ORIGINAL ARTICLE

Factors associated with thirty-day mortality and intensive care unit admission in patients undergoing hip fracture surgery

Elvan Tekir Yılmaz,[1] Yiğit Şahin,[2] Bilge Olgun Keleş,[1] Ali Altınbaş[1]

[1]Department of Anaesthesiology and Reanimation, Giresun University Faculty of Medicine, Giresun-*Türkiye*
[2]Department of Anaesthesiology and Reanimation, Giresun University Training and Research Hospital, Giresun-*Türkiye*

ABSTRACT

BACKGROUND: Various factors contribute to the development of mortality and morbidity in hip fracture surgeries. This study aims to investigate the effects of modifiable factors such as the type of anesthesia, anesthesia management, surgical method, and timing of surgery on 30-day mortality rates, intensive care unit admissions, and complications.

METHODS: A total of 400 patients who underwent hip fracture surgery between January 2021 and December 2023 at a Training and Research Hospital were retrospectively analyzed. Patients were divided into two groups: those followed in the ward, named Group 1 (n=304), and those in the intensive care unit, named Group 2 (n=96). Recorded data included demographic characteristics, American Society of Anesthesiologists (ASA) physical status scores, types of comorbidities, anesthesia type, surgical method, surgical delay time, duration of surgery, blood transfusion requirements, and complications.

RESULTS: Patients in Group 2 had higher mean age, comorbidity, and mortality rates compared to Group 1 (p<0.001). In terms of types of comorbidities, the rate of intensive care unit admission was higher in patients with coronary artery disease and chronic renal failure (p<0.001). Mean surgical delay and length of hospital stay were also higher in Group 2 (p<0.001). In multivariate logistic regression analysis, age (p<0.001, Odds Ratio [OR]=1.91, Confidence Interval [CI]=1.046-1.137), ASA score (p<0.001, OR=3.872, CI=1.913-7.838), duration of surgical delay (p<0.001, OR=2.029, CI=1.365-3.017), surgical method (p=0.003, OR=2.003, C=1.258-3.188), and length of hospital stay (p=0.006, OR=1.147, CI=1.04-1.266) were determined as predictive factors for 30-day mortality.

CONCLUSION: This study found that age, ASA classification, length of hospital stay, surgical method, and surgical delay were predictive factors for both morbidity and mortality. Among these, surgical delay time appears to be a modifiable parameter when all factors are considered.

Keywords: Hip fractures; mortality; morbidity; postoperative complications; predictive factors.

INTRODUCTION

Hip fractures are becoming an important worldwide health problem due to increased rates in the elderly population. By 2050, it is estimated that approximately 6.26 million hip fracture cases will occur globally.[1] Hip fractures increase the cost of both acute and rehabilitative care services due to high rates of complications and mortality risk in both the early and late postoperative periods.[2] Many factors such as optimal timing for operation, surgical method, type of anesthesia, and American Society of Anesthesiologists (ASA) physical status are effective factors on mortality and morbidity. However, the ideal method and duration are still controversial.[3-5] According to current clinical guidelines, surgical intervention is advised within 48 hours when medically optimized.[2]

Cite this article as: Tekir Yılmaz E, Şahin Y, Olgun Keleş B, Altınbaş A. Factors associated with thirty-day mortality and intensive care unit admission in patients undergoing hip fracture surgery. Ulus Travma Acil Cerrahi Derg 2024;30:571-578.

Address for correspondence: Elvan Tekir Yılmaz
Giresun University Faculty of Medicine, Giresun, Türkiye
E-mail: elvanty28@hotmail.com

Ulus Travma Acil Cerrahi Derg 2024;30(8):571-578 DOI: 10.14744/tjtes.2024.24186
Submitted: 30.04.2024 Revised: 25.06.2024 Accepted: 15.07.2024 Published: 02.08.2024

In hip fracture cases, intensive care unit (ICU) admission is a factor affecting the length of hospital stay and mortality.[6] Predicting the predictive factors for ICU admission and determining which comorbidities are at higher risk for hospitalization are important in terms of controlling preventable causes. Early planned operations without adequate preparation or delayed operations due to reasons such as anesthetic preparation, anticoagulant use, and control of existing comorbidities may have a negative effect on complications and mortality.

Although the effects of ASA physical status, surgical method, type of anesthesia, and comorbidities on mortality have been investigated in various studies, evidence regarding the factors affecting mortality and ICU admission is insufficient.[7-9]

The aim of this study was to identify predictive factors affecting 30-day mortality and morbidity in hip fractures. We investigated the effect of modifiable factors such as type of anesthesia, anesthetic management, surgical method, and timing of surgery on mortality rate, intensive care unit admission, and complications.

MATERIALS AND METHODS

This retrospective study was conducted at a Training and Research Hospital between January 2021 and December 2023, after obtaining the necessary permissions from the local ethics committee (KAEK-270, no: 04.12.2023/25). A total of 445 hip fracture patients were included in the study by searching the hospital information system and patient files. Forty-five patients were excluded due to open fractures, pathological fractures, presence of multiple trauma, or lack of data. The 400 patients who met the inclusion criteria were divided into two groups. Group 1 included 304 patients followed up in the ward, and Group 2 included 96 patients followed up in the ICU (Fig. 1). Age, sex, ASA physical status, type of comorbidities, surgical delay, surgical method, type of anesthesia, transfusion requirement and amount, major and minor complications were recorded. Types of anesthesia were classified as general, spinal, and combined spinal-epidural. The surgical methods were classified as total hip replacement (THR), partial hip replacement (PHR), and proximal femoral nail (PFN). Comorbidities were recorded as hypertension (HT), congestive heart failure (CHF), chronic renal failure (CRF), coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), cerebrovascular disease (CVD), and others. Major complications were recorded as pulmonary embolism, pneumonia, acute renal failure (ARF), sepsis, cerebrovascular accidents (CVAs), cardiovascular system (CVS) complications, and minor complications including urinary tract infection, upper respiratory tract infection, surgical wound infection, and delirium.

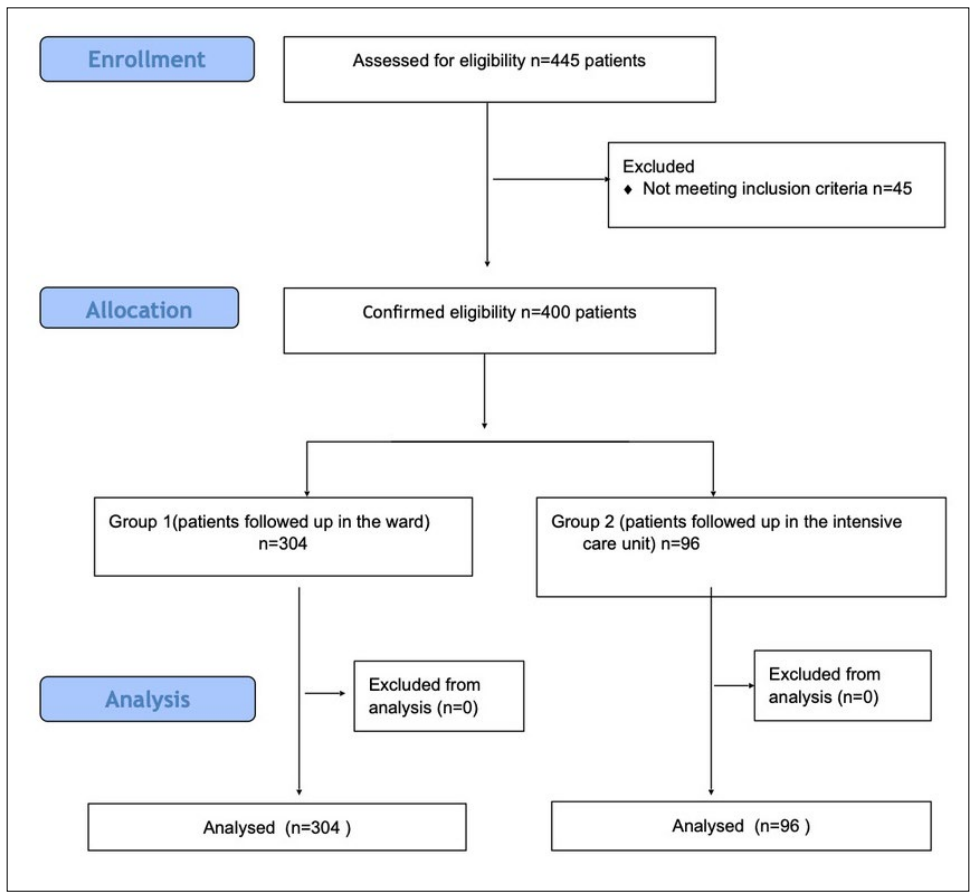

Figure 1. Flow chart of retrospective study.

Surgical delay time in days was calculated as the difference between admission and operation dates. ARF was defined as an increase in serum creatinine ≥ 0.3 mg/dL within 48 hours or an increase ≥ 1.5 times the baseline value within 7 days. The 30-day mortality rate was determined using the hospital information system data.

Statistical Analysis

The statistical analyses were conducted using IBM SPSS v23 (Chicago, IL, USA). The Kolmogorov-Smirnov test was used to assess the normality of quantitative data. Data conforming to a normal distribution were compared using the independent variables t-test, while data not conforming were compared using the Mann-Whitney U test. The comparison of qualitative data was conducted using the Pearson chi-square test. The relationship between data sets was analyzed using the Spearman rho test. Logistic regression analysis was conducted to identify predictors of mortality. Data were presented as mean ± standard deviation, median (min-max), n (%) and mean (95% Confidence Interval [CI]). Statistical significance was set at $p<0.05$.

RESULTS

The study completed statistical analysis of 400 patients with hip fractures. The mean age of the patients was 81.16±8.73 years (range 64-102). The rate of women was 70.7%. A total of 5.2% of the patients were ASA1, 32.5% ASA2, 53.2% ASA3, and 9% ASA4. A total of 94.7% of the patients presented with at least one comorbidity. The mean operation time was 132.90±80.60 minutes, the mean hospital stay was 7.79±4.26 days, the mean intensive care unit stay was 4.3±3.9 days, and the mean surgical delay was 2.44±0.92 days.

ICU Admission

1. The Effect of Preoperative Factors on Intensive Care Admission

Among the patients hospitalized in the ICU, 43.8% had CAD, 35.4% had CVD, 18.8% had CRF, and there was a significant difference compared to patients without ICU hospitalization ($p<0.001$, $p<0.001$, $p=0.023$). The rates of comorbidities such as HT, CHF, DM, COPD were similar in both groups (Table 1).

The incidence of intensive care unit hospitalization was found to increase with increasing ASA score. In total, 72.2% of patients with an ASA score of 4 required follow-up in the intensive care unit. A statistically significant difference was observed between ASA 1-3, 1-4, 2-3, 2-4, and 3-4 in terms of ICU admission ($p<0.001$) (Table 1).

The mean surgical delay time was 3.3±1.1 days in patients hospitalized in the ICU. In patients without ICU admission,

Table 1. Preoperative data between the two groups

	Group 1 (n=304)	Group 2 (n=96)	p
Sex (%)			
Female	214 (70.4)	69 (71.9)	0.781
Male	90 (29.6)	27 (28.1)	
Age (years) (Mean±SD)	79.5±8.67	86.5±6.9	<0.001*
Duration of Surgical Delay (days) (Mean±SD)	2.3±0.9	3.3±1.1	<0.001*
Comorbidity (%)			
Hypertension	248 (81.6)	85 (88.5)	0.111
Coronary Artery Disease	74 (24.3)	42 (43.8)	<0.001*
Congestive Heart Failure	13 (4.3)	9 (9.4)	0.056
Diabetes Mellitus	84 (27.6)	35 (36.5)	0.099
Chronic Renal Failure	12 (3.9)	18 (18.8)	<0.001*
Chronic Obstructive Pulmonary Disease	42 (13.8)	21 (21.9)	0.059
Cerebrovascular Disease	72 (23.7)	34 (35.4)	0.023*
Others	49 (16.1)	10 (10.4)	0.170
ASA ps (%)			
1	21 (6.9)	0 (0)	<0.001**
2	118 (38.8)	12 (12.5)	
3	155 (51)	58 (60.4)	
4	10 (3.3)	26 (27.1)	

*p-value <0.05 is considered statistically significant. **Difference between ASA1-3, 1-4, 2-3, 2-4, 3-4. Group 1: Patients followed up in the ward. Group 2: Patients followed up in the intensive care unit. ASA ps: American Society of Anesthesiologists Physical Status.

Table 2. Intraoperative data between the two groups

	Group 1	Group 2	p
Surgical Method (%)			
THR	116 (3.2)	2 (2.1)	<0.001*
PHR	61 (20.1)	35 (36.5)	
PFN	127 (41.8)	59 (61.5)	
Type of Anesthesia (%)			
General	58 (19.1)	22 (22.9)	0.096
Spinal	202 (66.4)	68 (70.8)	
Combined Spinal Epidural	44 (14.5)	6 (6.3)	
Duration of Surgery (minutes) (Mean±SD)	134.8±89.4	127±42.5	0.251

*The p-value <0.005 is considered statistically significant. THR: Total Hip Replacement; PHR: Partial Hip Replacement; PFN: Proximal Femoral Nail. *Difference between THR-PHR and THR-PFN. Group 1: Patients followed up in the ward. Group 2: Patients followed up in the intensive care unit.

Table 3. Postoperative data between the two groups

	Group 1	Group 2	p
Major Complications (%)			
Pulmonary Embolism	0 (0)	1 (1)	0.075
Sepsis	2 (0.7)	6 (6.3)	0.001*
Pneumonia	1 (0.3)	15 (15.6)	<0.001*
Cerebrovascular Accidents	1 (0.3)	2 (2.1)	0.082
Cardiovascular Complications	1 (0.3)	7 (7.3)	<0.001*
Acute Renal Failure	4 (1.3)	10 (10.4)	<0.001*
Minor Complications (%)			
Yes	33 (10.9)	10 (10.4)	0.904
No	271 (89.1)	86 (89.6)	
Transfusion History (Erythrocyte Suspension) (%)	200 (65.7)	80 (83.3)	0.001*
1-2 Units	141 (70.5)	43 (53.8)	0.008*
3 Units and Above	59 (29.5)	37 (46.2)	
Length of Hospital Stay (days) (Mean±SD)	6.9±3.1	10.7±5.9	<0.001*
Mortality (%)			
Survivor	301 (99)	82 (85.4)	<0.001*
Non-Survivor	3 (1)	14 (14.6)	

*p-value <0.05 is considered statistically significant. Group 1: Patients followed up in the ward. Group 2: Patients followed up in the intensive care unit.

this period was 2.3±0.9 days, and there was a significant difference between the two groups (Table 1).

2. The Effect of Intraoperative Factors on ICU Admission

PFN was performed in 61.5%, PHR in 36.5%, and THR in 2.1% of the patients with ICU hospitalization. There was a statistically significant difference between patients with THR and those with PHR and PFN in terms of ICU admission (p<0.001). The anesthesia method did not affect ICU admission. Transfusion history was present in 83.3% of the patients with ICU hospitalization. The duration of surgery did not affect ICU hospitalization (Table 2).

3. The Effect of Postoperative Factors on Intensive Care Admission

Of the patients hospitalized in the intensive care unit, 14.6% died within the first 30 days. Mortality was significantly different between the two groups. The duration of hospitalization was 10.7±5.9 days in ICU-hospitalized patients and was significantly higher.

Table 4. Univariate and multivariate analysis of factors associated with 30-day mortality

	Univariate Logistic Regression		Multivariate Logistic Regression	
	OR (95% CI)	p	OR (95% CI)	p
Age	1.107 (1.074 - 1.142)	<0.001	1.091 (1.046 - 1.137)	<0.001*
Coronary Artery Disease	2.417 (1.495 - 3.91)	<0.001	0.653 (0.298 - 1.434)	0.288
Chronic Renal Failure	5.615 (2.595 - 12.152)	<0.001	1.811 (0.582 - 5.642)	0.305
Cerebrovascular Disease	1.767 (1.077 - 2.898)	0.024	0.496 (0.231 - 1.066)	0.072
Surgical Method	2.426 (1.748 - 3.367)	<0.001	2.003 (1.258 - 3.188)	0.003*
ASA ps	5.09 (3.21 - 8.072)	<0.001	3.872 (1.913 - 7.838)	<0.001*
Length of Hospital Stay	1.247 (1.16 - 1.341)	<0.001	1.147 (1.04 - 1.266)	0.006*
Duration of Surgical Delay	2.486 (1.91 - 3.236)	<0.001	2,029 (1.365 - 3.017)	<0.001*

*p-value <0.05 is considered statistically significant. ASA ps: American Society of Anesthesiologists Physical Status.

Table 5. Correlation between the risk of complications and demographic and surgical data

	Major Complications	
	r	p
ASA ps	0.186	<0.001*
Duration of Surgical Delay	0.249	<0.001*
Type of Anesthesia	-0.041	0.412
Surgical Method	0.161	0.001*
Age	0.204	<0.001*
Duration of Surgery	-0.042	0.400
Sex	0.031	0.540

*p-value <0.05 is considered statistically significant. ASA ps: American Society of Anesthesiologists Physical Status.

Pneumonia, ARF, sepsis, and CVS complications were significantly higher in the ICU group (p<0.001, p=0.001). There was no significant difference in the rates of pulmonary embolism, CVAs, and minor complications (Table 3).

Additionally, 46.2% of patients with ICU hospitalization and 29.5% of those without ICU hospitalization received blood transfusions of 3 units or more. Both the rate and amount of transfusion were statistically significantly higher in patients with ICU hospitalization.

Mortality

The 30-day mortality rate was 4.3% (17 patients). The causes of death included septic shock, myocardial infarction, pulmonary infection, and pulmonary embolism, in order of frequency. Logistic regression analysis was performed to determine the predictors of mortality. The results of the logistic regression analysis are shown in Table 4. In univariate logistic regression analysis, age, CAD, CRF, CVD, surgical method, ASA, length of hospital stay, and surgical delay were found to be significant. In multivariate logistic regression analysis with the same parameters, age, surgical method, ASA, length of hospital stay, and surgical delay were found to be significant. Advanced age, high ASA scores, increased length of hospital stay, and prolonged surgical delay were identified as predictors of mortality. When comparing surgical methods, PHR and PFN were found to increase mortality compared to THR (Table 4).

Complications

When the correlation of complications with age, gender, ASA, surgical delay time, type of surgery, and type of anesthesia was examined, significant positive correlations were found between ASA (r=0.186), surgical delay time (r=0.249), surgical method (r=0.161), and age (r=0.204) (p<0.001) (Table 5).

DISCUSSION

Unlike previous studies focusing on mortality determinants and complications in patients undergoing hip fracture surgery, this study focused on patients requiring ICU admission, predominantly those over 80 years old. We identified preoperative, intraoperative, and postoperative factors affecting ICU admission and examined their relationship with mortality. We also evaluated the relationship between postoperative complications and factors such as ASA, surgical delay time, surgical methods, and anesthesia methods.

Significant differences were found in terms of type of comorbidity, ASA physical status, surgical delay time, type of surgery, amount of transfusion, mortality, and complications between patients admitted to the ICU and those not admitted. Advanced age, high ASA scores, prolonged hospital stay, and prolonged surgical delay time were identified as determinants of mortality.

The 30-day mortality rate in this study was 4.3%. This rate may be lower than that reported in existing studies.[10,11] We attribute this result to the high number of patients with post-

operative ICU follow-up. The ICU follow-up of high-risk patients may have contributed to a lower mortality rate.

Publications report that age is associated with mortality in hip fracture cases.[12-14] In our study, the mean age of patients requiring postoperative intensive care was higher. We found that age was associated with an increase in postoperative major complications and 30-day mortality. There are studies in the literature that associate male gender with mortality,[14,15] while others report the opposite.[16,17] In our study, we found no association between gender and intensive care unit hospitalization or mortality.

The majority of hip fracture cases worldwide are over 65 years of age.[18,19] Hip fractures are injuries with high mortality and morbidity rates. The increasing comorbidity rate with age is one of the reasons for poor prognosis.[20,21] One or more comorbidities were present in 94.7% of patients. CAD was the most common comorbidity leading to ICU admission. We believe the high mean age of our patients explains this high rate. Similar to our study, Ayhan et al.,[22] reported that ICU admission and length of stay were associated with comorbidity, complications, and high ASA status and affected mortality.

In many studies, high ASA scores were associated with complications, surgical delay, and mortality.[12,14,15] In this study, high ASA scores were found to be predictors for intensive care unit hospitalization and mortality and were also associated with major complications.

Surgical delays may be prolonged due to reasons such as electrolyte imbalances, the use of anticoagulants, comorbidities, and the need for ICU.[3,23] Many studies show that surgeries performed within the first 48 hours reduce postoperative complications and mortality.[4,24] Uzoigwe et al.,[25] in their study of 2,056 patients, found that mortality decreased in those operated on between 12-24 hours and increased after 36 hours. Simunovic et al.[26] found that mortality increased after 72 hours in their meta-analysis. Although the data on this subject have been controversial, in September 2014, the American Academy of Orthopaedic Surgeons published a recommendation, supported by moderate evidence, suggesting that hip fracture operations should be performed within the first 48 hours after hospital admission. The guideline updated in 2022 supported better outcomes in operations performed within 24 hours, but noted that surgery within 24 to 48 hours was appropriate due to resource differences in health units.[2] Surgical delays may lead to an increase in postoperative complications and mortality.[4,23] In our study, surgical delay was also found to be longer in patients with ICU hospitalization. This prolongation may be attributed to taking necessary precautions to provide optimum conditions for patients with severe diseases and high ASA scores. We also found a significant correlation between surgical delay time and major complications. Additionally, mortality increased with increasing surgical delay time. After 48 hours, we found a 4-fold increase in mortality for each day. Surgical delay time was determined as a predictive factor for mortality.

Different results have been reported in studies investigating the effect of fracture localization and surgical method on mortality.[16,27] Many studies reported higher mortality in trochanteric fractures treated with PFN.[12,28] In our study, we found that PHR and PFN operations increased mortality compared to THR, in accordance with the literature.

Studies have shown that the type of anesthesia affects mortality. In these studies, regional anesthesia was found to have lower mortality than general anesthesia.[29,30] However general anesthesia is mostly preferred for patients with a high risk of hypotension and bleeding. This may be one of the reasons that increases mortality in patients receiving general anesthesia. Bennet et al.[7] found that the choice of anesthesia technique did not affect mortality and morbidity in their study. Similarly, in our study, we found that anesthesia technique did not affect complications, ICU admission, and mortality. We believe that good anesthesia management, starting from the preoperative period and including postoperative ICU follow-up, may reduce mortality regardless of the method.

Perioperative anemia is among the factors affecting mortality and morbidity in hip fractures.[31,32] In our study, the rate of patients requiring transfusion and more than 3 units of replacement was higher in the ICU hospitalization group. However, we did not find any correlation between the need and amount of transfusion and mortality.

In this study, we were also able to establish a relationship between the length of hospital stay and mortality and complications of ICU admission. By evaluating the factors affecting ICU admission, factors affecting complications, and mortality predictors, we have examined all adverse conditions that may be encountered in hip fracture surgery. We think that the fact that our mortality predictors are also predictors of ICU admission and have an effect on the development of complications minimizes confounding factors and increases the reliability of our study.

Limitations

The main limitation of this study is that it was primarily a single-center retrospective study. In addition, the decision to admit to the ICU was not a standardized choice. We think that it should be supported by prospective and multicenter studies.

CONCLUSION

Hip fractures present a significant risk of mortality and morbidity in the postoperative period. Identifying modifiable factors and implementing timely interventions may be effective in reducing these risks. This study found that age, ASA classification, length of hospital stay, surgical method, and surgical delay were predictive factors for both morbidity and mortality. Among these, surgical delay time appears to be a modifiable parameter when all factors are considered.

Ethics Committee Approval: This study was approved by the Giresun University Training and Research Hospital Ethics Committee (Date: 04.12.2023, Decision No: KAEK-270).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: E.T.Y., B.O.K.; Design: E.T.Y., E.Ş.; Supervision: E.T.Y., A.A.; Resource: E.T.Y., B.O.K., Y.Ş., A.A.; Materials: Y.Ş., E.T.Y.; Data collection and/or processing: E.T.Y., Y.Ş., A.A.; Analysis and/or interpretation: E.T.Y., B.O.K., Y.Ş.; Literature search: E.T.Y., A.A.; Writing: E.T.Y.; Critical reviews: A.A.

Conflict of Interest: None declared.

Financial Disclosure: The author declared that this study has received no financial support.

REFERENCES

1. Beaupre LA, Jones CA, Saunders LD, Johnston DW, Buckingham J, Majumdar SR. Best practices for elderly hip fracture patients. A systematic overview of the evidence. J Gen Intern Med 2005;20:1019–25. [CrossRef]
2. Switzer JA, O'Connor MI. AAOS Management of hip fractures in older adults evidence-based clinical practice guideline. J Am Acad Orthop Surg 2022;30:e1297–301. [CrossRef]
3. Tran T, Delluc A, de Wit C, Petrcich W, Le Gal G, Carrier M. The impact of oral anticoagulation on time to surgery in patients hospitalized with hip fracture. Thromb Res 2015;136:962–5. [CrossRef]
4. Bohm E, Loucks L, Wittmeier K, Lix LM, Oppenheimer L. Reduced time to surgery improves mortality and length of stay following hip fracture: results from an intervention study in a Canadian health authority. Can J Surg 2015;58:257–63. [CrossRef]
5. Wang LX, Guan LJ, Deng MH, Zhou LH. Risk factors of serious adverse events for geriatric hip fractures: is it the frailty or the timing? Geriatr Orthop Surg Rehabil 2024;15:21514593241250165. [CrossRef]
6. Ekinci M, Bayram S, Gunen E, Col KA, Yildirim AM, Yilmaz M. C-reactive protein level, admission to intensive care unit, and high American Society of Anesthesiologists score affect early and late postoperative mortality in geriatric patients with hip fracture. Hip Pelvis 2021;33:200–10.
7. Bennett A, Li H, Patel A, Kang K, Gupta P, Choueka J, et al. Retrospective analysis of geriatric patients undergoing hip fracture surgery: delaying surgery is associated with increased morbidity, mortality, and length of stay. Geriatr Orthop Surg Rehabil 2018;9: 2151459318795260. [CrossRef]
8. Ovidiu A, Stefan GT, Dragos P, Bogdan V, Dana AI. Survival of nonagenarian patients with hip fractures: a cohort study Acta Ortop Bras 2017;25:132–6. [CrossRef]
9. Donegan DJ, Gay AN, Baldwin K, Morales EE, Esterhai JL Jr, Mehta S. Use of medical comorbidities to predict complications after hip fracture surgery in the elderly. J Bone Joint Surg Am 2010;92:807–13. [CrossRef]
10. Kavak M, Oğuz S, Akkoyun Z, İnan U. Predictive factors associated with thirty-day mortality in geriatric patients with hip fractures. Acta Orthop Traumatol Turc 2022;56:240–4. [CrossRef]
11. McGuire KJ, Bernstein J, Polsky D, Silber JH. The 2004 Marshall Urist award: delays until surgery after hip fracture increases mortality. Clin Orthop Relat Res 2004;428:294–301.
12. Bretherton CP, Parker MJ. Early surgery for patients with a fracture of the hip decreases 30-day mortality. Bone Joint J 2015;97-B:104–8. [CrossRef]
13. Rosso F, Dettoni F, Bonasia DE, Olivero F, Mattei L, Bruzzone M, et al. Prognostic factors for mortality after hip fracture: operation within 48 hours is mandatory. Injury 2016;47:S91–7. [CrossRef]
14. Kempenaers K, Van Calster B, Vandoren C, Sermon A, Metsemakers WJ, Vanderschot P, et al. Are the current guidelines for surgical delay in hip fractures too rigid? A single center assessment of mortality and economics. Injury 2018;49:1169–75. [CrossRef]
15. Carow J, Carow JB, Coburn M, Kim BS, Bücking B, Bliemel C, et al. Mortality and cardiorespiratory complications in trochanteric femoral fractures: a ten year retrospective analysis. Int Orthop 2017;41:2371–80.
16. Kesmezacar H, Ayhan E, Unlu MC, Seker A, Karaca S. Predictors of mortality in elderly patients with an intertrochanteric or a femoral neck fracture. J Trauma 2010;68:153–8. [CrossRef]
17. Aharonoff GB, Koval KJ, Skovron ML, Zuckerman JD. Hip fractures in the elderly: predictors of one year mortality. J Orthop Trauma 1997;1:162–5. [CrossRef]
18. Panula J, Pihlajamäki H, Mattila VM, Jaatinen P, Vahlberg T, Aarnio P, et al. Mortality and cause of death in hip fracture patients aged 65 or older: a population-based study. BMC Musculoskelet Disord 2011;12:105.
19. Hameed D, McCormick BP, Sequeira SB, Dubin JA, Bains SS, Mont MA, et al. Cemented versus cementless femoral fixation for total hip arthroplasty following femoral neck fracture in patients aged 65 and older. J Arthroplasty 2024;39:1747–51. [CrossRef]
20. Frost SA, Nguyen ND, Black DA, Eisman JA, Nguyen TV. Risk factors for in-hospital post-hip fracture mortality. Bone 2011;49:553–8. [CrossRef]
21. Kang BJ, Lee YK, Lee KW, Won SH, Ha YC, Koo KH. Mortality after hip fractures in nonagenarians. J Bone Metab 2012;19:83–6. [CrossRef]
22. Ayhan A, Kesimci E, Yazar C, Akovali N. Delay in geriatric hip fracture surgery: retrospective analysis of factors associated with perioperative anesthesiologic management and their impact on 30-day mortality and morbidity. JARSS 2023;31:372–9. [CrossRef]
23. Shah AA, Kumar S, Shakoor A, Haroon R, Noordin S. Do delays in surgery affect outcomes in patients with inter-trochanteric fractures? J Pak Med Assoc 2015;65: S21–4.
24. Shiga T, Wajima Z, Ohe Y. Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis, and meta-regression. Can J Anaesth 2008; 55:146–54. [CrossRef]
25. Uzoigwe CE, Burnand HG, Cheesman CL, Aghedo DO, Faizi M, Middleton RG. Early and ultra-early surgery in hip fracture patients improves survival. Injury 2013;44:726–9. [CrossRef]
26. Simunovic N, Devereaux PJ, Sprague S, Guyatt GH, Schemitsch E, Debeer J, et al. Effect of early surgery after hip fracture on mortality and complications: systematic review and meta-analysis. CMAJ 2010;182:1609–16. [CrossRef]
27. Vestergaard P, Rejnmark L, Mosekilde L. Has mortality after a hip fracture increased? J Am Geriatr Soc 2007;55:1720–6. [CrossRef]
28. Haentjens P, Autier P, Barette M, Venken K, Vanderschueren D, Boonen S. Survival and functional outcome according to hip fracture type: a one-year prospective cohort study in elderly women with an intertrochanteric or femoral neck fracture. Bone 2007;41:958–64. [CrossRef]
29. Mayordomo-Cava J, Abásolo L, Montero-Fernandez N, Ortiz-Alonso J, Vidán-Astiz M, Serra-Rexach JA. Hip fracture in nonagenarians: Characteristics and factors related to 30-day mortality in 1177 patients. J Arthroplasty 2020;35:1186–93. [CrossRef]
30. Rodkey DL, Pezzi A, Hymes R. Effects of spinal anesthesia in geriatric hip fracture: a propensity-matched study. J Orthop Trauma 2022;36:234–8.
31. Groff H, Kheir MM, George J, Azboy I, Higuera CA, Parvizi J. Causes of in-hospital mortality after hip fractures in the elderly. Hip Int 2020;30:204–9. [CrossRef]
32. Endo A, Baer HJ, Nagao M, Weaver MJ. Prediction model of in-hospital mortality after hip fracture surgery. J Orthop Trauma 2018;32:34–8.

ORİJİNAL ÇALIŞMA - *ÖZ*

Kalça kırığı ameliyatı geçiren hastalarda otuz günlük mortalite ve yoğun bakım ünitesine yatış ile ilişkili faktörler

Elvan Tekir Yılmaz,[1] Yiğit Şahin,[2] Bilge Olgun Keleş,[1] Ali Altınbaş[1]

[1]Giresun Üniversitesi Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, Giresun, Türkiye

[2]Giresun Üniversitesi Eğitim Araştırma Hastanesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, Giresun, Türkiye

AMAÇ: Kalça kırığı ameliyatlarında mortalite ve morbidite gelişimine katkıda bulunan çeşitli faktörler vardır. Bu çalışmada anestezi tipi, anestezi yönetimi, cerrahi yöntem, ameliyatın zamanlaması gibi değiştirilebilir faktörlerin 30 günlük mortalite oranı, yoğun bakım ünitesine yatış ve komplikasyonlar üzerindeki etkisini araştırmayı amaçladık.

GEREÇ VE YÖNTEM: Bir Eğitim ve Araştırma Hastanesinde Ocak 2021 ile Aralık 2023 tarihleri arasında kalça kırığı nedeniyle ameliyat edilen toplam 400 hasta retrospektif olarak analiz edildi. Hastalar iki gruba ayrıldı: serviste takip edilenler Grup 1 (n=304) ve yoğun bakım ünitesinde takip edilenler Grup 2 (n=96) olarak adlandırıldı.

Demografik özellikler, Amerikan Anestezistler Derneği fiziksel durum skorları, komorbidite tipi, anestezi tipi, cerrahi yöntem, cerrahi gecikme süresi, cerrahi süre, kan transfüzyon gereksinimi ve komplikasyonlar kaydedildi.

BULGULAR: Grup 2'deki hastaların yaş ortalaması, komorbidite ve mortalite oranları Grup 1'e göre daha yüksekti ($p<0.001$). Komorbidite türleri açısından, koroner arter hastalığı ve kronik böbrek yetmezliği olan hastalarda yoğun bakım ünitesine yatış oranı daha yüksek bulundu ($p<0.001$). Ortalama cerrahi gecikme ve hastanede kalış süresi Grup 2'de daha yüksekti ($p<0.001$). Yapılan multivaryant lojistik regresyon analizinde; yaş ($p<0.001$, QR=1.91 Cl=1.046-1.137), ASA skoru ($p<0.001$ QR=3.872 Cl=1.913 - 7.838), cerrahi gecikme süresi ($p<0.001$, QR=2.029 Cl=1.365-3.017), cerrahi yöntem ($p=0.003$, QR= 2.003 Cl=1.258-3.188) ve hastanede kalış süresi ($p=0.006$, QR=1.147 Cl: 1.04-1.266) 30 günlük mortalite için prediktif faktörler olarak belirlendi.

SONUÇ: Bu çalışmada yaş, ASA sınıflandırması, hastanede kalış süresi, cerrahi yöntem ve cerrahi gecikmenin hem morbidite hem de mortalite için prediktif faktörler olduğu bulunmuştur. Bunlar arasında cerrahi gecikme süresi, tüm faktörler göz önünde bulundurulduğunda değiştirilebilir bir parametre olarak görülmektedir.

Anahtar sözcükler: Kalça kırıkları; mortalite; morbidite; postoperatif komplikasyonlar; prediktif faktörler.

Ulus Travma Acil Cerrahi Derg 2024;30(8):571-578 DOI: 10.14744/tjtes.2024.24186