



A case series of patients change in mobility following a hip fracture

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Abstract

Introduction Hip fractures are common in the elderly population. It is currently believed that patients can expect to lose a level of mobility following a hip fracture. The aim of this study was to compare the pre- and post-treatment mobility of patients treated in our institution who had suffered a fracture neck of femur and identify the factors that could predict pre-operatively those patients who would suffer a deterioration in mobility after treatment.

Methods Patients admitted to a large UK teaching hospital with a surgically treated neck of femur fracture were included between 2 April 2011 and 31 March 2014. Patient's mobility was assessed on admission and at 1 year following surgery.

Results There were a total of 615 patients alive at 1 year. There were 142 males and 473 females with a mean age of 82.1 (range 47–100). On admission, 338 (55.0%) mobilised independently 52.2% had no change in their pre-fracture mobility at 1 year following their treatment. Age, a lower AMTS, a higher ASA and living in residential care were significant risk factors for not regaining their pre-fracture mobility. Sex and type of fracture were not associated with change in mobility.

Conclusion It is commonly stated that patients lose one level of mobility following a hip fracture. This case series demonstrates that over 50% of patients can expect to have the same level of mobility at 1 year post-surgery as they did previously.

Keywords Hip fracture · Mobility · Hemiarthroplasty · Dynamic hip screw

Introduction

Hip fractures are common in the elderly population with over 65,000 hip fractures occurring per year in the UK [1]. A hip fracture is a critical event in an elderly person's life. As well as high mortality rates, it also has effects on patients living circumstances, their mobility, and independence.

In the UK, nearly all patients who suffer a hip fracture undergo surgical treatment. The aim of surgery is to enable mobilisation immediately following surgery. Early mobilisation strategies prevent complications associated with prolonged bed rest. It is still currently believed that patients, even though they are appropriately treated, can expect to lose a level of mobility [1–6]. This statement whilst commonly quoted to patients is based on limited research.

The aim of this study was to compare the pre- and post-treatment mobility of patients treated in our institution who had suffered a fracture neck of femur and identify the factors

that could predict pre-operatively those patients who would suffer a deterioration in mobility after treatment.

Methods

Patients admitted to a large UK teaching hospital with a neck of femur fracture were included between 2 April 2011 and 31 March 2013. Data on all patients who underwent surgical treatment of a hip fracture were collected. The exclusion criteria from this study included patients with incomplete data, patients that were wheelchair- or bed-bound on admission, and patients who died within 1 year after their fracture. No other patients were excluded from the analysis.

Patients who admitted with a hip fracture were admitted by the on-call orthopaedic team. Patients were treated as per the NICE guidelines for hip fractures, with the aim for surgery to be undertaken within 36 h [1, 2]. Patients with intracapsular hip fractures underwent either a hip hemiarthroplasty or total hip replacement, if appropriate. Patients with extracapsular hip fractures underwent either dynamic hip screw fixation or proximal femoral nail fixation depending on fracture pattern. All operations were

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performed on a trauma list with a Consultant Orthopaedic Surgeon present. Patients were reviewed pre-operatively by a specialist orthogeriatrician and had regular medical input post-operatively. All patients were mobilised the first day after surgery unless they were medically unwell or there was an intraoperative complication which prevented full weight bearing.

Patient's mobility indoors was collected by the admitting medical team on admission. Data about individual mobility 1 year following their fracture were collected via telephone interviews by a trauma coordinator employed by the trust. Our standard follow-up protocol was followed in line with national hip fracture guidelines. Mobility was classified as ability on mobilising indoors. This was divided into independent, the use of 1 aid or stick, the use of 2 aids or Zimmer frame and wheelchair-bound.

Data on admission included patient demographics including age, sex, ASA grade, residential status, time to operation, type of fracture, and surgery undertaken.

Statistical analysis was undertaken using Minitab 17 (Coventry, UK). Microsoft Excel (2007) was used for data recording. Patients were divided into either those that had the same mobility at 1 year and those that had lost one level of mobility at 1 year. Statistical analysis was completed using both Mann–Whitney and the Chi-squared tests to compare outcomes between the two groups. The level of 0.05 was used as the level of significance.

Results

There were 1007 patients admitted with a hip fracture. Of these, 243 patients died within 1 year. Of the 764 alive at 1 year, there were complete data on 615 patients alive at 1 year. There were 142 males and 473 females with a mean age of 82.1 (range 47–100). On admission, 338 (55.0%) mobilised independently indoors, 145 (23.6%) mobilised with 1 aid, and 132 (21.5%) mobilised with 2 aids.

Of the 338 patients that were independent on admission prior to fracture 51.8% mobilised independently at 1 year. 16.3% used 1 aid, 24.9% used 2 aids, and 7.1% were wheelchair-/bed-bound at 1 year.

There were 199 admitted previously using 1 stick in the house. Of these 52.3% had mobility that was the same or better at 1 year following fracture. 38.7% mobilised with 2 sticks and 9% were wheelchair-bound. Of the 131 patients who mobilised with 2 sticks, at 1 year 73.3% had mobility that was the same or better, and 17.6% mobilised with a wheelchair.

Overall, of 615 patients admitted with a neck of femur fracture, 52.2% had no change in their pre-fracture mobility at 1 year following their treatment.

The mean age of those that had no change in mobility at 1 year was 79.3 (46–100) and in those with a change in mobility was 84.9 (50–100) ($P = 0.0001$).

In those with no change in mobility there were 74 males and 247 females, and in those with a change in mobility 68 males and 226 females ($P = 0.403$).

There was no significant difference in change in mobility dependent on the type of fracture ($P = 0.096$).

Of those patients that had a pre-admission AMTS of 7 or more, 57.9% had the same mobility at 1 year. In those patients with an AMTS of less than 7, 38.1% had the same mobility at 1 year. Therefore, those with an AMTS of less than 7 were significantly more likely to lose a level of mobility than those that had an AMTS of 7 or more ($P < 0.0001$).

Patients with a higher ASA were significantly more likely to lose a level of mobility than those with a lower ASA grade ($P < 0.0001$).

The patients who admitted from a residential home were significantly more likely to lose a level of mobility post-treatment ($P = 0.0009$) than those admitted from their own home (Table 1).

Table 1 Patient demographics in those with no change in mobility and those with a change in mobility

No change in mobility (<i>n</i> = 321)	Change in mobility (<i>n</i> = 294)	<i>P</i> value
Age		
79.3 (46–100)	84.9 (50–100)	< 0.0001
Sex		
74 males	68 males	0.403
247 females	226 females	
Type of fracture		
214 intracapsular	177 intracapsular	0.096
107 extracapsular	117 extracapsular	
AMTS		
37 unknown	35 unknown	< 0.0001
56 AMTS < 7	91 AMTS < 7	
228 AMTS > 7	166 AMTS > 7	
ASA		
19 ASA 1	4 ASA 1	0.0001
114 ASA 2	82 ASA 2	
157 ASA 3	162 ASA 3	
8 ASA 4	22 ASA 4	
23 unknown	24 unknown	
Residential status		
15 hospital	11 hospital	0.000986
47 residential care	79 residential care	
259 own home	204 own home	

Discussion

This study found that age, an increased ASA, residential status, and a decreased AMTS were significant risk factors for patients not regaining their pre-fracture level of mobility a year after a hip fracture.

There is currently limited evidence on patient's mobility following a hip fracture. This case series demonstrates that over 50% of patients can expect to have the same level of mobility at 1 year as they did prior to suffering a hip fracture. This challenges the current assumption that patients will lose one level of mobility following a hip fracture.

Previous studies have found similar results regarding change in mobility, with between 40 and 75% regaining pre-operative mobility [5, 7]. A study by Chirodian et al. [6] over 10 years ago found that approximately 50% will return to their pre-operative level of mobility in 1024 sliding hip screws. Marcionda et al. found approximately 57% of hip fracture patients regained their pre-fracture functional status, but almost 13% of formerly independent patients were unable to walk; this compares to 7.1% in this study. Therefore, almost 1 in 10 patients will go from being completely independent to completely reliant on others for mobility within 1 year of a hip fracture. They found that comorbidities, a poor cognitive status, and non-weight-bearing status after surgery were negative predictors. Like this current study, the type of fracture and its surgical treatment were not related to the functional outcome [7].

Fukui et al. showed that in 650 hip fracture patients approximately 50% regained their pre-fracture function at 6 months. Patients who were community ambulators and independent in bathing were strong predictors of maintaining mobility [8].

Vochtelo et al. in 390 patients found that just under half of patients regained their pre-fracture mobility, but those who were independently mobile had an increased risk of not regaining their functional status. Most important independent risk factors for failure to return to the pre-fracture level of mobility were a limited pre-fracture level of activities of daily living and delirium during admission [4].

In Kristenson et al.'s study of 280 hip fracture patients, 77% regained their full mobility in previously independent patients admitted to a specialist hip fracture unit. They demonstrated that low pre-fracture new mobility score and an intertrochanteric fracture were more likely to not regain their level of mobility. They also found the odds of not regaining independent mobility increased with age by 5% per year [9–11]. Tsuboi et al. [12] found that the type of fracture was not a significant risk factor for change in 1-year mobility and that full functional recovery has been found to take between 4 and 6 months.

Other studies have found type of fracture to be a risk factor for mobility at discharge, but not at 1 year post-operative [13, 14].

Living in institutionalised care was a significant risk factor for a reduction in mobility in our study. This has been found in other studies [4, 15, 16]. Patients in institutionalised care tend to have a higher incidence of dementia and poor mobility, which we have shown are significant risks for loss of mobility after the treatment of their hip fracture.

A poor physiological reserve, as evidenced by a high ASA, age and poor pre-fracture mobility and decreased cognitive function could impede the patient's ability to fully engage and benefit from a rehabilitation programme. Our study results reflect this.

Several scoring systems for predicting post-operative mobility have been proposed including the Cumulated Ambulation Score (CAS) and the New Mobility Score (NMS) [17, 18]. The NMS is a score based on patient's pre-fracture ability to perform indoor walking, outdoor walking, and shopping before the hip fracture [17]. The CAS measures getting in and out of bed, sitting down and standing up from a chair, and walking ability with an appropriate walking aid in the immediate post-operative period [18]. The CAS has been demonstrated to be a reliable and valid predictor of long-term mortality, but is inferior to the CAS in the prediction of late rehabilitation outcome [11]. Studies by these authors have also demonstrated many of the same variables found in this study to be associated with worse functional outcomes.

The limitations of this study include that this was a single-centre study. This study whilst assessing patient's mobility did not assess any other functional aspects of these patients and did not assess activities of daily living. There were also no data available on patient-reported outcome measures.

Conclusion

It is commonly stated that patients lose one level of mobility following a hip fracture. This case series demonstrates that over 50% of patients can expect to have the same level of mobility at 1 year post-surgery as they did previously.

Compliance with ethical standards

Conflict of interest Toby Jennison and Rathana Yarlalagadda declare that they have no conflict of interest.

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