

Social function after cervical hip fracture

A comparison of hook-pins and total hip replacement in 47 patients

Brynjólfur Jónsson, Ingemar Sernbo, Åke Carlsson, Hans Fredin and Olof Johnell

47 patients with a cervical hip fracture Garden 3 or 4 and fully ambulatory before the fracture, were randomized to either fixation with Hansson hook-pins (24 patients, median age 79 years) or to a Charnley hip replacement (23 patients, median age 80 years). The patients were followed for 2 years. Social function was evaluated using a standard questionnaire.

There were no postoperative deaths and no significant differences in hospital stay. 9/24 patients

treated with hook-pins developed healing complications and 2 dislocations occurred in the THR group. After 1 and 2 years, fewer patients treated with hip replacement used outdoor walking aids; they were also more likely to do their own shopping.

Hip replacement is a good choice when treating healthy older people with displaced cervical hip fractures, when primary mortality is expected to be low and the risk of healing complications after nailing is high.

Department of Orthopedics, Malmö University Hospital, S-205 02 Malmö, Sweden. Tel +46 40-331000. Fax - 336200
Submitted 95-12-27. Accepted 96-06-22

For decades, the preferred treatment of cervical hip fractures in Scandinavia has been closed reduction and internal fixation, with nonunion or late segmental collapse in more than one third of cases after 2 years (Sernbo et al. 1990, Lu-Yao et al. 1994). Primary arthroplasty is an alternative for treating displaced cervical fractures (Kavlie and Sundal 1974, Sim and Stauffer 1980, Schwartz-Lausten et al. 1987, Bochner et al. 1988).

Since many individuals who are independent before their hip fracture become consumers of health and social resources after the fracture (Sernbo and Johnell 1993), social function and the degree of ambulation should be included when evaluating the results of treatment.

We compared the social function after displaced femoral neck fractures treated with hook-pins and hip replacement.

Patients and methods

50 patients with displaced cervical hip fractures—Garden's stages 3 and 4—were randomized for treatment, using either closed reduction and fixation with the Hansson hook-pins (Strömkvist et al. 1983) or primary replacement with the Charnley prosthesis, using the standard procedure with a trochanteric osteotomy. To be eligible for inclusion in the study, the patients had to be living in their own homes and be fully ambulatory before the fracture. The fractures

had to be less than 48 hours old at the time of admission—the patients had usually undergone surgery on the following day.

Before the randomization, possible candidates were assessed by an anesthesiologist and only patients considered healthy enough to withstand the strain of a hip replacement were included. The randomization was performed by drawing a sealed envelope specifying the operation method selected. The study was approved by the Lund University Ethics Committee.

From the original group of 50, 2 patients from the prosthesis group and 1 from the hook-pin group were excluded after the randomization, 2 because of an unexpected rapid deterioration in the medical condition while waiting for the operation and 1 because of misclassification of the fracture. Thus 47 patients remained to be treated and followed for 2 years.

24 patients with a median age of 79 (70–89) years were treated with hook-pins and 23 with a median age of 80 (67–89) years were given a prosthesis. There were 18 women and 6 men in the former group and 18 women and 5 men in the latter.

The patients were followed for 1, 4, 12 and 24 months postoperatively and their social function was evaluated during an out-patient visit, using a standard questionnaire (Sernbo and Johnell 1987). The patients were asked about their social background, degree of ambulation, use of walking aids, dependence on home aid, pain on walking and at rest and the consumption of analgetics.

Table 1. Postoperative morbidity in both treatment groups. Multiple complications occurred in some patients

Type of complication	THR (n 23)	Hook-pins (n 24)
None	13	17
Confusion	3	3
Superficial infection	1	
Deep vein thrombosis	3	
Pulmonary embolism	1	1
Bead sore		2
Urinary tract infection	2	2
Myocardial infarction	1	
Heart failure		1
Postoperative dislocation	1	

Radiographs were taken postoperatively and at 1 and 2 years in both groups and also at 4 months in the hook-pin group.

During the observation period, 2 patients in the hook-pin group and 3 in the THR group died as a result of reasons unrelated to the treatment, 1 in the THR group had moved from the city and 1 in the hook-pin group refused to return after the 4-month visit.

Results

Prior to fracture, there was no difference in ambulation and social dependence between the groups. There were no deaths within the first month postoperatively and all patients were discharged from the department. 1 patient in the prosthesis group died 1 month postoperatively. No difference between the groups was found regarding postoperative morbidity (Table 1). The median hospital stay for patients treated with hook-pins was 12 (7-47) days and 15 (8-73) days for patients treated with arthroplasty. The difference was not statistically significant. The very long hospitalization periods in a few cases were due to complications such as myocardial infarction. At 1 and 4 months, there were no significant differences between the groups concerning walking ability, pain or social function.

The prosthesis group used walking aids (expressed as the use of only 1 cane outdoors at most) significantly less at 1 and 2 years. Patients in this group were also more often able to do their own shopping ($p = 0.06$ at 1 year).

No statistically significant difference was found between the groups concerning walking distance, pain or the use of home assistance or analgetics, even if differences were in favor of the prosthesis group (Table 2).

Table 2. Comparison of function variables between patients treated with the Charnley total hip replacement (THR) or closed reduction and internal fixation with the Hanson hook-pins. Statistics using Odds ratio (OR) and 95% confidence intervals (95% CI), where the THR group is regarded as the cases and the hook-pins as the controls. Note the reduction in the study groups due to failures and deaths

	THR	Hook-pins	OR (95% CI)
<i>Size of the study group</i>			
On admission	23	24	
Discharge	23	24	
1	22	24	
4	21	24	
12	18	17	
24 months	18	17	
<i>Walking-aids; 1 cane or less outdoors</i>			
Pre-fracture	19	23	0.2 (0.02-2)
Discharge	0	0	
1	2	1	2.3 (0.2-27)
4	10	9	1.5 (0.5-5)
12	18	10	13 (2-88)
24 months	15	7	7.1 (1.6-33)
<i>Able to do own shopping</i>			
Pre-fracture	18	20	0.7 (0.2-3)
Discharge	0	0	
1	2	3	0.7 (0.1-5)
4	12	10	1.7 (0.5-6)
12	15	9	4.4 (1-20)
24 months	12	8	2.3 (0.6-9)
<i>Walking distance 1 kilometer or more</i>			
Pre-fracture	21	21	1.5 (0.2-10)
Discharge	0	0	
1	4	4	1.1 (0.2-5)
4	10	6	2.7 (0.8-10)
12	13	10	1.8 (0.4-78)
24 months	11	8	1.8 (0.5-7)
<i>No pain at rest</i>			
1	13	18	0.5 (0.1-2)
4	18	19	1.6 (0.3-8)
12	17	15	2.3 (0.2-27)
24 months	18	15	2.4 (0.2-28)
<i>No pain when walking</i>			
1	11	9	0.6 (0.1-2)
4	9	11	0.9 (0.3-3)
12	13	8	2.9 (0.7-12)
24 months	13	11	1.4 (0.3-6)
<i>No use of analgetics</i>			
1	7	10	0.7 (0.2-2)
4	12	15	0.8 (0.2-3)
12	14	14	0.8 (0.1-4)
24 months	13	14	0.6 (0.1-3)
<i>Home assistance less than 4 hours weekly</i>			
Pre-fracture	21	23	0.5 (0.04-5)
Discharge			
1	8	12	0.6 (0.2-2)
4	16	14	2.3 (0.6-8)
12	14	16	0.2 (0.02-2)
24 months	14	12	0.9 (0.2-5)

9/24 patients in the hook-pin group developed non-union or late segmental collapse. 7 have had a replacement, 1 patient was unsuitable for operation and 1 has only mild symptoms so far.

1 of the prosthesis patients was revised 1 year after the primary operation because of late dislocations resulting from ipsilateral muscular weakness follow-

ing a cerebrovascular accident several months after the primary operation. Another patient in the prosthesis group had an early postoperative dislocation.

Discussion

This small study was a pilot project and will be followed by a larger multicenter study. Studies similar to ours are rare. Söreide et al. (1979), as we, found superior ambulation and better 1-year results for a prosthesis group. In that study, von Bahr screws were compared with the Christiansen prosthesis, which later turned out to be a disaster (Ahnfelt et al. 1990).

Hemiarthroplasty has been the commonest alternative to closed reduction and internal fixation (Johnson and Crothers 1975, Sikorski and Barrington 1981, Hodgkinson et al. 1989, Vugt et al. 1993). However, dislocations and acetabular protrusions are common with hemiarthroplasties. The risk of dislocations can probably be reduced if a total replacement is used (Johnsson et al. 1984).

Our results after total arthroplasties seem to be better than in studies of hemiarthroplasties, probably because our patients—mentally alert and mobile—were not representative of the ordinary hip fracture patient. The patients in our study were strictly selected. Prior to fracture, 23 in the hook-pin and 21 in the prosthesis groups needed home-aid less than 4 hours weekly. 15 in both groups were living alone. These figures must be compared with hip fracture patients in general. In Malmö, almost half of the men and three quarters of the women lived alone. Every other man and one third of the women needed no home assistance. Two thirds of the men and one half of the women with hip fracture were able to shop before the fracture (Johnell and Sernbo 1986).

We know it is hard to compare hip replacement with internal fixation. Complications after the former usually emerge late, whereas with internal fixation the complications requiring secondary surgery usually become obvious during the first years. However, the long-term results of internal fixation also depend on the follow-up time; after 10 years, two thirds of initially displaced cervical hip fractures treated with internal fixation had failed (Jónsson et al. 1993).

Our patients were given similar rehabilitation programs and were evaluated in the same manner, focusing on social independence and the patients' ability to take care of themselves. In our opinion, social skills and subjective evaluation of pain is the proper method for assessing the outcome in elderly patients, especially if the treatment methods are fundamentally different.

Poor recovery from a hip fracture treated with hook-pins in our study was caused by pain and poor walking because of healing complications. However, the walking ability has been found to improve to some extent after a salvage arthroplasty (Nilsson et al. 1989), but patient satisfaction is less than after an uneventful internal fixation (Nilsson et al. 1991).

We conclude that the type of operation is important for the social outcome and future ambulatory status of the patient. A patient having a good life expectancy and a displaced cervical hip fracture with a poor prognosis—the relatively healthy, mobile and socially independent patient over 70—should be considered for a primary hip prosthesis. This appears to be a better choice, even if late complications of this procedure, such as mechanical loosening, are taken into account. The majority of patients over 70 years of age are also less likely to live long enough to develop loosening problems. The very old, frail or immobile patients should be treated with an osteosynthesis. In undisplaced fractures (Garden 1 and 2) where the complication rate is low, nailing still seems the best choice.

Acknowledgement

Financial support was obtained from the Swedish Medical Society and the Herman Järnhardt and Greta and Johan Kock foundations.

References

- Ahnfelt L, Herberts P, Malchau H, Andersson G B J. Prognosis of total hip replacement: a Swedish multicenter study of 4,664 revisions. *Acta Orthop Scand* (Suppl 238) 1990; 61: 1-26.
- Bochner R M, Pallicci P M, Lyden J P. Bipolar hemiarthroplasty for fracture of the femoral neck: clinical review with special emphasis on prosthetic motion. *J Bone Joint Surg (Am)* 1988; 70: 1001-10.
- Hodgkinson J P, Meadows T H, Davies D R A, Hargadon E J. Treatment of displaced subcapital fractures with the Charnley-Hastings Hemiarthroplasty. *J Bone Joint (Br) Surg* 1989; 71: 478-92.
- Johnell O, Sernbo I. Health and social status in patients with hip fractures and controls. *Age Ageing* 1986; 15: 285-91.
- Johnson J T H, Crothers O. Nailing versus prosthesis for femoral neck fractures. *J Bone Joint Surg (Am)* 1975; 57: 686-92.
- Johnsson R, Bendjelloul H, Ekelund L, Persson B M, Lidgren L. Comparison between hemiarthroplasty and total hip replacement following failure of nailed femoral neck fractures focused on dislocations. *Arch Orthop Trauma Surg* 1984; 102: 187-90.
- Jónsson B, Johnell O, Redlund-Johnell I, Sernbo I. Function 10 years after hip fracture: 74 patients after internal fixation. *Acta Orthop Scand* 1993; 64: 645-6.

- Kavlie H, Sundal B. Primary arthroplasty in femoral neck fractures: a review of 269 consecutive cases treated with the Christiansen endoprosthesis. *Acta Orthop Scand* 1974; 45: 579-90.
- Lu-Yao G L, Keller R B, Littenberg B, Wennberg J E. Outcomes after displaced fractures of the femoral neck: a meta-analysis of one hundred and six published reports. *J Bone Joint Surg (Am)* 1994; 76: 15-25.
- Nilsson L T, Strömkvist B, Thorgren K-G. Secondary arthroplasty for complications of femoral neck fracture. *J Bone Joint Surg (Br)* 1989; 71: 777-81.
- Nilsson L T, Franzén H, Strömquist B, Wiklund I. Function of osteosynthesis in femoral neck fracture and of secondary arthroplasty for its complications. *Int Orthop* 1991; 15: 315-8.
- Schwartz-Lausten G, Vedel P, Nielsen P M. Fractures of the femoral neck treated with a bipolar endoprosthesis. *Clin Orthop* 1987; 218: 63-7.
- Sernbo I, Johnell O. Background factors in patients with hip fractures: difference between cervical and trochanteric fractures. *Compr Gerontol* 1987; 1: 109-11.
- Sernbo I, Johnell O. Consequences of a hip fracture: a prospective study over 1 year. *Osteoporos Int* 1993; 3: 148-53.
- Sernbo I, Johnell O, Bååth L, Nilsson J-Å. Internal fixation of 410 cervical hip fractures: a randomized comparison of a single nail versus two hook-pins. *Acta Orthop Scand* 1990; 61: 411-4.
- Sikorski J M, Barrington R. Internal fixation versus hemiarthroplasty for the displaced subcapital fracture of the femur. *J Bone Joint Surg (Br)* 1981; 63: 357-61.
- Sim F, Stauffer R N. Management of hip fractures by total hip arthroplasty. *Clin Orthop* 1980; 152: 191-7.
- Strömkvist B, Hansson L I, Palmer J, Ceder L, Thorgren K-G. Scintimetric evaluation of nailed femoral neck fractures with special reference to type of osteosynthesis. *Acta Orthop Scand* 1983; 54: 340-7.
- Söreide O, Mölster A S, Raugstad S. Internal fixation versus primary prosthetic replacement in acute femoral neck fractures: a prospective randomized clinical study. *Br J Surg* 1979; 66: 56-60.
- Vugt A B, Oosterwijk W M, Goris R J A. Osteosynthesis versus endoprosthesis in the treatment of unstable intracapsular hip fractures in the elderly: a randomized clinical trial. *Arch Orthop Trauma Surg* 1993; 113: 39-45.