Internal fixation compared with total hip replacement for displaced femoral neck fractures in the elderly

A RANDOMISED, CONTROLLED TRIAL

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The treatment algorithms for displaced fractures of the femoral neck need to be improved if we are to reduce the need for secondary surgery. We have studied 102 patients of mean age 80 years, with an acute displaced fracture of the femoral neck. They were randomly placed into two groups, treated either by internal fixation (IF) with two cannulated screws or total hip replacement (THR). None showed severe cognitive dysfunction, all were able to walk independently, and all lived in their own home. They were reviewed at four, 12 and 24 months after surgery. Outcome measurements included hip complications, revision surgery, hip function according to Charnley and the health-related quality of life (HRQoL) according to EuroQol (EQ-5D).

The failure rate after 24 months was higher in the IF group than in the THR group with regard to hip complications (36% and 4%, respectively; p < 0.001), and the number of revision procedures (42% and 4%, p < 0.001). Hip function was significantly better in the THR group at all follow-up reviews regarding pain (p < 0.005), movement (p < 0.05 except at 4 months) and walking (p < 0.05). The reduction in HRQoL (EQ-5D index score) was also significantly lower in the THR group than in the IF group, comparing the pre-fracture situation with that at all follow-up reviews (p < 0.05).

The results of our study strongly suggest that THR provides a better outcome than IF for elderly, relatively healthy, lucid patients with a displaced fracture of the femoral neck.

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Patients and Methods

We have studied 87 women (79%) and 23 men with a mean age of 80 years (70 to 96) who sustained acute, displaced fractures of the neck of the femur (Garden III and IV).2 The inclusion criteria were age ≥70 years, no evidence of severe cognitive dysfunction, giving 3 or more correct answers on a ten-item Short Portable Mental Status Questionnaire (SPMSQ),12 domestic independence (i.e. not institutionalised) and ability to walk with or without walking aids. Patients with fractures not suitable for internal fixation, i.e. pathological fractures, displaced fractures more than 24...
hours old, and patients with chronic arthritis, either rheuma-
toid or osteoarthritis, were not included. After acceptance
by an anaesthetist, the patients were randomly allocated
(sealed-envelope technique) to be treated either by IF with
two cannulated screws or by primary THR.

The study was performed according to the Helsinki de-
claration and the protocol was approved by the local Ethics
Committee.

In the THR group two patients with aortic valve stenosis
were considered to be unfit for surgery and were excluded.
One patient developed a urinary infection while awaiting
surgery and two patients changed their mind after randomi-
sation and opted out of the study. In the IF group one patient
changed her mind after randomisation and refused to partic-
ipate and two patients, one in each group, were excluded
after treatment when rheumatoid arthritis was diagnosed,
although it did not affect the hip. Therefore, 102 patients
remained, 53 patients in the IF group and 49 in the THR
group (Fig. 1).

Operative techniques. One of two surgeons (JT or HT)
carried out the primary operations in both groups. Both
were general orthopaedic surgeons specialising in trauma and
experienced in both the procedures used in this study.

With the patient on a fracture table, the fractures were
reduced by closed manipulation, with the help of an image
intensifier, to neutral or slightly valgus impaction, and inter-

<table>
<thead>
<tr>
<th>Randomised patients</th>
<th>110</th>
</tr>
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<tbody>
<tr>
<td>Randomised THR</td>
<td>55</td>
</tr>
<tr>
<td>Excluded, 6</td>
<td>-see text</td>
</tr>
<tr>
<td>Included &amp; received THR</td>
<td>49</td>
</tr>
<tr>
<td>Deceased, 5</td>
<td>-none re-operated</td>
</tr>
<tr>
<td>Lost, 1</td>
<td>-revised due to dislocation</td>
</tr>
<tr>
<td>THR 24-month follow-up</td>
<td>43</td>
</tr>
<tr>
<td>Hip complication, 1</td>
<td>-periprosthetic #</td>
</tr>
<tr>
<td>Re-operated</td>
<td>-Open reduction and IF of periprosthetic #</td>
</tr>
<tr>
<td>THR No hip complications</td>
<td>42</td>
</tr>
</tbody>
</table>

| Randomised IF | 55 |
| Excluded, 2 | -see text |
| Included & received IF | 53 |
| Deceased, 10 | -hip complications 3 |
| Lost, 2 | -none re-operated |
| IF 24-month follow-up | 41 |
| Hip complications, 16 | -non-unions, 10 |
| Re-operated, 14 | -arthroplasties, 10 |
| IF No hip complications | 25 |

Fig. 1

The surgical outcome for the 102 patients included in the study.

nally fixed with two cannulated screws (Olmed; De Puy,
Sweden). The screws were positioned according to the recom-
mendations of Lindequist and Törnkvist. We categ-
orised the reductions as good (displacement <2 mm,
Garden angle 160° to 175°, posterior angulation <10°), fair
(displacement <5 mm, Garden angle 160° to 175°, posterior
angulation <20°) or poor (displacement >5 mm, Garden
angle <160° or >175°, posterior angulation >20°). The posi-
tion of the screw was good if the tips of the screws were
within 5 mm of the subchondral bone. In the anteroposterior
(AP) projection the distal screw entered the lateral cortex at
the level of the lesser trochanter and lay on the calcar femo-
rare. The proximal screw was introduced at least 2 cm above
and parallel to the distal one (the angle being within 10° of
the distal screw). In the lateral projection, the screws were
placed parallel to each other in the central or posterior third
of the femoral head and neck. All patients were given low-
molecular-weight heparin (Fragmin; Pharmacia, Sweden)
preoperatively and daily for approximately ten days after
surgery. No antibiotic prophylaxis was given to patients in
this group.

For THR the surgeons used an anterolateral approach
(modified Hardinge), with the patient in the lateral decu-
bitus position. The Exeter modular stem (Stryker, Sweden)
with a head diameter of 28 mm, and the OGEE acetabular
component (De Puy, Sweden) were used. All patients were
given low-molecular-weight heparin (Fragmin) preoperatively and daily for approximately ten days after surgery. Cefuroxim (Zinacef, 1.5 g; GlaxoSmithKline, Sweden) was given preoperatively followed by two additional doses during the first 24 hours. We categorised the position of the stem as good if it was in the neutral position or slight valgus (<5˚ of varus). The cup was considered to be in a good position if the lateral opening in the AP view was 30˚ to 50˚ from the horizontal and if the anteversion on the lateral view was less than 30˚. Leg length was also assessed on the radiographs. The operating time, the intraoperative blood loss and the need for blood transfusion were all recorded.

Patients in both groups were mobilised bearing full weight as tolerated. We informed patients in the THR group about mobilisation techniques and allowed them to sit on a high chair immediately after surgery. They abandoned their crutches at their own convenience. After six weeks there were no restrictions.

Primary assessment and follow-up. The primary assessment included confirmation of the inclusion and exclusion criteria and any comorbidity. The patients were interviewed about their mobility, activities of daily living (ADL) and HRQoL according to the EuroQol (EQ-5D) during the last week before the fracture (Table I). They attended for clinical and radiological review at four (mean 4.3, SD 0.6), 12 (mean 12.4, SD 1.3) and 24 months (mean 24.2, SD 0.9). We assessed hip function according to Charnley’s numerical classification and asked the patients to rate their HRQoL according to the EQ-5D. An unbiased observer (a research nurse, not involved in the surgery or clinical decisions) assessed all clinical variables except movement of the hip. The research nurse could not be blinded as to the type of surgical intervention.

We graded comorbidity as (A) full health, (B) another illness not affecting rehabilitation and (C) another illness which affected rehabilitation. The Katz ADL index status is based on an evaluation of the patient’s functional independence or dependence on others for bathing, dressing, feeding, going to the toilet, transferring and continence. An ADL index of A indicates independence in all six functions and index B, independence in all but one of the six functions. Indices C to G indicate dependence in bathing and at least one other function.

The fracture was defined as healed if trabeculations were visible radiologically across the fracture line, with no sign of AVN. Nonunion was defined as an absence of trabeculation across the fracture line and/or redisplacement. In the THR group, we analysed the radiographs for signs of loosening of the components.

Charnley’s numerical classification defines the clinical state of the affected hip in regard to pain, movement and ability to walk. Each feature is graded from 1 to 6, of which 1 is total disability and 6 the normal state. Although the Charnley hip score is an ordinal variable, each value is presented as the mean. These results are shown in Table II. The percentage of patients with the best scores (5 and 6) is also shown.

Table I. The preoperative details of 102 elderly patients with displaced fractures of the femoral neck randomised to either IF or THR: there were no significant differences between the groups

<table>
<thead>
<tr>
<th></th>
<th>THR</th>
<th>IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>49</td>
<td>53</td>
</tr>
<tr>
<td>Mean (± SD) age in years</td>
<td>79.2 ± 5.0</td>
<td>81.4 ± 6.6</td>
</tr>
<tr>
<td>Mean (± SD) cognitive function SPMSQ</td>
<td>9.0 ± 1.1</td>
<td>8.7 ± 1.6</td>
</tr>
<tr>
<td>Mean (± SD) EQ-5D index score prefracture</td>
<td>0.80 ± 0.22</td>
<td>0.84 ± 0.13</td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>40 (82)</td>
<td>42 (79)</td>
</tr>
<tr>
<td>M</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Number with mobility with no walking aid or just one stick (%)</td>
<td>45 (92)</td>
<td>46 (87)</td>
</tr>
<tr>
<td>Number with ADL with index A or B (%)</td>
<td>48 (98)</td>
<td>51 (96)</td>
</tr>
<tr>
<td>Number with co-morbidity A or B (%)</td>
<td>40 (82)</td>
<td>44 (83)</td>
</tr>
</tbody>
</table>

Table II. Hip function according to the Charnley score for the 95 patients available at the four-month follow-up, the 92 available at 12 months and the 84 available at 24 months (1 = total disability, 6 = normal state)

<table>
<thead>
<tr>
<th>Follow-up (months)</th>
<th>THR</th>
<th>IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Mean value</td>
<td>Percentage of patients with scores of 5 and 6</td>
</tr>
<tr>
<td>4</td>
<td>5.7</td>
<td>85</td>
</tr>
<tr>
<td>12</td>
<td>5.3</td>
<td>76</td>
</tr>
<tr>
<td>24</td>
<td>5.6</td>
<td>84</td>
</tr>
<tr>
<td>Movement</td>
<td>Mean value</td>
<td>Percentage of patients with scores of 5 and 6</td>
</tr>
<tr>
<td>4</td>
<td>5.0</td>
<td>65</td>
</tr>
<tr>
<td>12</td>
<td>5.0</td>
<td>70</td>
</tr>
<tr>
<td>24</td>
<td>4.9</td>
<td>67</td>
</tr>
<tr>
<td>Walking</td>
<td>Mean value</td>
<td>Percentage of patients with scores of 5 and 6</td>
</tr>
<tr>
<td>4</td>
<td>4.3</td>
<td>33</td>
</tr>
<tr>
<td>12</td>
<td>4.6</td>
<td>50</td>
</tr>
<tr>
<td>24</td>
<td>4.5</td>
<td>51</td>
</tr>
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</table>
The HRQoL was rated using the EQ-5D, which has five categories: mobility, self-care, usual activities, pain or discomfort and anxiety or depression. Each category is divided into three degrees of severity: no problem, some problems and major problems. Dolan et al.21 used the Time Trade-Off method to rate differing states of health in a large UK population (UK EQ-5D Index Tariff). We used the preference scores (EQ-5D index scores) generated from this population when calculating the scores for our study population. A value of 0 indicated death or a health state worse than death, a value of 1 indicated full health. This is a divergence from the UK EQ-5D Index Tariff in which some health states were given a negative score, but the appropriate scaling of negative scores is controversial.22,23 To validate the method of rating the HRQoL before the injury and to detect any recall bias, the EQ-5D index scores before the fracture were compared with those of the age-matched Swedish reference population. They were slightly better (0.85) for the study age group of 70 to 79 years and for the age group of 80 to 89 years (0.80) compared with the reference population (0.79 and 0.74, respectively).

In the outcome analysis, all patients remained in their primary randomisation groups according to the intention-to-treat principle, regardless of secondary procedures. There was no significant difference between the THR and IF groups regarding baseline data as shown in Table I.

**Statistical analysis.** The statistical software used was SPSS (SPSS Inc, Chicago, Illinois) 11.0 for Windows. All scale variables were tested for normality with the Kolmogorov-Smirnov test. Student’s t-test was used for parametric scale variables in independent groups and the Mann-Whitney U test for non-parametric scale variables and ordinal variables in independent groups. Nominal variables were tested by the chi-squared test or Fisher’s exact test. All tests were two-sided. The results were considered to be significant at p < 0.05. Trend values (0.05 ≥ p < 0.1) are displayed; all other values are reported as not significant (NS).

**Results**

**Operative data.** The mean operating time in the IF group, including reduction, was 20 minutes (7 to 35). The operative blood loss was 20 ml (0 to 100); three patients required postoperative blood transfusions. The reduction was considered to be good in 46 of 53 patients (87%) and to be fair in the remaining seven. The position of the screws was good in 51 of 53 patients (96%). There was no correlation between the incidence of complications of fracture healing and the accuracy of reduction or the position of the screws.

The mean operating time in the THR group was 102 minutes (40 to 152). The operative blood loss was 550 ml (150 to 1600) and 38 of 49 patients (77%) were given postoperative blood transfusions (mean volume 640 ml (maximum 2400)). The position of the stem was considered to be good in 48 of 49 patients (98%); in one patient the stem was in 8° of varus. The acetabular component was in a good position in 44 of 49 patients (90%). In five of the remaining patients the lateral opening was increased by 5° to 8°; one also had 6° of retroversion. The operated leg was lengthened by a mean of 6 mm (-10 to 24).

**General complications.** Before the four-month follow-up, five patients in the THR group developed general medical complications: two superficial wound infections (negative cultures; antibiotics for two weeks), two deep-venous thromboses and one decubital ulcer. In the IF group, five patients developed general medical complications: one pulmonary embolus, one myocardial infarction and three deaths. Of the total of 102 patients, 15 died during the observation period, ten (19%) in the IF group and five (10%) in the THR group (NS). The deceased patients were older than the survivors, 83.8 ± 6.4 compared with 79.8 ± 5.7 years of age (p < 0.05) and had a lower HRQoL (EQ-5D index score), 0.76 ± 0.13 compared with 0.84 ± 0.18 (p < 0.05). There were no significant differences in other baseline data such as SPMSQ, gender, mobility, activities of daily living (ADL) and comorbidity.

**Surgical outcome.** The surgical outcome is shown in Figure 1. The number of surgical complications in the THR group was two of 49 (4%); one patient with a malpositioned acetabular component sustained three dislocations and was eventually reoperated on six months after the primary surgery. The acetabular component was repositioned and the neck of the prosthesis was lengthened. No further dislocation occurred. The patient had good function of the hip at the 12-month follow-up but subsequently refused further examination. He reported satisfactory hip function in a tele-
phone interview 26 months after primary surgery. Another patient fell six weeks after initial surgery and suffered a periprosthetic fracture of the femoral shaft. This was fixed internally and the final outcome was good. There were no signs of radiological loosening of the components in any of the patients at the final follow-up.

In the IF group, 19 of 53 (36%) patients sustained a complication; 12 (23%) failed to unite and seven (13%) suffered AVN. Second operations were needed in 22 of 53 patients (42%). The procedures included replacement arthroplasty in 13 (four hemiarthroplasties and nine total arthroplasties), and removal of screws in nine. Of those converted to arthroplasty, three later died. The patients developing a complication did not differ from those with uneventful healing regarding baseline data (Table I). Local pain was the reason for removal of screws from five out of 25 (20%) patients with uneventfully healed fractures before the two-year follow-up. Two patients failed to attend the 24-month follow-up after showing no complication at 12 months. They were contacted by telephone at 23 and 24 months, respectively; both reported continuing satisfactory function of the hip.

The complication rate, including reoperations, differed between groups (p < 0.001). A life-table analysis of the surviving patients who had not undergone secondary surgery, is shown in Figure 2.

**Functional outcome and HRQoL for all patients.** There were no differences in ADL between the groups at any of the follow-ups. At four months, 89% in the IF group and 88% in the THR group were categorised as index A or B. This compared with 91% and 85% at 12 months and 88% and 90% at 24 months, respectively. Hip function was better in the THR group (Table II).

The HRQoL, according to the EQ-5D index score, was higher in the THR group at each follow-up, but the differences were only significant at four and 12 months (Fig. 3). The difference in the EQ-5D index score, i.e. the change of score between inclusion and each follow-up (4, 12 and 24 months), is shown in Table III. The decline in the EQ-5D index score was more pronounced in the IF group.

**Functional outcome and HRQoL for patients without hip complications.** At the final follow-up there remained 25 of 53 patients (47%) without a hip complication in the IF group and 42 of 49 (86%) in the THR group (Fig. 1). There were no differences in ADL between the groups at any of the follow-up periods. At four months, 88% in the IF group and 92% in the THR group were categorised as index A or B, at 12 months 93% and 88%, and at 24 months 88% and 92%, respectively. The THR group had a significantly better outcome regarding pain and walking ability at the four- and 12-month follow-up (Table IV). The HRQoL according to EQ-5D did not differ significantly between groups (Fig. 4), but the decrease in the EQ-5D index score was significantly larger in the IF group between inclusion and the four-month follow-up (Table V).
The EQ-5D index score; mean (SD)

Before fracture, At 4 months, At 12 months, At 24 months, ns

THR

IF

Discussion

The treatment of displaced fractures of the femoral neck is controversial, especially from an international perspective. For many years, the standard treatment in Sweden, in spite of high rates of complications, has been IF, based mainly on the argument that retaining the patient’s femoral head can always give better function of the hip than an arthroplasty. In most other European countries, the preferred treatment has been a primary arthroplasty, usually with a unipolar or bipolar femoral prosthesis. Most studies on this subject focus on complications and the need for further surgery rather than function of the hip, and almost none gave an assessment of the quality of life.

The population of elderly patients with fractures of the femoral neck is heterogeneous and contains a spectrum of patients ranging from the independent, healthy subject with high functional demands, to the institutionalised, cognitively impaired and bedridden patient. The techniques currently available, including IF, unipolar arthroplasty, bipolar arthroplasty and total hip arthroplasty, have different outcomes and differing risk profiles. The good long-term results of THR are confirmed in a recent study at 13 years of the same population as in the study by Skinner et al comparing IF, hemiarthroplasty and THR, in which the revision rate was 33%, 24% and 7%, respectively. Hip function, according to the Harris hip score, was best in the THR group and worst in the hemiarthroplasty group.

We believe that the displaced fracture of the femoral neck merits a more patient-related rather than diagnosis-related approach. In order to achieve this, we need randomised, controlled clinical trials in which the outcome analysis also includes the patient’s perspective of his or her quality of life. Our aim was to analyse the outcome after a displaced fracture of the femoral neck in an elderly, relatively healthy, independent patient, randomly selected to have a THR or IF.

Comparing THR with IF for a displaced fracture of the femoral neck in the elderly, yielded a significantly lower complication rate for THR, 4% compared with 36%, and an infrequent need for secondary surgery, 4% compared with 42%. In addition, THR produced significantly better hip function and a better health-related quality of life. When considering only patients with an uneventful postoperative course, the hip function after a THR and the HRQoL in the early postoperative phase, at four months, were better.

In our study, the results after IF revealed a complication rate of 36%. This is equal to or better than those in most other studies, including two recent randomised controlled trials which compared IF with THR in which the rate of complications at the two-year follow-up was almost 50%.

The fracture reduction and screw position, according to the current best practice, were optimal in most patients and yet the complication rate was unacceptably high. Rehnberg and Olerud, using the same implant (Olmed screw), reported complications of fracture healing (all AVN) in only 12%, in a study of 44 consecutive patients 43 of whom had a displaced fracture. These remarkably good results from one particular surgeon could not be reproduced in a randomised controlled trial from the same institution, in which the complication rate at one year was 21% using the same implant. By comparison, in our study the rate was 23% at one year. We believe that the results after IF, in osteoporotic elderly patients with a displaced fracture of the femoral neck, cannot be significantly improved with current fixation techniques.

Even after a successfully healed displaced fracture, removal of the screw is often required in 20% of our patients. This issue is rarely addressed in most studies of IF, but Sernbo et al reported removal of the implant after healing in approximately 7% of patients. In the ten-year follow-up by Jonsson et al, the implant was removed from 28% of the patients. The number of patients having implant-related problems is probably even higher. A treatment with a
built-in need for secondary surgery, albeit minor procedures, is not ideal.

Most complications of fracture healing require a secondary arthroplasty, provided that the follow-up is continuous. Without regular follow-up there is a risk that elderly patients will not return for help, instead adapting to reduced function and quality of life. Arthroplasty after failed IF was carried out in 68% of the patients (for nonunion in 92%; for AVN in 29%). The indications for an arthroplasty are nearly always relative, aimed at improving function and quality of life, and must be balanced against surgical risks. Some of the patients were reoperated upon by surgeons who were not involved in the study, which explains the variety of procedures: THR in 69% and hemiarthroplasty in 31%. Of the patients with a complication of fracture healing, 32% were not reoperated on during the period of the study.

The rate of dislocation of 2% after primary THR in our study compares favourably with those in previous reports. In our experience, the anterolateral approach is the best approach for optimising stability, which is the primary goal in patients with fracture of the femoral neck. Recent randomised, controlled trials of THR for fracture of the femoral neck used the posterolateral approach and reported a dislocation rate of 14% and 22%, respectively.

Another factor in avoiding dislocations was the exclusion of patients with severe cognitive dysfunction. In the series from Johansson et al., the dislocation rate in patients with mental dysfunction was 32% compared with 12% in mentally competent patients. Finally, we believe that the experience of the surgeons and the design of the prosthesis improved the outcome. Deep infection, previously a significant problem, now seems to be rare with modern techniques and antibiotic prophylaxis.

The rate of general complications was similar in both groups. The two-year mortality rate (15%) is comparable with or lower than that in most other studies of internal fixation and lower than in recent randomised, controlled trials which compare IF with THR. Johansson et al. reported a two-year rate of 33%, probably due to the selection of slightly older (mean age 84 years) and cognitively impaired patients (mental dysfunction in 45%). Neander reported a mortality rate at two years of 24% and, as in our study, there was a tendency to increased mortality in the IF group (28%) compared with the THR group (19%).

The surgical procedure itself does not increase the mortality rate. No patient in the THR group died during the first four months after surgery. One reason for the increased mortality rate in the IF group could be a selection bias, but that seems less likely since the randomisation groups in our study were comparable regarding baseline data. A more probable explanation is that the functional deterioration and pain impair the patient’s general condition and thus increase mortality. Those who died were four years older and had a lower HRQoL than survivors.

The number of patients lost to follow-up was low (3%). All attended the follow-up at 12 months and were interviewed on the telephone at the time of the 24-month follow-up. Their outcome is reported and the fact that they did not attend the latter should not affect the interpretation of the results.

We studied a rather healthy group of patients for several reasons. Only relatively healthy elderly patients with high functional demands and a relatively long life expectancy can fully enjoy the advantages of a THR. Secondly, patients with cognitive dysfunction have a high rate of dislocation. We excluded only patients with severe cognitive impairment (SPMSQ <3), a group constituting about 10% of all hip fracture patients admitted from independent living circumstances.

The age level is arbitrary. We chose ≥70 years and, in previous randomised, controlled trials, ≥65 years and ≥75 years. The reason for not undertaking THR in younger patients is the cumulative risk of revision because of aseptic loosening, but this risk seems to be minor from a ten-year perspective. The percentage of Swedish patients with hip fractures not revised 11 years after a THR is 98%. The expected mean survival of a 70-year-old Swedish woman is 16 years and of a man 13 years, and although the mortality is higher after a hip fracture, patients surviving the first year have an expected mean survival comparable with that of the rest of the population. In addition, the results after IF are better in younger patients. The optimal lower age for a THR is yet to be determined, but current results support the choice of 70 years. We did not set an upper age limit, but the other inclusion criteria excluded the oldest and most fragile patients, that is to say the approach considers biological rather than chronological age.

Most scores evaluating hip function have been validated for patients with THR after degenerative joint disease, but they have also recently been presented in studies comparing THR and IF in patients with fractures of the femoral neck. We used the Charnley hip score because it is well validated and the outcome is indicated in three important criteria regarding hip function. The values for pain and movement were relatively stable between all follow-up occasions, but were on a higher level for the THR group. The values for walking improved between the four- and 12-month follow-up periods and stabilised thereafter on a higher level for the THR group and for the IF patients with healed fractures. The explanation of the generally lower values in walking compared with those in studies on patients with THR after osteoarthritis is probably related to the older age and more frequent comorbidities in the hip fracture population. Even before the fracture, 22% of the patients used some sort of walking aid for other reasons than hip disorders.

A quality-of-life assessment provides a general outcome from the patient’s point of view and provides information about the effect of the injury. The EuroQol is brief and easy to use even in elderly patients. It can also be used for calculating quality-adjusted life-years (QUALY), as required for health-care evaluations. The patient’s ability to
recall their health status before the hip fracture may be questioned but the rated prefracture EQ-5D index score of our patients showed correlation with an age-matched Swedish reference population. The EQ-5D index score before injury was slightly higher than the reference population, indicating that the study population was relatively healthy.

The higher complication and mortality rates in the IF group were associated with a higher HRQoL in those with an uneventful postoperative course, which may affect comparisons between the groups. We also investigated the alteration in the quality of life by comparing the prefracture and follow-up values. The decrease in the quality of life (decline in EQ-5D index score) over the two-year period for patients with an uneventfully healed IF displaced fracture, was slightly lower than previously reported by us, 0.17 compared with 0.24, but the inclusion criteria for these studies were slightly different. The decrease in the EQ-5D index score after THR was comparable with the decrease after an uneventfully healed undisplaced fracture, -0.10 in both studies.

The limited number of surgeons involved in our study is both a weakness and a strength. In regard to the latter both procedures were carried out by experienced surgeons, thereby providing a fair comparison of the methods and the weakness is in terms of the ability to make generalisations. We believe our findings are amenable to generalisation because, in recent randomised controlled trials in which procedures were carried out by unselected surgeons, the conclusions were still that THR is the method of choice for treatment, with a lower complication rate and a better functional outcome.

In conclusion, the results of our study strongly support the view that a primary THR is preferable for an elderly, relatively healthy, lucid patient with a displaced fracture of the femoral neck. We found a lower complication rate than after IF, and the outcome regarding hip function and HRQoL is generally better. On the other hand, for the group of patients with a successfully healed fracture, two years after IF, hip function and HRQoL are comparable with those achieved after a primary THR. IF can be justified only if the follow-up is scrupulous and scheduled at regular intervals with urgent conversion to an arthroplasty if fracture healing fails for any reason.

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References


