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LONG-TERM SOCIAL PROGNOSIS AFTER HIP FRACTURES

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A long term follow-up study of 518 patients with hip fractures was undertaken 2.5 years after the operation.
The total mortality was 35 per cent (180/518).
The risk of social deterioration for patients admitted from home was 47 per cent (132/281). A statistical analysis showed this risk to be determined primarily by the age of the patient and secondarily by the placement of the patient on discharge from hospital. A thorough description of these factors is presented.

Key words: fractures, rehabilitation; femoral neck fractures, rehabilitation

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Social rehabilitation after hip fractures has become a topic of interest especially within the past 10 years (Ceder 1980, Ceder et al. 1979, Cobey et al. 1976, Jensen et al. 1979, 1980, Thomas & Stevens 1974). Most of these reports, however, have dealt with the short-term results.

The aim of the present study was to re-evaluate a group of patients (formerly described in two reports: Jensen et al. 1979, 1980) from the point of view of the long-term social prognosis, the assessment system applied and the influence of two different types of institutions for after-care on the final social result.

PATIENTS AND METHODS

The series consisted of 518 patients with hip fractures admitted during the year 1977.

These patients were assessed and classified into four social function groups according to their dependence on the social welfare system (Thomas & Stevens 1974, Jensen et al. 1979, 1980), as described in Table 1.

The patients were followed prospectively and re-assessed after 6 months (Jensen et al. 1979). The follow-up was repeated in the period from December 1979 to April 1980, with an observation time of 2.5 years (range 2–3.4). Based on a questionnaire a reclassification into social function groups was performed. In case of death the exact survival time was obtained from the Danish Central Bureau of Personal Registration. No living patient was lost to follow-up.

RESULTS

The mortality rate was 35 per cent (180/518) as shown in Table 2. The median age of those who had died was 83 years (range 32–96). Among patients admitted from home 26 per cent (101/382) died during the observation period.

Table 1. The assessment of social function

Social function groups	Definition
I Independent	Manages everything Possibly working
II Slightly dependent	Manages household Meals-on-wheels, Home-help ≤4 hours/week Manages personal needs
III Moderately dependent	Home-help ≥5 hours/week Possibly visits from District Nurse
IV Totally dependent	Living in nursing home or long-term nursing at home

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Table 2. Mortality at the 2.5-year follow-up in relation to pre-fracture social assessment

Pre-fracture social group	Mortality rate
I	18/148 = 12%
II	36/128 = 28%
III	47/106 = 44%
IV	79/136 = 58%
	180/518 = 35%

Table 3. The assessment of social function among survivors at follow-up

Social function group	Median age	Range
I: 103 (30%)	65 years	26–92
II: 47 (14%)	73 years	52–88
III: 76 (22%)	75 years	33–91
IV: 112 (33%)	81 years	59–96
338		

Table 2 also demonstrates that the mortality rate increases with the social dependence prior to the fracture.

The assessment of social function among the survivors at the 2.5-year follow-up examination is shown in Table 3. A higher degree of social dependence was found with increasing age ($P < 0.00005$, Kruskall-Wallis test).

In accordance with our assessment system improvement in social function can only take place among patients in groups II, III and IV. A comparison between the pre-fracture assessment and the social groups at the 2.5 year follow-up is shown in Table 4. A total of 15 per cent (22/151) of the patients admitted from home with a median age of 75 years (range 36–92) thus improved their social function during the observation period.

Maintenance of social function was encountered in 54 per cent (183/338) of patients with a median age of 72 years (range 27–94). Among patients admitted from home 45 per cent (127/281) maintained their function, predominantly those in group I.

Social deterioration, which by definition can only take place among patients admitted from home, was encountered in 47 per cent (132/281) of patients with a median age of 79 years (range 33–94).

Among patients admitted from home there was a risk of death of 26 per cent and of placement in a nursing home of 20 per cent (56/281).

A multivariate logistic analysis revealed that the risk of social deterioration was primarily determined by the age of the patients ($P < 0.0005$) and secondarily by the placement on discharge from hospital ($P < 0.003$), whereas the pre-fracture social dependence was only the third decisive factor ($P < 0.007$).

The results encountered at the follow-up after 2.5 years will thus be evaluated in accordance with these findings.

Discharged to own home from hospital were 107 patients. The mortality rate was 15 per cent (16/107), leaving 91 patients for follow-up examination.

Improved social function was encountered in

Table 4. A comparison between social function prior to the fracture and that at the 2.5-year follow-up

Pre-fracture assessment into social function groups		Social function groups at the 2.5-year follow-up I	II	III	IV	Risk of social deterioration
I	130	82	25	17	6	48/130 = 37%
II	92	19	21	34	18	52/92 = 57%
III	59	2	1	24	32	32/59 = 54%
IV	57	–	–	1	56	–
Total	338	103 (30%)	47 (14%)	76 (22%)	112 (33%)	

26 per cent (8/31) of patients in pre-fracture groups II and III after a hospitalization time of 36 days on average.

Maintenance of social function was observed in 60 per cent (55/91) of patients with an average hospitalization time of 24 days.

Deterioration of social function was encountered in 31 per cent (28/91) of patients. The average hospitalization time for those patients still living at home had been 33 days, whereas the 5 per cent (5/91) of patients placed in a nursing home had spent an average of 47 days in hospital.

The end result was compared with the preliminary results obtained at the 6-month follow-up study. By that time no patient showed an improvement, but 70 patients maintained their pre-fracture social function. During the following period 19 per cent (13/70) deteriorated. At 6 months post-fracture 26 patients had deteriorated. Among these, 6 regained their original function. The social function was preserved in 57 per cent (12/21), whereas 14 per cent (3/21) deteriorated further and 19 per cent died. This means that less than every third patient who has become more dependent as early as 6 months after the fracture will regain their original function and that these patients also constitute more than half of the deteriorated cases at the 2.5-year follow-up examination. Eventually 4 out of 5 nursing home patients were found in this group.

Discharged to a convalescent home from hospital were 120 patients. The mortality rate was 19 per cent (23/120); thus 97 patients attended the follow-up study.

Improved social function was encountered in 16 per cent (9/56) of patients in pre-fracture groups II and III after a rehabilitation period of 51 days, made up of 10 days in hospital and 41 days at the institution.

Maintenance of the social function was observed in 45 per cent (44/97) of patients after a rehabilitation period of 71 days (15 + 56).

Deterioration of social function was encountered in 45 per cent (44/97) of patients. The rehabilitation period for patients still living at home was 86 days (17 + 69) compared with 104 days (19 + 85) for the 15 per cent (15/97) of patients placed in a nursing home.

A comparison of the follow-up results after 6 months and after 2.5 years revealed that among the 68 patients preserving their social function at the 6-month follow-up 28 per cent (19/68) had deteriorated. Among 37 patients socially more dependent at that time 22 per cent (8/37) had died and 14 per cent (4/29) deteriorated further, whereas 3 had regained their original function and one patient in a nursing home at the 6-month follow-up had even improved on the pre-fracture status. Eventually 72 per cent (21/29) had preserved their social function, as assessed 6 months after the fracture. This means that nearly 90 per cent of patients becoming socially more dependent within the first 6 months after the hip fracture will remain at this level or become even more dependent. These patients also constitute more than half of the deteriorated cases at the 2.5-year follow-up examination and 60 per cent (9/15) of patients placed in nursing homes came from this group.

Discharged to a rehabilitation clinic from hospital were 102 patients. The mortality rate was 27 per cent (28/102), leaving 74 patients for follow-up examination.

Improved social function was encountered in 11 per cent (5/45) of patients in pre-fracture groups II and III after a rehabilitation course of 101 days (28 + 73).

Maintenance of social function was observed in 38 per cent (28/74) of patients after a rehabilitation course of 96 days (26 + 70).

Deterioration of social function was encountered in 55 per cent (41/74) of patients. The rehabilitation course for patients still living at home was 100 days (31 + 69) compared with 129 days (32 + 97) for those 23 per cent (17/74) of patients placed in a nursing home.

A comparison between the results 6 months and 2.5 years after the fracture was undertaken. Among the 37 patients preserving their social function at the 6-month follow-up, 43 per cent (16/37) had deteriorated. Among 52 patients more dependent socially at that time, 29 per cent (15/52) had died and 24 per cent (9/37) deteriorated further, whereas 30 per cent (11/37) had regained their original status, and one patient had even improved. Eventually 43 per cent

(16/37) had preserved the social function assessed 6 months after the fracture. This means that two out of every three patients who are more dependent at 6 months after the fracture will remain at this level or even deteriorate. One out of every three patients improves, however. Nearly half of all patients discharged to a rehabilitation clinic become more dependent on the social welfare system and every fourth patient is placed in a nursing home.

DISCUSSION

The mortality rate of 35 per cent after 2.5 years is consistent with earlier reports (Jensen & Tøndevold 1979), but was found to be higher among patients discharged to institutions than among those discharged to their own homes.

On admission to hospital the social dependence was found to increase with age (Jensen et al. 1979). This was also the situation at the follow-up 2.5 years after the fracture, although the patients in the social function groups were younger on average and because of the mortality the pattern of social function was dominated by more dependent patients.

The assessment groups can naturally be criticized for being fairly broad. It should, however, be noted that the total risk of death or social deterioration increases with the dependence on the social welfare system on admission. The assessment method is indeed very easy to apply, as it is based on the simplest possible information, viz. the hours of home-help needed per week. At the long-term follow-up almost half of the patients had become more dependent and every fifth patient was placed in a nursing home. Maintenance of the social function was, however, most often encountered among patients placed in group I on admission to hospital. Groups II and III can both improve and deteriorate socially. Every fifth patient in group II improved, compared to only 5 per cent of patients in group III, in which group deterioration was identical with placement in a nursing home. Thus the risk of nursing home placement is very high in group III patients, as was also proved at the 6-month follow-up (Jensen et al. 1979). As the goal for our fracture treatment is to bring the patient back to the pre-fracture level of function the assessment system presented seems to offer a fairly good prognostic evaluation in spite of its simplicity.

One of the main topics of this study was to evaluate the influence of the discharge situation on the long-term social prognosis, as patients discharged to their own home or a convalescent home were more likely to maintain their social function at the 6-month follow-up than those discharged to a rehabilitation clinic (Jensen et al. 1979). This observation is consistent with other reports (Ceder 1980, Ceder et al. 1979).

For the present series of patients the consumption of hospital resources was 31 days for patients discharged to their own home (Jensen et al. 1980), being identical with the entire rehabilitation course. At the 2.5-year follow-up examination every third patient admitted from home had deteriorated socially and these patients had stayed in hospital for an extra week. The most interesting observation was, however, that only about every fifth patient deteriorated further after the first 6 months following the fracture, irrespective of the preliminary result at 6 months. This is consistent with Ceder's observation (1980) that the social function should be regained after 4 months for patients discharged to their own home.

Among patients discharged to a convalescent home nearly half of the patients deteriorated socially during the 2.5 years following the fracture. The total rehabilitation course for patients maintaining their social function was, however, three times as long as for patients discharged to their own home, and in deteriorated cases a further 2 weeks were needed. At the 6 months' follow-up 67 per cent had maintained their function (Jensen et al. 1979) but the risk of secondary deterioration was twice as high for those who were more dependent by then, although nearly two-thirds of the latter were placed in a nursing home. The proportion of nursing home patients was three times as high in this group as the proportion of patients discharged to their own home, and the rehabilitation course for these patients was as long as 104 days. The prognosis for patients discharged to their own home was thus considerably better and the total rehabilitation course similarly shorter.

Concerning patients discharged to a rehabilitation clinic it has already been shown that these patients were socially more dependent after 6 months (Jensen et al. 1979) and the rehabilitation course was prolonged (Jensen et al. 1980) compared to that of both the formerly mentioned groups. At the present follow-up more than half of these patients had deteriorated socially. There was no difference in the rehabilitation course between patients improving, maintaining or deteriorating socially, as the total course was 100 days on average.

Nothing seems thus to be gained through this extra consumption of resources. The present study does not reveal when the patients become more dependent after discharge from the institution, but it has been proved that the dependence is higher at 6 months for those discharged to rehabilitation clinics. It might thus be assumed that the patients discharged to a convalescent home are more independent for a longer period and thus may have a better quality of life (Devas 1974). It might be argued that the patients discharged to a rehabilitation clinic were older than the others and age has been proven to be connected with social dependence. In the present series, however, the place of discharge was the second most important factor as regards the social prognosis.

It is thus our opinion that the after-care programme following hip fractures should emphasize discharge of the patients to their own homes, which is in accordance with the report of Ceder (1980). If institutionalized after-care is needed this should take place at an ordinary convalescent home with physiotherapy facilities. This type of institution is cheaper to run and the total rehabilitation course is considerably shortened and even the waiting list is shorter. This would benefit the social welfare system and the economics of the local authorities and does not seem to have a negative influence on the social rehabilitation of patients suffering from hip fractures.

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REFERENCES

Ceder, L. (1980) *Hip fracture in the elderly. Prognosis and rehabilitation.* (Thesis) Studentlitteratur, Lund.

Ceder, L., Ekelund, L., Inerot, S., Lindberg, L., Odberg, E. & Sjölin, C. (1979) Rehabilitation after hip fracture in the elderly. *Acta Orthop. Scand.* **50**, 681–688.

Cobey, J. C., Cobey, J. H., Conant, L., Weil, U. H., Greenwald, W. F. & Southwick, W. O. (1976) Indicators of recovery from fractures of the hip. *Clin. Orthop.* **117**, 258–262.

Devas, M. B. (1974) Geriatric orthopaedics. *Br. Med. J.* **1**, 190–192.

Jensen, J. Steen & Tøndevold, E. (1979) Mortality after hip fractures. *Acta Orthop. Scand.* **50**, 161–167.

Jensen, J. Steen, Tøndevold, E. & Sørensen, P. Hove (1979) Social rehabilitation following hip fractures. *Acta Orthop. Scand.* **50**, 777–785.

Jensen, J. Steen, Tøndevold, E. & Sørensen, P. Hove (1980) Costs of treatment of hip fractures. *Acta Orthop. Scand.* **51**, 289–296.

Thomas, T. G. & Stevens, R. S. (1974) Social effects of fractures of neck of the femur. *Br. Med. J.* **3**, 456–458.

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