home help provided by the community was received by 25 percent of the patients in Oulu, 21 percent in Sundsvall and 22 percent in Lund with an average of 9 hours per week in Oulu, 10 in Sundsvall and 5 in Lund. The different types of fracture showed few differences in the three regions (Table 1).

The majority of the cervical fractures were operated on using two screws according to the von Bahr method in Sundsvall, whereas Lund used hook-pin osteosynthesis according to Hansson (Table 1). In Oulu the majority of the cervical fractures received a hemiprossthesis. For mainly undisplaced fractures osteosynthesis with three screws was also performed in Oulu. For the trochanteric fractures screw-plate was the predominating method in Oulu and in Lund, whereas Sundsvall used Ender nailing. Direct weight bearing was applied in all hospitals. Reoperations during the first treatment period at the acute hospital were performed in 5 percent or less. Mortality during the initial treatment period was in general somewhat higher for trochanteric than for cervical fractures and ranged overall from 3-6 percent. These figures are also dependent on the time in the acute hospital.

Results

The mean (median) hospitalization time at the orthopedic department was 13 (9) days in Oulu, 19 (13) days in Sundsvall and 17 (11) days in Lund. In the Swedish hospitals the hospital stay was longer for the trochanteric than for the cervical fractures, e.g., 13 versus 13 days in Oulu, 23 versus 16 days in Sundsvall and 20 versus 15 days in Lund.

Of the patients admitted from their own home 24 percent were discharged directly home from the orthopedic department in Oulu, 72 percent in Sundsvall and 55 percent in Lund. Rehabilitation in a geriatric hospital was used by 57 percent in Oulu, 10 percent in Sundsvall and 3 percent in Lund. Referral to a nursing home was not used in Oulu but used for 4 percent of the patients in Sundsvall and 14 percent in Lund. A convalescent home was used by 12 percent of the patients in Lund but not at all in Oulu and Sundsvall. One third of the patients in Oulu were discharged to their original place of living versus three quarters in Sundsvall and one half in Lund.

The difference between pre- and postoperative ADL activity was greatest in Oulu, but on the other hand these patients were on average evaluated some days earlier due to the shorter mean hospitalization time in Oulu; the continued rehabilitation of these patients was performed at the geriatric hospital.

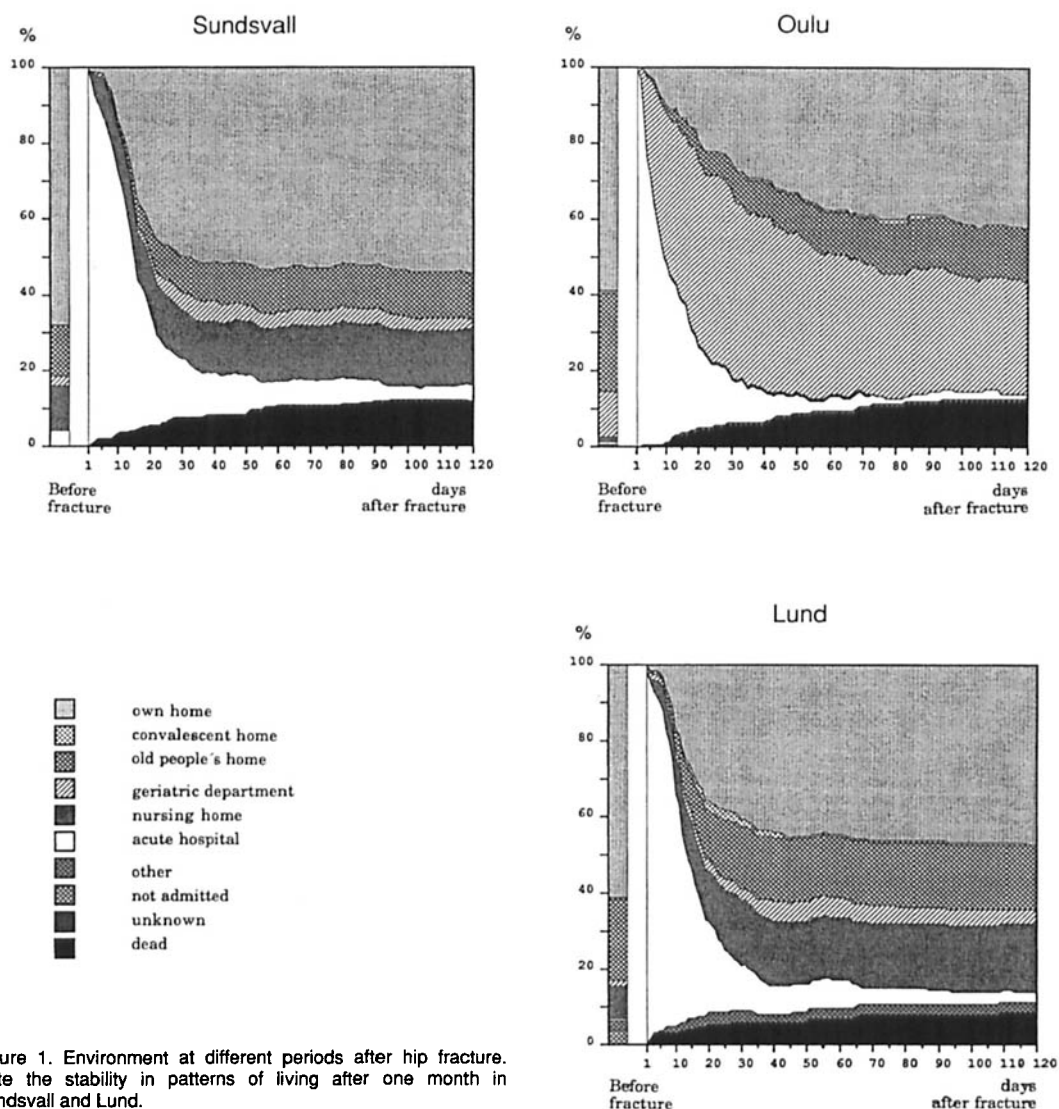


Figure 1. Environment at different periods after hip fracture. Note the stability in patterns of living after one month in Sundsvall and Lund.

More than two thirds of the patients could walk indoors with one cane or with no walking aid before the fracture. At two weeks after the operation (or at discharge if earlier) this figure was 3-5 percent and had increased to 30-45 percent at four months.

When one month had passed after the operation the majority of the Sundsvall patients had returned to the place they lived before the fracture (Figure 1). From one month onwards there was a great stability in the living conditions of the Sundsvall patients.

The patterns of referral and living were different in Oulu. When one month had passed after the fracture only about one third of the patients admitted from their own home had returned there. A majority of the

patients were then in the geriatric hospital where they successively were transferred to more independent living in their own home or an old people's home. Two months after the fracture the place of living was more stabilized with about two thirds of the patients coming from their own home having returned there but one third of the patients were still in the long-term care of the geriatric hospital, even at four months after the fracture.

In Lund the pattern was very similar to that in Sundsvall, but the use of the old people's home was commoner both before and after the fracture. When one month had passed there were few changes in the pattern of living.

Discussion

People live differently in various countries for geographic and ethnic reasons. However, Oulu in Finland and Sundsvall in Sweden have a similar climate, and the housing conditions and care facilities are fairly similar in Finland and Sweden. In Sweden institutionalized living in nursing homes means a permanent treatment of a severely disabled person in bed, whereas the geriatric hospitals usually offer a mixture of rehabilitation beds and more permanent housing. In old people's homes the person has his (her) own room with own furniture but goes out for meals to a dining room that is shared with the others. They are supposed to manage ADL-activities and walking by themselves, but temporary and part-time help can be offered by the personnel. Some more disabled persons are also cared for. The same principles are applied in Finland.

Hip fractures constitute the most resource-consuming group of patients needing operation within any health care system in the West (Holmberg and Thorngren 1985, Holmberg et al. 1987, Thorngren 1991). In the present study the prefracture background parameters for the patients, such as mean age, sex proportion, place of living (an indicator of prefracture health level), use of home help, ADL-activity and walking ability were similar, indicating that the same types of patients were compared. Furthermore, the fracture types were similar.

In the studied areas the structures for taking care of elderly people differ, which influences the referral pattern. In recent years the availability of nursing home facilities, administered through the primary care system has increased in Lund. In Sundsvall the majority of the primary care resources have been concentrated on home care facilities. In Oulu the geriatric hospitals have these facilities. Thus, in Oulu a considerable fraction of the patients were transferred to a geriatric hospital instead of discharged directly to their own home. It is evident from the graph (Figure 1) that when the first month has passed after the fracture there is a great stability in the pattern of living for the Swedish patients; most patients have then returned to their prefracture residence. In Oulu patients are still rehabilitated from the geriatric hospital to their own home during the second and beginning of the third month, and thereafter few changes of residence occur. At 4 months after the fracture considerably more patients remained in a geriatric hospital in Oulu than in the Swedish hospitals. This reflects differences in the ways the community takes care of elderly people and suggests different possible ways for the hospitals to rehabilitate the hip fracture patients.

When, for patients originally coming from their own home, the mean hospitalization time at the ortho-

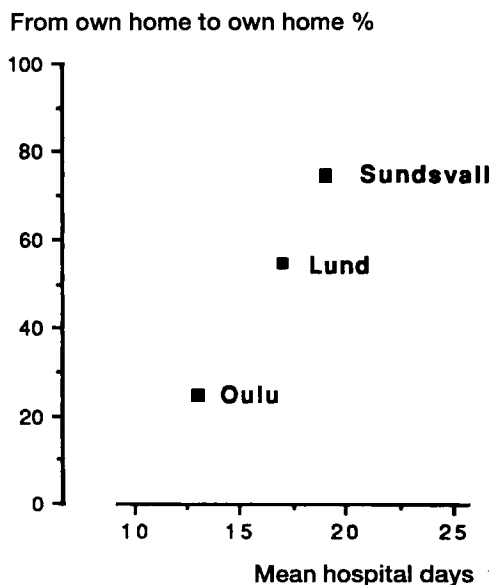


Figure 2. Relation between mean hospitalization time for all fractures and direct discharge to own home for patients originally coming from own home.

pedic department was related to the percentage of patients directly discharged to their own home an almost linear relationship was found (Figure 2). There is presumably an optimum proportion between these entities that will be revealed in future large-scale multicenter comparisons. If the costs are compared for these three treatment schemes, using cost levels previously determined in detail for treatment of hip fractures in Lund (Borgquist et al. 1991), the relation for the first 4 months of treatment would be: Sundsvall 1.0, Lund 1.11 and Oulu 1.29. Thus, the whole treatment chain during four months after the fracture is in Lund 11 percent and in Oulu 29 percent more expensive than in Sundsvall. The predominance there of patients directly rehabilitated to their own homes is clearly cost-efficient.

The two different ways of treating the cervical hip fractures in Sweden and Finland reflect the different philosophies for this resource-consuming fracture. When osteosynthesis is performed all the patients are treated as if they would heal, whereas on the contrary when arthroplasty is performed all the patients are primarily treated as if they would not heal their femoral neck fracture (Strömquist et al. 1987, Nilsson et al. 1989, Olerud et al. 1991). That a healed fracture with a retained intact femoral head is better than a prosthesis is undeniable. The clinical results of the primary hemiarthroplasty in many cases are not satisfactory as regards pain and hip function and they deteriorate with

time (Diercks and Hollander 1985, Jalovaara and Virkunen 1991). In the present study the postoperative functional level within the first four months concerning ADL-activity and walking ability was higher in the Swedish hospitals where osteosynthesis was preferred. There was thus no early gain from the primary arthroplasty.

In conclusion, this study shows three different ways to solve the over-all treatment of hip fractures. The treatment is based on choices made by the orthopedic surgeons but strongly influenced by traditions and the structural facilities for local medical care. All the details reported as basic data in this type of international multicenter hip fracture study give the possibility of a more refined analysis of the results of operation methods and rehabilitation routines.

Acknowledgments

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