DOI: 10.5350/SEMB.20170613034900

# Is Intensive Care Unit Necessary for Geriatric Hip Fractures?

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**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 admitted to post-operative intensive care units and orthopaedic clinics.

**Materials and Method:** The study included 118 elderly patients (aged >65 years) who were available from medical records of hospital archives, with proximal femoral fractures who were surgically treated between 2010 and 2015 in our orthopaedic and traumatology clinics, with American Society of Anesthesiologists (ASA) 3 scores. 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:** A total of patients over 65 years of age with 118 proximal femur fractures with an ASA score of 3 were evaluated in two groups; in the postoperative intensive care unit and in orthopaedic clinics. 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 ASA 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:** Fracture, geriatric, hip, intensive care

**ÖZET:**

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

**Amaç:** Beklenen yaşam sürelerininin artışı ile ileri yaşlarda görülen hastalıkların da sıklığı artmaktadır. Sıklıkla basit düşmeler sonucu görülen kalça kırıkları ilerleyen yaş gruplarında belirgin ölçüde daha yaygındır. Bu çalışmada 65 yaş üstü proksimal femur kırıklı hastaların postoperatif yoğun bakım üniteleri ve ortopedi klinklerinde 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 değerlendirlmesi amaçlanmıştır. Hastalar postoperatif dönemde nereye başvurduklarına göre iki gruba ayrıldı.

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

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

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

**Ş.E.E.A.H. Tıp Bülteni 2017;51(3):201-6**

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Date of receipt / Geliş tarihi:
June 10, 2017 / 10 Haziran 2017

Date of acceptance / Kabul tarihi:
June 13, 2017 / 13 Haziran 2017

## 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 admitted to either the ICU or the orthopaedics 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 availability of 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±7.74 years. All patients had isolated hip fracture following simple traumatic injury and presented to the hospital within the first 24 h of following the accident. The time to surgery varied from 1 to 15 days, with a mean of 5.97±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

**Table-1:** Distribution of properties related to patients and operations

| | | Min-Max | Mean±SD |
|---|---|---|---|
| **Age** (years) | | 66-100 | 80.47±7.74 |
| **Hospitalisation length** (days) | | 6-71 | 13.86±8.72 |
| **Time-to-surgery** (days) | | 1-15 | 5.97±2.75 |
| **Operation time** (min) | | 30-120 | 75.82±22.55 |
| **Number of transfused product units** (n= 90) | | 1-3 | 1.91±0.71 |
| **ICU stay after operation** (days) (n= 62) | | 1-10 | 1.98±1.80 |
| | | **n** | **%** |
| **Gender** | Female | 76 | 64.4 |
| | Male | 42 | 35.6 |
| **Operation type** | Nail | 65 | 55.1 |
| | Prosthesis | 53 | 44.9 |
| **Operated side** | Right | 62 | 52.6 |
| | Left | 56 | 47.5 |
| **Transfusion** | Yes | 90 | 76.3 |
| | No | 28 | 23.7 |
| **ICU admission after operation** | Yes | 62 | 52.5 |
| | No | 56 | 47.5 |

regarding admission 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 trauma or high-energy injury, perioperative alteration of anaesthesia type, surgery under general anaesthesia, presence of pathologic fractures, 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).

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

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

## RESULTS

Operative time varied from 30 to 120 min, with a mean of 75.82±22.55 min. Blood transfusions were required in 90 patients (76.3%). For those who received transfusions, the number of transfused product units varied from 1 to 3, with a mean number of 1.91±0.71 units and a 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±1.80 days. For all patients, the length of hospitalisation varied from 6 to 71 days, with a mean duration of 13.86±8.72 days.

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

**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 (%) | |
| ***Gender** | | | |
| **Female** | 39 (62.9) | 37 (66.1) | 0.868 |
| **Male** | 23 (37.1) | 19 (33.9) | |
| ****Operation time** | | | |
| **Nail** | 35 (56.5) | 30 (53.6) | 0.753 |
| **Prosthesis** | 27 (43.5) | 26 (46.4) | |
| ***Transfusion** | 51 (82.3) | 39 (69.6) | 0.164 |
| *****Early mortality** | 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 (%) | |
| **Gender** | | | |
| **Female** | 4 (5.2) | 72 (66.1) | 0.277 |
| **Male** | 5 (11.9) | 37 (33.9) | |
| **Operation type** | | | |
| **Nail** | 4 (6.5) | 61 (56) | 0.729 |
| **Prosthesis** | 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 orthopaedics 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 to 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 people with osteoporosis 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 riskiest 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 of 13.3% following hip fracture surgery. In the present study, we examined the 30-day mortality rate in patients who admitted or not, to the intensive care unit (ICU) following hip fracture surgery. We observed mortality in 5 of 62 patients (8.1%) who 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 compatible with data found in the literature.

Among all factors that influence mortality following hip fracture; age, gender, 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 ones. 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 to be 28% in patients aged older than 90 years, whereas this 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 to 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 factors that influenced the decision.

The interval between the presentation to our

hospital and surgery in our study varied from 1 to 15 days. The major determinants of this duration appear to have been medications used by the patients at the time of presentation (namely antiaggregants), hormonal disorders detected with initial laboratory tests 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 to 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 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 ≥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 operative time). Wagner et al. compared a patient population evaluated by orthopaedists with a patient population evaluated by orthopaedists and geriatrists together, and they found 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 that the higher rate of intermediate ICU admission is required to better regulate the patients' medical problems (diabetes mellitus, hypertension, etc.). 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 traumatology 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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