

Early Mortality After Hip Fracture – Is Type of Surgery Important?

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Abstract

Introduction: Hip fractures are associated with an in-hospital mortality rate of 7-14%, and a profound impairment of independence and quality of life. Current guidelines indicate that surgery for hip fracture should be performed within 24 h of injury. The main purpose of this study was to determine which factors affect in-hospital mortality and the potential role of the anesthetist in its prevention.

Methods: A retrospective, observational study of all patients submitted to hip fracture surgery during one year was carried out. Data were collected from medical records and linear regressions and a multivariate analysis with SPSS version 23.0 was run.

Results: A total of 372 patients with the diagnosis of hip fracture submitted to surgery were included in this study. No correlation between waiting time for surgery and in-hospital mortality was found. In multivariate analysis, only increased ASA score ($p=0,018$) and having a fracture treated with an arthroplasty procedure ($p=0,028$) were statistically significant predictors of postoperative mortality.

Conclusion: In our study, the statistically significant predictors of postoperative mortality were an increased ASA score and type of surgery (arthroplasty procedure). The surgical approach should always be a multidisciplinary decision, involving the anesthesiology and the orthopedic teams, and based on patient's clinical state and not only the type of fracture.

Keywords: In-hospital mortality; Hip fracture; Surgical timing; Type of surgery; Hip arthroplasty complications; Multidisciplinary approach; Anesthesia; Prognostic factors

Introduction

Hip fractures are associated with an in-hospital mortality rate of 7-14%, and a profound impairment of independence and quality of life [1]. The criteria for postponing surgery and the effect of preoperative waiting time on mortality are a long-standing subject of debate. Current guidelines indicate that surgery for hip fracture should be performed within 24 h of injury, previously 48 h [2,3].

Earlier surgery is associated with better functional outcome, lower length of hospital stay and lower rates of postoperative complications [4-6].

The main purpose of this study was to identify the average waiting time until surgery in our hospital and determine whether this waiting time, type of surgery and other clinical factors affected in-hospital mortality, as well as the potential role of the anesthesiologist in its prevention.

Methods

A retrospective, observational study was conducted and included all patients submitted to surgical treatment for hip fracture at our University Hospital.

After approval from the Hospital's Ethics Committee, data were collected from hospital records (from January to December 2016), and included: demographic data, American Society of Anesthesiologists (ASA) physical status classification, type of fracture, waiting time for surgery, type of surgery, length of stay and in-hospital mortality.

Linear regressions and multivariate analyses with SPSS version 23.0 (SPSS Inc., Chicago, Illinois) were calculated and a $p<0,05$ was considered to be statistically significant.

Results

A total of 372 patients underwent hip fracture surgery during this period. The majority of the patients were female ($n=290$; 77,9%), the median age was 81 years old (minimum 21 years old, maximum 99 years old) and most were classified as ASA III (50,8%) and ASA II (40,3%). The type of fracture was classified as intracapsular fracture ($n=126$; 33,9%) or extracapsular fracture ($n=246$; 66,1%), and type of surgery was classified as internal fixation ($n=303$; 82%) or hip replacement ($n=69$; 18%), (Table 1).

Characteristic	n total	Percentage %
Age (years)		
<60	32	8,6
60-80	122	32,8
>80	218	58,6
Gender		
male	82	22,1
female	290	77,9
ASA score		
I	12	3,2
II	150	40,3
III	189	50,8
IV	21	5,7
Type of fracture		
intracapsular	126	33,9
extracapsular	246	66,1
Type of Surgery		
PTA	303	81,5
Internal fixation	69	18,5

Table 1: Patient Characteristics (n=372)

The mean waiting time for surgery was 49 h. More than half of patients (n=187; 50,3%) waited more than 48 h for surgery, and 75,3% waited for more than 24 h for surgery. The mortality rate following surgery was 4,3% (n=16). Patients submitted to surgery within 24 h had an in-hospital mortality rate of 5,4%, against a rate of 5,0% in those patients who experience a delay of more than 24 h. This was not a statistically different (p=0,869), as well as for those who were operated on within 12 h (5,0%) against those who experience a delay of more than 12 h (6,9%, p =0,649) (Table 2).

Characteristic	n	Mortality rate	P value
Age (years)			
<60	32	0	0,780
60-80	122	0,07	
>80	218	0,05	
Gender			
male	82	9,8	0,03
female	290	3,8	
ASA score			
I	12	0,0	0,002
II	150	1,3	

III	189	6,9	
IV	21	19,0	
Type of fracture			
intracapsular	126	7,9	0,08
extracapsular	246	3,7	
Type of Surgery			
PTA	303	11,6	0,028
Internal fixation	69	3,6	
Wait time for surgery (hours)			
<12	29	6,9	0,649
≥12	343	5,0	
<24	92	5,4	0,869
≥24	280	5,0	

Table 2: In Hospital Mortality according to Baseline Characteristics

In multivariate analysis, only increased ASA score (p=0,018) and having a fracture treated with an arthroplasty procedure (p=0,028) was statistically significant predictors of postoperative mortality.

Discussion

Due to an ageing population, our results confirm that hip fracture is a major public health issue. The overall mortality (4,3%) was similar to the previous studies [7]. Despite we don't found any correlation between waiting time for surgery and in-hospital mortality, many authors have reported the benefits. These divergences may be explained because delay on surgery may be necessary to stabilize patients with significant comorbidities. Nevertheless, current recommendations emphasize the importance of a coordinated approach, between orthopedic and anesthetic staff through a multidisciplinary program, in order to stabilize patients with significant comorbidities and allow early surgery and faster recovery.

In our study, the increased, age-adjusted, mortality in men was superior compared to women, which is consistent with previous studies [8,9]. However, after multivariate analyses gender was not a statistically significant predictor of postoperative mortality. The reasons for the gender differences are unclear, although previous study demonstrates that men tend to be sicker and frailer than women at the time of fracture [10].

In our study, the statistically significant predictors of postoperative mortality were an increased ASA score and type of surgery (arthroplasty procedure). The ASA score is a validated and accepted means of documenting an individual's health status before surgery. In other studies, patients with higher ASA scores also had higher reported postoperative mortality, after hip surgery [11]. The effects of individual co-morbid conditions were not specifically examined.

Additionally, this study emphasizes the impact of surgery on early mortality and prognosis. Hip replacement was a strong independent factor for in-hospital mortality. We found no other study that correlates type of surgery and early mortality in patients with hip fracture. Nevertheless, the surgical approach should always be a

multidisciplinary decision, involving the anesthesiology and the orthopedic teams, and be grounded on patient's clinical state, not only the type of fracture. More studies are needed to stratify the impact of the surgical procedure on mortality and prognosis of elderly patients with hip fracture.

Several limitations may be found in this study. Medical comorbidities were not recorded in our study. Hip fracture patients are more likely to be older and have multiple comorbidities. In fact, they have an increased mortality risk even without hip fracture. This might result in an overestimated risk of death in hip fracture patients compared to the general population. Furthermore, we did not have information on postoperative complications and those were not recorded. Many studies have demonstrated that mortality after hip fracture may be linked to complications following the fracture and the procedure, such as pulmonary embolism [12,13], infections [14,15] and heart failure [14,15].

Conclusions

Comorbidities and type of surgery in hip fracture patients have an important impact on their prognosis.

More invasive procedures (arthroplasty) and higher ASA score are associated with an increased mortality.

Surgical approach should be a multidisciplinary decision, involving the anesthesiology team, and patients with higher ASA score may benefit from an earlier observation by a multidisciplinary team.

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