



## Correlation between pre-injury mobility and clinical scoring with the mortality following femoral neck fracture in elderly

Adnan.A.Faraj and Vijay Patel

Departments of Orthopaedic Surgery,  
Airedale General Hospital  
Skipton Rd, Steeton, West Yorkshire, U.K.  
shevanfaraj@hotmail.com

**Abstract:** A poor pre-injury mobility and high ASA (American Society of Anaesthiologist) grading is thought to be associated with a poor survival following surgical treatment of femoral neck fractures in the elderly. This is why there is reluctance among some orthopaedic surgeons to operate on this group of patients. In this retrospective study, the pre-injury mobility and ASA scores of 401 patients with fractured neck of femur treated by surgery was assessed in relation to mortality within the first 30 days of injury. Following surgery, a temporary deterioration in the ASA grading and mobility was noticed. Patients who required intensive medical care following surgery had higher mortality rate. The mortality was 15% among patients with ASA III and 40% among patients with ASA IV. 14% of 65 immobile patients, 18% of those mobile with Zimmer frame died after surgery for femoral neck fracture. A poor pre-injury mobility state and a higher ASA grading were associated with higher mortality, however a significant number of patients with ASA-IV (60%) and immobile patients (86%) survived following surgery for femoral neck fractures. Thus, poor pre-injury mobility and high ASA scoring are associated with higher early mortality following surgery for femoral neck fracture, however, this should not preclude surgery for patients with poor pre-injury ASA grading and mobility sustaining femoral neck fractures, for a significant number of these patients in this study survived.

**Keywords:** clinical scoring, mortality, femoral neck fracture

### Introduction:

The mid and long term outcome in elderly patients with fractured neck of femur treated by surgery depends on preoperative daily living, age, gender, ASA (American Society of Anaesthiologist)-classification, type of fracture and treatment, length of stay and rehabilitation [1]. The most significant factors in predicting survival at home, were mental state, physical health and age and type of fracture [2]. It is reported that even with successful outcome after treatment, patients with femoral neck fracture experience reduced daily activities by 20% [1]. Fractured neck of femur in the elderly is not only associated with an overall decline in the daily activities and mobility, but also with increased mortality in the intermediate-term. At one year from injury, there are reports of mortality in at least one third of these patients [3]. In the current study, we correlated the mobility and the fitness for anaesthesia using ASA scoring system and early mortality (within 30 days of injury).

## Patients

Between July 2001 and July 2003, 401 elderly patients (>65y) were admitted to the orthopaedic department, Airedale General Hospital, with fractured neck of femur. This constituted 10.1% of overall (elective and acute) admissions and 17.2% of acute admission to the orthopaedic department. The mean age was 83.09 (range 65-101 years). There were 69 males (17.2%) and 332 females (82.8%). 90.2% had associated co-morbidity including chronic congestive heart failure, atrial fibrillation, diabetes mellitus, and chest infection. All the patients underwent surgery, using dynamic hip screw fixation for the extracapsular fractures, cannulated screw fixation for patients with undisplaced intracapsular fracture; and hemiarthroplasty (using Austin Moore or cemented-uncemented Thompson's endoprosthesis) for displaced intracapsular fractures.

Within 30 days of surgery, the overall mortality rate was 10.2% (41 patients), of which 35 (8.7%) were females and 6 (1.5%) were male.

We reviewed the medical and nursing notes of these patients in an attempt to examine possible correlation between early mortality (within the first 30 days of injury) and the pre-injury mobility state and co-morbidity of these patients using the ASA grading of these patients.

## Results

There was a postoperative deterioration of the ASA grading in 70% of patients, this, however was temporary and in 40% of these patients the ASA grading returned to the preoperative grading upon discharge from hospital (Table 1). There was also a deterioration of mobility and the need for walking aids in all these patients. The mobility, however, improved to pre-injury status in 65% of patients. The mean duration of recovery to pre-injury mobility status was 13 weeks (range 12-24 weeks).

Table 1: The percentage of patients with different ASA scoring system, before and after surgery for femoral neck fracture.

Preoperative ASA scoring			Postoperative ASA scoring				
ASA	Numbers	%	I	II	III	IV	V
I	52	13%	5%			8%	
II	140	35%		20%	5%	10%	
III	144	36%			16%	20%	
IV	65	16%				11%	5%

Patients' survival following surgery for femoral neck fracture correlated well with anaesthetic grading (I-III), whereas poor anaesthetic grading (III-IV) was associated with the highest mortality rate (Table 2).

Table 2. Two ways of looking at the relationship of the percentage of patients with different ASA scoring system and survivability.

A. Percent survival against ASA score

ASA	I	II	III	IV
<b>Died at 30d [41 (100%)]</b>	3 (7%)	7 (17%)	19 (46%)	12 (29%)
<b>Survived [360 (100%)]</b>	46 (13%)	190 (53%)	106 (29%)	18 (5%)

B. Percent of patients with various scores against clinical outcome within 30 days.

ASA	I	II	III	IV
<b>[401 (100%)]</b>	(49, 100%)	(197, 100%)	(125, 100%)	(30, 100%)
<b>Died at 30d [41 (10%)]</b>	3 (6%)	7 (4%)	19 (15%)	12 (40%)
<b>Survived [360 (100%)]</b>	46 (94%)	190 (96%)	106 (85%)	18 (60%)

Twenty-two patients (5 male, 17 female) whose ASA grading failed to improve to their pre-injury grading required transfer to the medical wards, and another 16 patients (3 male and 13 female) required transfer to the high dependency unit. The mortality in these patients was higher than those who remained solely under the care of the orthopaedic team. Those who were transferred within the hospital for extra-medical care and survived (25), were eventually transferred to nursing homes.

The destination of discharge from the orthopaedic ward was also examined. Following surgery, 329 patients (45 male and 284 female) were sent back to the nursing home (where they came from prior to injury) and 31 patients (13 female and 18 male) were discharged from the orthopaedic ward to their own homes with the input from the occupational therapist and the social workers. The mortality rate occurred among those who came from the nursing homes as compared to those who came from their own home.

Although mortality was higher among the less mobile, this was not universal. Those who survived 30 days following injury, were immobile prior to surgery in 86%, used Zimmer frame in 82%, used sticks in 90% or were independently mobile in 94% (Table 3).

Table 3. Pre-injury mobility status of patients with femoral neck fracture and its relation to patient survival. Poor pre-operative mobility correlated well with mortality.

Pre-injury mobility status (401)	Died within 30 days of injury (41)	Survived (360)
Immobile (66)	9 (14%)	57 (86%)
Mobile with walking frame (61)	11 (18%)	50 (82%)
Stick (69)	5 (7%)	64 (93%)
Independent (201)	12 (6%)	189 (94%)
Unknown (4)	4 (100%)	

### Discussion:

A normal gait is essential to physical functioning and the performance of daily activities in elderly patients with fracture of the femoral neck [4]. Poor mobility has been shown to correlate with higher mortality. Both ASA grading and mobility scores have given in a study a highly significant prediction, but the mobility score was found to have a greater predictive value of mortality than ASA grading at one year following injury [5]. The current study is in agreement with the concept that poor mobility and higher ASA grading (III and IV) is associated with a higher mortality. The current study however also showed that a significant number of patients who survived had poor mobility state prior to injury and a high ASA grading, furthermore the initial postoperative deterioration in ASA grading was transient in most of the surviving patients.

It is possible that the health status of the elderly patients deteriorates following a fractured neck of femur, and that the femoral neck fracture may constitute the beginning of a decline. Previous studies have shown that even when well treated, the proportion of the survivors who walked prior to injury without aids was reduced by more than half at one and three years following fractured neck of femur in the elderly. The proportion of those bedridden increased six folds [5]. Among patients who walked without aids before fracture 31% needed two sticks or more and 7% were bedridden after one-year [5]. The follow-up in our study was short, aiming at factors affecting early mortality following surgery for femoral neck fracture. We have however noticed that the survivors regained their pre-injury mobility state and ASA grading in 90% of the cases.

Unfortunately, the natural history of this fractured neck of femur in the elderly is one of deterioration of the level of mobility. This process, however, may not commence immediately after injury. Intensive rehabilitation often aims at regaining the initial pre-injury mobility state of these in-patients, whereas further deterioration seems to occur following discharge from the hospital.



### **Conclusion:**

Poor preoperative mobility and ASA-grading should not preclude surgery for elderly with fractured neck of femur; there is however a significant correlation between early mortality, pre-injury mobility and high ASA scoring.

### **References:**

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