

# Is Intensive Care Unit Necessary for Geriatric Hip Fractures?

Muharrem Kanar<sup>1</sup>, Raffi Armagan<sup>1</sup>, Yunus Oc<sup>1</sup>, Mehmet Ali Talmac<sup>1</sup>, Osman Tugrul Eren<sup>1</sup>

### ABSTRACT:

#### Is intensive care unit necessary for geriatric hip fractures?

**Objective:** As life expectancy increases, so does the prevalence of diseases observed in the elderly. Hip fractures that usually occur with simple falls are profoundly more common in the elderly population. In the present study, we aimed to examine the outcomes of patients with proximal femoral fractures aged >65 years who were admitted to intensive care units and orthopaedic clinics during postoperative period.

**Materials and Method:** The study included 118 elderly patients (aged >65 years) with proximal femoral fractures who were surgically treated between 2010 and 2015 in our orthopaedic and traumatology clinics. Patients who had ASA 3 score and, were available from medical records of hospital archives. Our aim was to evaluate the mortality rate during the early postoperative period (30 days). Patients were categorised into two groups based on where they were admitted to during the postoperative period.

**Results:** The intensive care unit group or the orthopaedic and traumatology care group. There was no significant difference between the two groups in terms of mortality rate during the early postoperative period.

**Conclusion:** For patients with proximal femoral fractures aged >65 years with an American Society of Anesthesiologists score of 3 and who are thoroughly evaluated preoperatively, complications that may develop as a result of delays in the time-to-surgery caused by postoperative intensive care requirements may be reduced by performing the surgery without delay.

**Keywords:** Geriatric, hip fracture, intensive care

### ÖZET:

#### Geriatrik kalça kırıklı hastalar için yoğun bakım ünitesi gerekli mi?

**Amaç:** Beklenen yaşam sürelerinin artışı ile ileri yaşlarda görülen hastalıklarında sıklığı artmaktadır. Sıklıkla basit düşmeler sonucu görülen kalça kırıkları ilerleyen yaş gruplarında belirgin artmaktadır. Bu çalışmada 65 yaş üstü proksimal femur kırıklı hastaların postoperatif yoğun bakım üniteleri ve ortopedi kliniklerinde yatışlarının sonuçlarını değerlendirmeyi amaçladık.

**Gereç Yöntem:** Çalışmamıza 2010-2015 tarihleri arasında ortopedi ve travmatoloji kliniklerimizde opere edilen ileri yaş (65 üzeri), ASA skoru 3 olan proksimal femur kırıklı ve hastane kayıtlarından ulaşılabilen 118 hasta dahil edilmiştir. Hastaların postoperatif erken dönem (0-30 gün) mortalitelerinin değerlendirilmesi amaçlanmıştır.

**Bulgular:** ASA skoru 3 olan 118 proksimal femur kırıklı 65 yaş üstü hasta postoperatif yoğun bakım ünitesinde ve ortopedi kliniklerinde yatan hastalar iki gruba olarak değerlendirildi. Bu iki grup hastanın erken dönem mortaliteleri arasında anlamlı fark saptanmadı.

**Sonuç:** Preop iyi değerlendirilen ASA 3, 65 yaş üstü, proksimal femur kırıklı hasta postop yoğun bakım gereklilikleri ihtimaline karşı uzun süre bekletilmeden opere edilmeleri preop bekleme sürelerinin uzaması sonucu oluşan komplikasyonları minimize edilebilir.

**Anahtar kelimeler:** Geriatrik, kalça kırığı, yoğun bakım

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Sisli Hamidiye Etfal Training and Research Hospital Department of Orthopaedic and Traumatology, Istanbul - Turkey

Address reprint requests to / Yazışma Adresi: Muharrem Kanar, Sisli Hamidiye Etfal Training and Research Hospital Department of Orthopaedic and Traumatology, Istanbul - Turkey

E-mail / E-posta: dr.kanar@hotmail.com

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## INTRODUCTION

Due to increased life expectancy, the incidence of disorders observed in the elderly population, such as proximal femoral fractures, has also increased. Hip fractures are the leading injuries sustained in the elderly population (1). Hip fracture is an important public health problem, both prior to surgery and during the rehabilitation phase, due to medical comorbidities that are often present in elderly patients (2). In addition to the method of treatment, the length of hospitalisation, time-to-surgery and, particularly, the postoperative follow-up care provided are important in the prognosis of these fractures. It should be emphasised that the cost of hospitalisation and rehabilitation for hip fractures, which has gained increased importance due to advances in medical care and increases in the elderly population, will become a greater share of health expenditures (2).

Frequently, elderly patients may have considerable wait times before surgery because they may require monitoring in the intensive care unit (ICU) during the postoperative period, and this involves specific risk factors (e.g., decubitus wounds and cardiovascular and respiratory problems secondary to immobilisation). In many orthopaedic clinics, surgery is delayed due to unavailability of beds in the ICU. Moreover, despite the lengthy delays, most often, these patients are either not admitted to the ICU or

monitored in the ICU for <24 h. In this regard, we aimed to compare the early postoperative period (30-day) mortality rates among elderly patients with similar risk levels for complications from anaesthesia who had sustained proximal femoral fractures and were admitted to either the ICU or the orthopaedic ward and traumatology ward after surgery.

## MATERIALS AND METHOD

The study included 118 elderly patients aged >65 years with proximal femoral fractures who were surgically treated between 2010 and 2015 in the orthopaedic and traumatology clinics of Şişli Hamidiye Etfal Hospital. Inclusion criteria were having an American Society of Anesthesiologists (ASA) score of 3 and medical records that were present in the hospital archives. Of all the patients, 76 (64.4%) were women and 42 (35.6%) were men. Patient age varied from 66 to 100 years, with a mean of  $80.47 \pm 7.74$  years. All patients had isolated hip fracture following simple traumatic injury and had presented to the hospital within the first 24 h of their accidents. The times to surgery varied from 1 to 15 days, with a mean of  $5.97 \pm 2.75$  days. The study included only patients whose ASA scores were 3, as assessed by an anaesthesiologist during the preoperative period. All patients were operated under spinal anaesthesia. The decision regarding admission

**Table-1: Distribution of Properties Related to Patients and Operations**

		Min-Max	Mean±SD
<b>Age</b> (years)		66-100	80.47±7.74
<b>Hospitalisation length</b> (days)		6-71	13.86±8.72
<b>Time-to-surgery</b> (days)		1-15	5.97±2.75
<b>Operation time</b> (min)		30-120	75.82±22.55
<b>Number of transfused units</b> (n= 90)		1-3	1.91±0.71
<b>ICU stay after operation</b> (days) (n= 62)		1-10	1.98±1.8
		<b>n</b>	<b>%</b>
<b>Sex</b>	Female	76	64.4
	Male	42	35.6
<b>Operation type</b>	Nail	65	55.1
	Prosthesis	53	44.9
<b>Operated side</b>	Right	62	52.6
	Left	56	47.5
<b>Transfusion</b>	Yes	90	76.3
	No	28	23.7
<b>ICU admission after operation</b>	Yes	62	52.5
	No	56	47.5

to the ICU was made postoperatively following evaluation by an anaesthesiologist on the basis of the patient's perioperative findings. Surgical nails were applied in 65 patients (55.1%) and prostheses were placed in 53 patients (44.9%). The operated side was on the right in 62 patients (52.6%) and on the left in 56 patients (44%) (Table-1).

Study exclusion criteria were age <65 years, history of multi-traumatic or high-energy injury, perioperative alteration of anaesthesia type, surgery under general anaesthesia, presence of pathologic fractures, surgical time exceeding 2 h, perioperative

or postoperative blood transfusion requirement of more than 3 units and inability to obtain medical records.

Although the ASA scoring system has been modified since its inception, it is still valid today, and provides well-accepted general outlines (Table-2).

## RESULTS

Surgical times varied from 30 to 120 min, with a mean of  $75.82 \pm 22.55$  min. Blood transfusions were required in 90 patients (76.3%). For those who had received transfusions, the number of transfused units varied from 1 to 3, with a mean of  $1.91 \pm 0.71$  units and median of 2 units. Following surgery, 62 patients (52.6%) were admitted to the ICU. For those patients, the length of stay varied from 1 to 10 days, with a mean of  $1.98 \pm 1.8$  days. For all patients, the length of hospitalisation varied from 6 to 71 days, with a mean of  $13.86 \pm 8.72$  days.

Early mortality was observed in 9 patients (7.6%), and the time to mortality varied from 7 to 30 days.

**Table-2: American Society of Anesthesiologists (ASA) scoring system**

<b>ASA 1</b>	Normal healthy patient
<b>ASA 2</b>	A patient with mild systemic disease that does not cause functional limitations
<b>ASA 3</b>	A patient with systemic disease that limits activation without causing loss of capacity
<b>ASA 4</b>	A patient with severe disease that is a constant threat to life
<b>ASA 5</b>	A moribund patient who is not expected to survive for 24 h.

**Table-3: Evaluation of Other Properties of Patients According To Postoperative ICU Admission States**

	Postoperative ICU Admission		p
	Yes (n= 62)	No (n= 56)	
	n (%)	n (%)	
<b>*Sex</b>			
<b>Female</b>	39 (62.9%)	37 (66.1%)	0.868
<b>Male</b>	23 (37.1%)	19 (33.9%)	
<b>**Operation time</b>			
<b>Nail</b>	35 (56.5%)	30 (53.6%)	0.753
<b>Prosthesis</b>	27 (43.5%)	26 (46.4%)	
<b>*Transfusion</b>	51 (82.3%)	39 (69.6%)	0.164
<b>***Early mortality</b>	5 (8.1%)	4 (7.1%)	1.000

\*Continuity (Yates) Correction, \*\*Chi-square Test, \*\*\*Fisher's Exact Test

**Table-4: Comparison of Patients' Sex and Operation Types According To Early Mortality**

	Early Mortality		p
	Yes (n= 9)	No (n= 109)	
	n (%)	n (%)	
<b>Sex</b>			
<b>Female</b>	4 (5.2%)	72 (66.1%)	0.277
<b>Male</b>	5 (11.9%)	37 (33.9%)	
<b>Operation type</b>			
<b>Nail</b>	4 (6.5%)	61 (56%)	0.729
<b>Prosthesis</b>	5 (10.4%)	48 (44%)	

Fisher's Exact Test

There was no difference between male and female patients in ICU admission rates ( $p>0.05$ ); however, the overall mortality rate was higher in men than in women. The mortality rates did not differ significantly according to postoperative ICU status ( $p>0.05$ ). Similarly, blood transfusion requirements were not statistically significantly different between those admitted to the postoperative ICU and those who were not ( $p>0.05$ ). Early mortality during the postoperative period was observed in 5 of 62 patients (8.1%) admitted to the ICU, and in 4 of 56 patients (7.1%) admitted to the orthopaedic and traumatology wards. There was no statistically significant difference between the two groups ( $p<1.000$ ) (Table-3) Regarding comparison of the types of operation by rates of early mortality, the rate was higher in the prosthesis group compared with the nail group. The early mortality rate was also higher in men than in women (Table-4).

## DISCUSSION

Recent systematic epidemiological studies have shown an increased early mortality rate following hip fracture (3). Hip fractures are a serious result of falls in osteoporotic persons aged older than 65 years, occurring at a rate of 87% to 96% (4,5). The mortality rate in patients with hip fractures is three times higher than that in the general population of the same age and sex (6). As the average life expectancy increases, so does the prevalence of patients with proximal femoral fractures. These patients require close postoperative monitoring following the major surgical procedures that they have to undergo. Each year, 1.5 million people in the world are affected by hip fractures, and this number is predicted to rise to 2.6 million by 2025 and 4.5 million by 2050 (3,7,8).

Mortality following hip fracture is highest within the first 30 days. Although various studies have found different rates, the first 30 days appears to be the most risky period for these patients. For instance, Daugaard et al. (9) examined 38,020 patients from 2003 to 2010 and found a 30-day mortality rate of 10%, whereas Caretta et al. (10) examined 1,320 patients from 2004 to 2007 and reported a 30-day mortality

rate of 3.5%. In another meta-analysis, Hu et al. (11) found a 30-day mortality rate following hip fracture surgery of 13.3%. In the present study, we examined the 30-day mortality rate in patients who were or were not admitted to the intensive care unit (ICU) following hip fracture surgery. We observed mortality in 5 of 62 patients (8.1%) admitted to the ICU, and in 4 of 56 patients (7.1%) who were followed up in the orthopaedic and traumatology wards during the postoperative period. There was no statistically significant difference between the two groups regarding 30-day mortality rate, and this rate was in agreement with data found in the literature.

Among all factors that influence mortality following hip fracture, age, sex, fracture type, place of residence and activity level prior to fracture, ASA score, time-to-surgery, and type of anaesthesia used appear to be the most important. In patients with hip fracture, mortality was found to be higher in men compared with women (12). We also observed higher mortality in male patients, with rates of 11.9% in men and 5.2% in women. Additionally, in a study that examined several factors of mortality following hip fracture, age was found to have the strongest association with mortality. The 120-day mortality rate was reported at 28% in patients aged older than 90 years, whereas the rate was 5% for patients between the ages of 50 to 59 years (13). Regarding the type of fracture, mortality was reported to be higher for extracapsular fractures compared with intracapsular fractures (14).

ASA score is an approved and well-accepted tool for documenting the health status of individuals prior to undergoing surgery (15). High ASA score in patients with hip fracture was found to be strongly associated with postoperative mortality (16). The study included only patients whose ASA score was 3, as assessed by an anaesthesiologist in the preoperative period. The decision regarding admission to the ICU or orthopaedic ward was made postoperatively following evaluation by an anaesthesiologist on the basis of the patient's perioperative findings. Hemodynamic changes observed during surgery were the major factor that influenced the decision.

The interval in our study between presentation at our hospital and surgery varied from 1 to 15 days.

The major determinants of this duration appear to have been medications used by the patient at the time of presentation (namely antiaggregants), hormonal disorders detected with initial laboratory test and requiring correction prior to surgery (such as hypothyroidism, hyperthyroidism, Cushing syndrome, and hypercalcaemia), and the availability of beds in the ICU. Several studies that examined the time-to-surgery following hip fracture have reported increased mortality with surgical delays of more than 24 or 48 hours (17,18), whereas others have found no association between delayed surgery and rates of mortality (19,20). One meta-analysis found a higher mortality rate when surgery was delayed for more than 48 hours (21). Furthermore, a recent study reported that timing of surgery could influence 30-day mortality rates, but did not have any effect on 90-day mortality rates (22).

The type of anaesthesia used in hip fracture surgery is also known to have significance in terms of 30-day mortality rate. One study found lower 30-day mortality with regional anaesthesia compared with general anaesthesia (23). Another retrospective cohort study including 9,425 patients also found lower 30-day mortality with regional anaesthesia compared with general anaesthesia (24). In the present study, we only included patients who were operated under spinal anaesthesia. Patients who had received general anaesthesia or blood transfusion of more than 3 units were excluded.

In hip fractures, the type of fracture and operation are also known to have an effect on mortality. The risk of mortality is higher with femoral neck fracture compared with intertrochanteric femoral fracture, and with hemiarthroplasty compared with intramedullary nailing (25,26). In our study, neither the fracture type nor the type of operation had an influence on our patients' ICU admission status.

Additionally, these factors were not found to have had significant roles in mortality.

One study found higher mortality among patients admitted to the ICU following hip fracture (27) ; but in that study, patients who had and had not stayed in the ICU could not be standardised, and patients who had required intensive care had increased comorbidities. Naturally, the mortality rate will be higher in patients whose ASA scores are  $\geq 4$ , regardless of their admission to the ICU. As noted earlier, our study only included patients whose ASA scores were 3, and we minimised the effect of other factors that may have influenced the risk of mortality (e.g., type of anaesthesia, blood transfusion requirement, and surgical time). Wagner et al compared a patient population attended to by orthopaedists with a patient population attended to by orthopaedists and geriatrists together, and they found lower a lower ICU admission rate, higher intermediate ICU admission rate, and lower internal medicine ward transfer rate in the latter group of patients. They explained the higher rate of intermediate ICU admission as having been required to better regulate the patients' medical problems (diabetes mellitus, hypertension ...) Although they found lower rates of ICU admission when patients were followed up by orthopaedists and geriatrists together, they did not find that this made a significant difference in the mortality rate. In our study, we also did not find a significant difference in mortality rates between patients who were admitted to the ICU postoperatively and those who were admitted to the orthopaedic and traumatologic wards.

In conclusion, there is no need for ICU admission following hip fracture if patients are evaluated thoroughly in the preoperative period, and surgery should not be delayed for these patients due to unavailability of beds in the ICU.

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