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Research Article

Prioritising Treatment of High-Risk Patients with Neck of Femur Fractures Can Improve Outcomes

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Abstract

Background: As we are living longer the number of hip fractures in the elderly population is increasing. This has resulted in significant costs to health and social care systems around the world. By 2050 the number of hip fractures is projected to reach 4.5 million. In UK alone the cost of medical and social care costs related to hip fracture is around £2 billion annually.

Objective of the Study: The objective of the study was to analyse patient characteristics, evaluate time from admission to surgery, reasons for delay in surgery, average Length of stay (LOS), in hospital mortality, one- and three-year mortality rates for hip fractures in elderly people.

Methods: We prospectively studied case record of patients with fractured neck of femur aged over 65 years admitted to a self-contained hospital over a twelve-month period. Patient characteristics gathered included: age, sex, mental state, mobility status, ASA grading, type of fracture, surgical intervention, length of stay in hospital, destination at discharge and mortality rate. Patient information was collected at admission to hospital, at discharge and after one and four years respectively.

Result: 227 patients with hip fracture were admitted in the 12-month study period. 190 consecutive patients were analysed during the study period. Mean age was 78 years (Range 65 - 99). 133 (77%) were female and 57 (33%) were males. Mean time for admission from Emergency Department to Orthopaedic ward 3.10 hours (range ½ hour to 23 hrs). 145 (76.3%) were operated within 48 hours of admission to the hospital. The mean length of stay (LOS) on Orthopaedic trauma ward was 11 days. Mortality at 30 days was 9.45% (18/190). 94.44% of the deaths were in patients above 80 years with ASA 3 and above. Of the patients who died 50% (9/18) were operated after 48 hrs of admission to the hospital.

Conclusion: Advanced age, high ASA status, coupled with delayed surgery are associated with higher mortality in neck of femur fractures. Resources should be directed at optimising patients for early surgical intervention.

Keywords: *Neck; Femur Fractures; Length of Stay (LOS); Hip Fractures*

Introduction

The number of hip fractures globally in 2000 was 1.6 million [1]. By 2050 the number is projected to reach 4.5 million resulting in significant costs to health and social care systems**.** The current UK incidence of hip fractures is between 70,000 to 75,000, and the an-

nual cost of medical and social care for these patients is estimated to be over £2 billion [2,3]. 20% of beds in Orthopaedic wards are occupied by neck of femur patients and it accounts for 87% of the total cost of all fragility fractures**.** Most of the Elderly patients have multiple comorbidities, osteoporosis, are prone to falls and are at high risk of hip fractures. Morbidity associated with neck of femur fractures leads to functional decline, prolonged recourse to specialised care, and mortality. The mainstay of the treatment is to restore pre-injury function with minimal morbidity. This study evaluated the outcomes in hip fracture patients in our unit and access risk factors for mortality.

Methods

227 patients with hip fracture were admitted in a 12-month period in our self-contained general hospital. The inclusion criterion in the study were patients more than 65 years of age who had a hip fracture. Patients with lytic lesions, subtrochanteric extension, inpatients for other medical reasons and periprosthetic hip fractures (n = 37) were excluded. A total of 190 patients who satisfied the criteria were recruited. The study was approved by orthopaedic department as part of the department of Health National Hip fracture audit. All characteristics of the patients were recorded at time of admission and followed prospectively till discharge.

Result

The patient's population comprised of 146 females and 44 males with mean age 85 (range 66 - 99 years) at the time of injury. Fracture type intracapsular - 105, extracapsular - 85. 106 (57.2%) were left side fractures. The anaesthetist in charge of the operating list evaluated the American Society of Anaesthesiology (ASA) grading of the patients. Eight were ASA grade I, 65 Grade II, 98 Grade III, 18 Grade IV and one grade V. Mean time of admission to orthopaedic ward after arrival in Emergency Department was 3.15 hours (range 30 mins to 23 hours). All 190 patients received surgery. 46.8% (70) had Unipolar cemented hemi arthroplasty, 3.6% (7) bipolar cemented hemi arthroplasty, and 4.21% (8) THR. Osteosynthesis was performed in 105 patients, Dynamic hip screw in 44.21% (84), internal fixation with cannulated screws - 7.89% (15) and IM nailing - 3.15% (6). 73.68% (142) patients were operated within 48 hrs of admission to orthopaedic ward of which 12.6% (24) patients were operated within 24 hours.

• Medically unfit required stabilization (n = 22) 44%.
• System wise distribution of causes of delay - Pulmonary- 9, Haematological- 8, Cardiovascular- 5.
• Awaiting space on theatre list (n = 14) 36%.
• Awaiting scan to confirm the diagnosis (n = 6) 12%
• Surgery cancelled as list over run (n = 4) 8%.
• Unknown reason (n = 2) 4%.

Table 1: *Reasons of delay in surgery beyond 48 hours (n = 48).*

No specific correlation to day of week admitted to hospital and delay in surgery was noted.

Mean overall length of stay (LOS) on Orthopaedic ward was 11 days (range 2 - 28 days).

Destination after discharge from Orthopaedic ward was analysed (Figure 1).

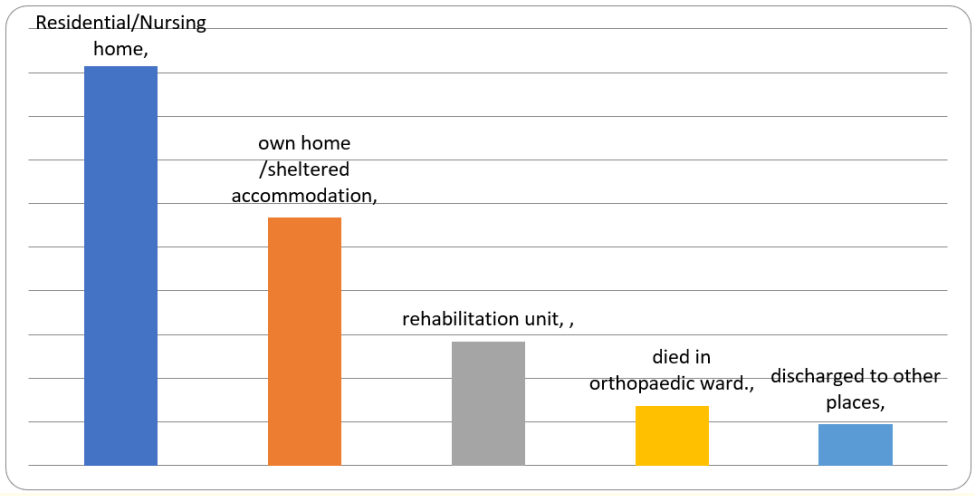

Figure 1: *Destination of discharge from hospital.*

- 45.78% (87) residential/nursing home,
- 28.42% (54) own home/sheltered accommodation,
- 14.21% (27) rehabilitation unit,
- 5.7% (11) died in hospital,
- 4.73% (9) discharged to other places.

60% of patients stayed in ward more than 10 days. In hospital mortality rate was 5.7% (n = 11) and the 30-day mortality was 9.45% (n=18). 50% (n = 9) of the patients who died within 30 days were operated beyond 48 hours. Reason of delays in surgery were analysed (Table 1). Mortality data of the studied cohort was collected form NHS digital to gather deaths outside the hospital at the end of one and four years. Mortality at one year and four years was 31.5% and 66.8% respectively.

No. (%) of patients	(n = 190)
In hospital mortality	11 (5.7%)
30-day mortality	18 (9.4%)
1-year mortality	60 (31.5%)
4-year mortality	127 (66.8%)

Table 2: *Mortality following hip fracture surgery.*

Variable	Patient died within 30 days (n = 18)
Mean Age (years)	84 +-8
American Society of Anaesthesiologists grade III or higher	18
Abbreviated Mental score (AMT)	
< 7	11
> 7	7
Time to operation	
< 48 hrs	9
> 48 hrs	9
Type of fracture	
Intracapsular	8
Extracapsular	10
Preadmission mobility	
Aided	15
Unaided	3
Nursing Home/Sheltered accommodation	13
Own Home	4

Table 3: *Variables associated with 30-day mortality.*

Risk factors	p Value
Patient age	0.004
American Society of Anaesthesiologists grade 3 or higher	0.005
Time to operation of > 48 hours	0.002
Aided Preadmission mobility	0.045

Table 4: *Risk factors of developing 30 days postoperative mortality.*

Discussion

The study of this cohort identifies the outcomes of elderly hip fracture patients and enables comparison with other units to set a benchmark. The patient characteristics in our group were similar to those in other studies [4,5].

In National Hip Fracture database 30 day mortality (9.45% in this study) is recorded, but it remains uncertain if that is the most relevant measure in Neck of femur care in the long run.

Patients in our study were tracked outside of the hospital after discharge, and deaths recorded in the community using public death records.

It is important to recognise systematic differences in long-term outcomes (e.g. 12-month survival) that might be more important in accessing the quality of care received. Delay in taking these patients to theatre (> 48 hours after admission) is associated with increased mortality rates [6,7]. Delayed surgery is most often due to medical reasons, as optimisation is needed prior to surgery (e.g. dealing with respiratory problems, reversal of warfarin, cardiovascular problems, and electrolyte imbalance). Small number of delays are due to patient requiring further investigations (e.g. awaiting scans), this is an area where more resources need to be directed to prevent the delays.

The units providing regular ortho-geriatric ward service have been able to demonstrate reduction in delays to surgery and length of stay in the hospital [8].

The combined Orthopaedic and Orthogeriatric service has also results in fewer complications, and is becoming the gold standard of care [9].

Delays for non- medical reason are mainly due to lack of operating theatre time or rarely due to lack of equipment. Patients lacking mental capacity should be taken up for surgery after taking the next of kin into confidence and should not be a reason for delay.

Medically fit patients should be operated immediately on the available trauma list. Delays to surgery should be avoided and early involvement of Orthogeri and Anaesthetist in unwell patients is recommended. The study from Yorkshire has shown that a multidisciplinary care pathway for management of patients with fractured neck of femur has potential benefits [10]. A systematic review and meta-analysis of 16 observational studies published in an anesthesiology journal found that operative delays of more than 48 h were associated with an increased risk of 30-day and 1-year mortality [11]. The factors determining return to home after discharge included mental state, age, sex, and pre-injury mobility. Hip fracture treatment is also increasingly driven by protocols and pathways, which might reduce variation between hospitals [12,13]. Many patients require a higher level of care after hip fracture, particularly if already resident in residential home, significant variability exists in process of care for older patients with hip fracture [14].

Conclusion

Delay in surgical intervention, advanced age, ASA 3 and above, and aided preadmission mobility is associated with higher mortality. Resources should be directed at optimising patients for early surgical intervention. The standardised measurement of hip fracture outcomes in elderly subjects enables comparison between units and facilitates improvement in standards of care available.

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