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Results of non-operative treatment following hip fracture compared to surgical intervention

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ABSTRACT

We followed all consecutive hip fracture patients admitted between 2004 and 2006, identified cases in which the intention was to treat non-operative and compared their functional outcome and mortality with a similar cohort treated surgically over the same period. We recorded length of hospital stay, place of discharge, pre and post-fracture mobility and residence, 30 days and 1 year mortality, re-admission due to same fracture and delayed surgery. The group treated surgically was recruited and matched for age, gender, pre and post-fracture mobility, mental confusion and independence. 25 patients were treated non-operative. 22 patients treated surgically over the same time period matched the patient characteristics of the non-operative arm. The mean hospital stay was 13 days in both groups. There were 4 extra-capsular fractures (3 displaced) and 21 intra-capsular fractures (5 displaced) in the non-operative arm and 11 extra-capsular fractures and 9 intra-capsular fractures in the surgically treated arm. 4 patients from the non-operative treatment group underwent late surgery because of persisting hip pain 20 days–2 months after the index event (2 cannulated screws, 1 hemiarthroplasty, 1 total hip arthroplasty). 11 patients in the surgical treatment arm underwent dynamic screw fixation, 1 had cannulated screw, 1 had total hip replacement and 7 had hemiarthroplasty. 14 of the non-operative treated patients were mobile independently or with aid before fracture but only 9 patients retained their pre-fracture mobility following treatment, compared to 16 patients pre-fracture and 11 patients post-fracture after surgery. 16 patients treated non-operative were living independently prior to injury but only 7 went back to their own residence. Of the operatively treated patients 14 patients were living independently and 10 patients went back to their previous residence. 1 month and 1 year mortality in the non-operative treated group was 4/21 and 7/21 respectively compared to 1/20 and 5/20 in the operative fixation group. There was no statistically significant difference in mobility, residence or mortality between the two groups (Fisher exact test, $p > 0.05$). Non-operative management after hip fracture is suitable for medically unfit patients and does not result in statistically significant difference in functional outcome or mortality compared to patients treated surgically.

Introduction

Most patients following hip fracture are treated surgically. However, some patients are not suitable for surgical intervention. Data from a recent Scottish hip fracture audit confirms that we are facing an increasing number of medically unfit patients presenting with hip fracture and consequently more patients are being treated non-operatively (4.3% in 2004 compared to 2.7% in 1998).[1] It may, therefore, be useful to know what happens to the group of patients treated non-surgically. There have been several historical series presenting functional outcome after non-operative management of undisplaced hip fractures or incomplete Garden type I fractures, but we are not aware of any recent study that has presented the functional outcome of non-operative treated patients in general. We identified and followed up all consecutive patients with hip fracture treated non-operative and compared their functional outcome and mortality against an identical cohort of patients treated operatively over the same time period.

Patients and methods

Over a 3-year period we identified 25 patients with hip fracture where the initial intention was to treat the patient non-operatively. 1 patient who was deemed medically fit but refused surgery was excluded. We did not include any patients judged temporarily unfit who required medical optimisation before undergoing delayed

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surgery. In our unit all patients with acute fracture deemed medically fit were treated with surgical fixation irrespective of pre-fracture mobility. Patients were not treated surgically if they were not medically fit, or minimally symptomatic following late diagnosis of hip fracture or in some cases were already bed-ridden and also had associated significant medical co-morbidity. All patients were reviewed daily by a senior elderly care physician with a view to optimising medical co-morbidities. Medical fitness and suitability for surgery was decided on the basis of American Society of Anaesthesiologists (ASA) grading. All patients were reviewed by more than one senior anaesthetist on more than one occasion who decided on medical fitness of patients and also agreed on suitability for anaesthesia and ASA grading before the patient was deemed medically unfit. Patients graded as ASA IV (severe systemic disease that is a constant threat to life) or above (ASA V – moribund patient not expected to survive for 24 h with or without surgery) were deemed medically unfit. The final decision about treatment was taken after discussion with the family and the patient (where applicable). Patients were then mobilised as soon as pain allowed. None of the patients had prolonged bed rest or traction. The plan of mobilisation was initially bed to chair followed by weight bearing on a walking frame and subsequent full weight bearing mobilisation as tolerated. Patients continued to be treated actively while an in-patient under the supervision of the elderly care team. Those previously resident in a residential or nursing home were, if possible, returned to their pre-fracture residence. Others were initially discharged to a community hospital and finally returned to the most suitable residence after social service and occupational therapy review. Fracture clinic follow-up was not arranged for any of these patients. There was, however, opportunity to re-refer any of these patients if the supervising elderly care physician felt that their medical condition had improved or minimally symptomatic patients with late diagnosed fractures were not making satisfactory progress. Patients were then readmitted, if necessary, to re-assess medical fitness and the need for surgery.

We also identified another cohort over the same time period – matched for age, gender, pre-fracture residence and mobility – who were treated with operative fixation and compared post-fracture mortality, mobility and independence between the two groups of patients. We consecutively recruited 22 patients who had operative fixation but 2 of them were visitors from an outside health region and were excluded as their final outcome could not be established. We recorded the following personal and clinical details: age, gender, mental confusion, pre and post-fracture residence, pre and post-fracture mobility, medical co-morbidities, type of fracture, fracture displacement, age of fracture, reason for non-operative management, readmission, subsequent change of decision and mortality at 1 month and 1 year. The length of hospital stay is the time spent in the acute hospital setting only and does not include time spent in a community hospital. Pre or post-fracture residence for a patient was categorised as living at own home with or without carers, or in an institutionalised setting (residential or nursing home). For patients transferred to a community hospital we considered post-fracture residence as the place where the patient was eventually transferred from the community hospital up to 3 months following discharge from the acute hospital. A patient's pre or post-fracture mobility was categorised as independently mobile indoors or outdoors, mobile with walking aids or immobile (wheel-chair or bed-bound). For patients not followed up following surgery we retrieved the clinical notes and searched entries from the elderly care clinic or physiotherapy out-patients to identify patient mobility up to 3 months following discharge from acute hospital setting. Acute confusional state was ignored, but patients were categorised as confused if chronic confusion or dementia was documented in the patient notes on admission.

Results

Over a 3-year period we identified 25 patients where the initial decision was to treat the hip fracture non-operative. There were 9 men and 16 women. The mean age was 82 (range 71–92). The mean hospital stay was 13 days (range 3–43 days). There were 4 extra-capsular fractures (3 displaced) and 21 intra-capsular fractures (5 displaced). 7 patients had valgus impaction fracture. 11 patients had delayed diagnosis of fracture and on the basis of history presumed to have sustained a fracture from 1 week to 9 weeks previously. 4 patients failed a trial of non-operative management and had to undergo late surgery because of persisting hip pain 20 days–2 months after the index event (2 cannulated screws, 1 hemiarthroplasty, and 1 total hip arthroplasty). Of the non-operative treated group, 14 patients were mobile independently or with aids before fracture, 9 of them maintained the same level of mobility afterwards. 11 out of 16 patients in the operatively treated group were mobile independently or with aids after fracture. The differences in pre and post-fracture mobility, residence and mortality between the two groups were not statistically significant (Fisher exact test, $p > 0.05$). In the non-operative treated group, 2 patients died while inpatients due to chest infection and 1 patient died due to septic shock and multiple organ failure 8–26 days following admission. No one developed pressure sores while an inpatient. None of the 4 patients who had delayed surgery died within the first year. The patient who underwent a total hip replacement in the delayed treatment group was suspected to have sustained hip injury around 6 weeks previously and presented with a healing intra-capsular fracture. Her ASA status was grade II. She was re-admitted from the clinic because of persisting hip pain and eventually underwent uneventful hip arthroplasty. 2 of the patients who had delayed surgery had delayed diagnosis of fracture. 1 of them had significant left ventricular failure (LVF) and the other chronic obstructive airway disease (COAD). These patients were categorised as ASA grade IV patients. Because of the combination of delayed diagnosis, minimal symptoms and significant medical conditions it was initially decided to treat these 2 patients non-operatively. The other patient had acute injury and was categorised as ASA grade IV with significant LVF and valvular heart disease. However, persisting uncontrolled pain on mobilisation prompted re-admission, reassessment and delayed surgery in these patients after discussion with the patient and the family regarding the high risks of surgery.

The mean time to surgery was 2 days in the operatively treated group. 11 patients underwent Dynamic Hip Screw (DHS) fixation, 1 patient had cannulated screw fixation, 1 patient with displaced intra-capsular fracture and co-existent rheumatoid arthritis had total hip arthroplasty and the rest had hemiarthroplasty. There were no cases of delayed diagnosis in the operative fixation group. Table 1 compares the pre and post-fracture characteristics of the operatively and non-operative treated groups. The patient who died within 1 month of surgery had bronchopneumonia. There were no re-admissions due to complications from surgery.

Discussion

The reported 1 year mortality in this series following non-operative management compares well with published UK national figures of mortality following surgical treatment of hip fractures (29–33%).[3,9] The results also show that compared to a group of patients who were in better health and underwent hip fracture surgery non-operative management of hip fracture in a group of patients deemed medically unfit for surgery did not result in statistically significant difference in functional outcome or 30 day

Table 1
Comparison between non-operative treated patients and patients who had surgical management.

Comparison parameters	Non-operative, $n = 21$	Operative fixation, $n = 20$
Age	Mean 82 (63–96)	Mean 81 (53–94)
M:F	13:8	12:8
Hospital stay	Mean 13 days (3–43)	Mean 13 days (7–65)
Type of fracture	4 extra-capsular and 17 intra-capsular	11 extra-capsular and 9 intra-capsular
Pre-fracture residence	Living at own home with or without carers 16; institutionalised (residential or nursing home) 5	Living at own home with or without carers 14; institutionalised (residential or nursing home) 6
Post-fracture residence	Living at own home with or without carers 7; institutionalised 14	Living at own home with or without carers 10; institutionalised 10
Pre-fracture mobility	Independently mobile indoors or outdoors 2; mobile with walking aids 12; immobile (wheel-chair or bed-bound) 7	Independently mobile indoors or outdoors 11; mobile with walking aids 5; immobile (wheel-chair or bed-bound) 4
Post-fracture mobility	Independently mobile indoors or outdoors 0; mobile with walking aids 9; immobile (wheel-chair or bed-bound) 12	Independently mobile indoors or outdoors 4; mobile with walking aids 7; immobile (wheel-chair or bed-bound) 9
Confusion	4	6
ASA status	ASA 2 (1), ASA 3 (3), ASA 4 (15), ASA 5 (2)	ASA 2 (5), ASA 3 (13), ASA 4 (2)
1 month mortality	4/21	1/20
1 year mortality	7/21	5/20

and 1 year mortality. The small sub-group of patients re-assessed and subsequently treated with surgical fixation also had no statistically significant difference in outcome with respect to mortality and functional status compared to the rest of the patients undergoing non-operative management.

Traditionally, the management of non-operative treatment for fracture of neck of femur has been synonymous with prolonged bed rest and/or traction with associated complications of pressure sore, chest infection, urinary tract infection, thromboembolism, etc. Surgery was proposed to offset these complications. Early surgery followed by rehabilitation has been proposed as the ideal treatment. Some authors in the past advocated non-operative treatment for sub-groups of hip fracture patients with undisplaced fracture or valgus impaction fracture.[2,7] Later researchers rejected these claims on the basis of late instability and poor functional outcome.[6,10] It is interesting in this regard to note comments from a Cochrane review that the case for surgery compared to non-operative treatment from the functional point of view for treating either intra or extra capsular fractures is not very strong.[5]

The epidemiology of hip fracture has consistently shown an upward trend in the mean age of patients presenting with fracture.[3] With increasing longevity of the population we now see increasing numbers of patients who are very elderly, with significant medical co-morbidities and often with cognitive impairment. This means that more patients than ever are being managed by non-operative means.[1] What happens to patients who are treated non-operative? We did not come across any recent publications and were interested to learn what role, if any, the present emphasis on early mobilisation had on functional outcome and mortality.

An isolated scrutiny of the results following non-operative management gives an impression that early mobilisation has resulted in comparable mortality and mobility to surgical fixation in patients not suitable for surgery. The mortality figure certainly compares well to published figures. Post-fracture mobility and dependence in the non-operative group is also comparable to published studies. However, in order to have a fairer picture of true functional outcome and mortality it was important to have a comparable cohort of patients treated by surgical fixation in the same unit. Such a comparison is fraught with difficulties. Data from Table 1 shows that the two groups are fairly similar in some respects. The non-operative treated group has a predominance of intra-capsular fractures compared to the surgically treated group. This difference would probably not be of significant interest as there is no evidence that the type of fracture has any bearing on final outcome.[8] More importantly, the non-operative treated group is physiologically inferior. This is unsurprising, otherwise this group would be candidates for surgical fixation. However, we feel the two groups are matched as close as practically possible. The gender distribution, mean age, hospital stay, pre-fracture residence and mobility and presence of confusion are well matched in our series and all these factors are possible variables influencing patient outcome. Previous studies have confirmed that older age, reduced functional status, confusion and higher ASA score increased the risk of mortality.[4,8] We might be criticised for not presenting any validated scoring to allow the reader to objectively determine patient's pre and post-injury functional status, independence or mental status. Such scoring is not usual practice in our unit although some recent studies have used validated scoring to describe functional status.[8] Our criteria for pre-fracture mobility and independence are derived from Scottish Hip Fracture Audit which to our knowledge is the largest UK based database on hip fracture outcome.[1] Other previously published studies have also used similar criteria for identifying outcome following hip fracture.[6,9] We did not report union time or non-union following treatment. Although radiological union has been used as an outcome variable following treatment our interest was in investigating the functional outcome.

Our results also highlight that some patients initially assigned to non-operative treatment will eventually end up with surgical management. Although clearly every patient having non-operative management will not be a candidate for follow-up it may be prudent to have a policy of easy access to follow-up for these patients. Non-operative treated patients were not universally followed up in our series. Follow-up was determined by individual Consultant's practice. We feel this to be another drawback of the study. Nevertheless, we have a close contact with elderly care team and general practitioner run community hospitals. There is always the option for referral and immediate review of any patients previously discharged from orthopaedic care. The efficacy of this collaboration is borne out by the fact that except for the patient who later underwent hip arthroplasty, all the other patients were admitted following referral from the elderly care team.

To avoid undue bias it would be best if one could undertake a randomised controlled trial to compare outcome between the non-operative treated group and the surgically treated group, but such a trial may prove difficult to get approval. There may not be significant bias in our series as our outcome measures are mostly hard and would not have been unduly influenced by observer bias.

A recent review has reported that the mortality from hip fracture has not changed over the last four decades in spite of advances in surgical management.[3] Our findings concur with this, offer support to clinicians who feel that the risk benefit ratio of

surgery in a small subset of patients with femoral neck fracture favours non-operative treatment.

Conclusion

Non-operative management after hip fracture is suitable for medically unfit patients and does not result in a statistically significant difference in functional outcome or mortality compared to patients treated surgically.

Conflict of interest

None.

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