

HEMIARTROPLASTİ İLE TEDAVİ EDİLMİŞ 85 YAŞ ÜSTÜ HASTALARDAKİ KALÇA KIRIKLARINDA MORTALİTE GÖSTERGELERİ

HIP FRACTURES TREATED WITH HEMIARTHROPLASTY: INDICATORS OF MORTALITY IN PATIENTS OLDER THAN 85 YEARS

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ÖZ

AMAÇ: Bu çalışmada ortopedik cerrahlar açısından zorlayıcı bir popülasyon olan 85 yaş üstündeki hastalardaki kalça kırığı olgularında, mortalite riskinin tespiti için preoperatif risk faktörlerinin belirlenmesi amaçlanmıştır.

GEREÇ VE YÖNTEM: Kalça kırığı tanısıyla servismize yatırılarak tedavi ve takip edilen 85 yaş üstündeki hastaların bilgileri hastane kayıtlarından retrospektif olarak toplandı. Hastaların sağkalım durumları ve hayatını kaybetmişse ölüm tarihleri tespit edildi. Seçilmiş hastalardan hayatını kaybeden 46 hasta grup 1 olarak adlandırılırken; sağ kalan 83 hasta grup 2 olarak adlandırıldı. Her iki grup yaş, cinsiyet, ameliyat süresi, ameliyat olana kadar geçen süre, hastanede toplam yatış süresi, American Society of Anesthesiologists skoru, kardiyak ejeksiyon fraksiyonu (EF), kırık tipi, protezin çimentolu / çimentosuz olarak uygulanması ve komorbid faktör varlığı ile sayıları açısından karşılaştırıldı.

BULGULAR: Grup 1'deki hastaların yaş ortalaması daha yüksekti ve istatistiksel olarak anlamlı idi ($p=0.011$). Erkeklerdeki ölüm oranı daha yüksekti ve istatistiksel olarak anlamlı idi ($p=0.047$). Çimentolu hemiartroplasti uygulanmış olanlarda ölüm oranı daha yüksekti ve istatistiksel olarak anlamlı idi ($p=0.038$). İki grup arasında ASA skoru ortalamaları ($p=0.352$), toplam yatış süresi ($p=0.120$), yatıştan ameliyat olana kadar geçen süre ($p=0.531$), ejeksiyon fraksiyonları ($p=0.484$) açısından anlamlı fark yoktu.

SONUÇ: Yaşlı, erkek ve çimentolu protez kullanılmış olan 85 yaş üstü kalça kırıklı hastalarda ölüm oranları daha yüksektir ve bu hastalarda takip ve tedavide daha dikkatli olunmalı, tek modifiye edilebilir değişken olan protez kullanımında mümkünse çimentosuz sistemler tercih edilmelidir.

ANAHTAR KELİMELER: Kalça kırıkları, Mortalite, Yaşlı

ABSTRACT

OBJECTIVE: The aim of this study was to determine the preoperative risk factors of all-cause mortality in the small but very challenging group of hip fracture patients aged over 85 years.

MATERIALS AND METHODS: Data was gathered retrospectively on patients aged over 85 years with a diagnosis of hip fracture. Subsequent survival was determined. The date of death was recorded (if present). The selected patients were separated into 2 groups: Group1 who had died within 1 year ($n=46$) and group2 who had survived ($n=83$). The two groups were compared in respect of age, gender, operating time, the time from initial trauma to surgery, total hospitalization duration, American Society of Anesthesiologists score, cardiac ejection fraction, type of fracture, application of cemented or uncemented prosthesis and number of comorbid diseases.

RESULTS: The mean age of the patients in Group 1 was determined to be significantly higher ($p=0.011$). The rate of male mortality was significantly higher ($p=0.047$). The rate of mortality of patients with cemented hemiarthroplasty was significantly higher ($p=0.038$). No difference was determined between the groups in respect of mean ASA scores ($p=0.352$), total hospitalization duration ($p=0.120$), the time from trauma to surgery ($p=0.531$) or ejection fraction ($p=0.484$). No significance was determined between the groups in respect of the presence and number of comorbid diseases.

CONCLUSIONS: The mortality rate of older male patients aged over 85 years with cemented prosthesis applied for hip fracture was higher. As the only parameter, which can be modified, uncemented systems, should be selected, if possible for the prosthesis to be used.

KEYWORDS: Elderly, Hip fractures, Mortality

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INTRODUCTION

Hip fractures, which continue to be a highly significant problem in elderly patients in parallel with currently increasing life expectancy, remains important because of high mortality rates or loss of function (1,2). It seems to be one of the problems with the highest mortality rates of all operations in the orthopaedics and traumatology practice (3-5). Although the aim of surgery is to provide preoperative functional capacity or at least for the patient to be able to perform daily activities independently, the serious problem of mortality can be evaluated as the most important point. Due to advanced age in particular, these patients have many comorbid diseases.

In reaching the goals aimed for with surgery, there is an explicit importance of variables such as preoperative comorbid diseases, surgical preferences, age, and gender of the patients. Therefore, a thorough preoperative evaluation of the risk factors and choice of surgery are vital. In addition, identifying which factors will affect which outcome can be evaluated as a critical stage. This requirement is more of a priority for patients in the extremes of old age (6-9). Therefore, it was aimed in this study to determine the preoperative risk factors by evaluating the all-cause mortality in this small but very challenging group of patients aged over 85 years with a hip fracture.

MATERIALS AND METHODS

Patient Selection and Study Design

Data was gathered retrospectively from the records of 567 elderly patients who were admitted and treated in our clinic for a diagnosis of hip (Intertrochanteric and femoral neck fractures) fracture between January 2012 and April 2013. Subsequent survival was determined by accessing the status in the population records system and the date of death was recorded, if present.

The study included patients with an isolated hip fracture who were aged over 85 years, who had walking capacity (with/without support) before

the fracture, treated with a cemented or uncemented hemiarthroplasty and were followed up for at least 1 year. Patients were excluded if they had any accompanying head or thoracic injury requiring intervention or if there were missing data from the records. Thus, patients who met the criteria were assigned as group 1 (n=46) who had died within 1 year and group 2 (n=83) who had survived within 1 year.

According to the type of femoral morphology, the same surgical team applied a cemented or uncemented partial hip prosthesis. The morphologic anatomy of the proximal femur was assessed based on Dorr's classification (10); Type A: narrow metaphysis with narrow medullary canal, with good cortical bone stock, Type B: wide metaphysis with large medullary canal, but relatively good cortex, Type C: wide metaphysis with wide medullary canal, loss of isthmus constriction and loss of cortical bone stock. Patients with type 1 and 2 femoral morphology were treated with uncemented arthroplasty and patients with type 3 femoral morphology were treated with cemented arthroplasty. On postoperative day 1, the patients were mobilized. Patients were followed up until they were able to sit unassisted, walk with or without support and absence of wound site problems; then they were discharged.

The two groups were compared in respect of age, gender, operating time, the time from initial trauma to surgery, total hospitalization duration, ASA score, cardiac ejection fraction (EF), fracture type (Intertrochanteric/femoral neck), application of cemented or uncemented prosthesis and presence of comorbidities.

Statistical Analysis

Statistical analyses of the data were performed with IBM SPSS statistics Version 22 package software. In the comparison of categorical data between groups, the Pearson's Chi Square test and Fisher's exact test were applied. When continuous variables did not conform to normal distribution (Kolmogorov-Smirnov and Shapiro Wilk $p < 0.05$), Mann Whitney U statistical analysis was used in the comparison between the

two groups. A value of $p < 0.05$ was accepted as statistically significant.

Ethical Approval

Approval for the study was granted by the Institutional Review Board of Katip Celebi University.

RESULTS

The mean age of patients was 88.8 ± 2.65 years in Group 1 and 87.6 ± 2.95 years in Group 2 and the difference was significant ($p = 0.011$). Male patients comprised 43.4% (20 patients) in Group 1 and 28.9% (24 patients) in Group 2. The high mortality rate of male patients was significant ($p = 0.047$) (Table 1). The mean ASA score was 3.1 ± 0.59 in Group 1 and 3.2 ± 0.6 in Group 2 and the difference was not significant ($p = 0.352$).

Table 1: Comparison of the groups according to patient characteristics

	No of patients	Mean Age	F/M
Group 1	46	88.8	26/20
Group 2	83	87.6	59/24
p		0.011	0.047

The mean total duration of hospitalization was 12.2 ± 5.5 days in Group 1 and 10.61 ± 3.88 days in Group 2 and the difference was not significant ($p = 0.120$). The mean time from admittance to surgery was 6.7 ± 2.7 days in Group 1 and 6.7 ± 3.1 days and the difference was not significant ($p = 0.531$). There was 32 intertrochanteric and 14 femoral neck fractures in group 1; 57 intertrochanteric 26 femoral neck fractures in group 2. There was no significant difference between two groups in terms of fracture type. The mean ejection fraction was determined as 57.9 ± 6.1 in Group 1 and 58 ± 6.8 in Group 2 and the difference was not significant ($p = 0.484$). Cemented hemiarthroplasty was applied to 60.8% (28 patients) of the patients in Group 1 and to 51.8% (43 patients) of the patients in Group 2. The high rate of mortality in the patients who underwent cemented hemiarthroplasty was determined to be significant ($p = 0.038$) (Table 2).

Table 2: Comparison of groups according to treatment modalities and physiologic status

	Survival ¹	ASA	Hospital stay ²	Time to surgery ³	EF	Fracture Type ⁴	Cemented/Un cemented
Group 1	99	3.2	12.2	6.7	58	32/14	28/18
Group 2	-	3.1	10.6	6.7	58	57/26	43/40
p	-	0.352	0.120	0.531	0.484	0.811	0.038

¹ the mean days from surgery to death, ² the total hospitalization days, ³ days from admittance to surgery, ⁴ Intertrochanteric/Femoral neck, EF: Cardiac ejection fraction

In Group 1, while 4 patients had no additional disease, 14 had 1, 16 had 2, 6 had 3 and 6 had 4 or more. In Group 2 patients, 7 patients had no additional disease, 27 had 1, 28 had 2, 9 had 3 and 12 had 4. No statistical significance was determined between the groups in respect of the number of additional diseases (Table 3). The additional diseases determined in the patients were hypertension, chronic obstructive pulmonary disease, diabetes mellitus, coronary artery disease, chronic renal failure, congestive heart failure, Alzheimer's disease, hypothyroidism, hyperthyroidism, asthma, cerebrovascular events, and combinations of these.

Table 3: Distribution of the number of comorbid diseases of the patients in both groups

No CD	Group 1 4 (8.8%)	Group 2 7 (8.6%)	p 0.492
1 CD	14 (30.4%)	27 (32.5%)	0.115
2 CD	16 (34.8%)	28 (33.7%)	0.134
3 CD	6 (13%)	9 (10.8%)	0.407
4 + CDs	6 (13%)	12 (14.4%)	0.968

CD: Comorbid disease

DISCUSSION

The most important finding of this study was that after hip fractures of patients older than 85 years, mortality rates are higher in older male patients treated with cemented hemiarthroplasty.

The mortality rates have been reported to be higher in the male patient group and have been determined as 2.44 fold higher than that of females (11). Although the reason for such finding has not yet been determined, Magaziner et al stated that it was due to male patients being exposed to more severe trauma, that they had more concomitant diseases and that they received a lower level of community or social support (12). Additionally, it was reported that the male predisposition to

comorbid factors, particularly cardiovascular and respiratory system diseases and that the physiological activity reserve of males are lower than that of females (13). In a meta-analysis, 64,316 patients in 94 articles were evaluated and mortality was reported to be significantly higher in the presence of advanced age, male gender, high ASA score, and the existence of one or more comorbid diseases (4). However, it should be taken into consideration that many of these studies include patients aged 40 years and over. In the current study, male gender and advanced age were determined to be related to high mortality rates, which were consistent with literature.

It was found that the extremely elderly patients presented with poorer indicators of health status as demonstrated by higher ASA scores (9). In contrast, it was reported that the ASA score had no effect on mortality (14). In the current study, the mortality rates seem to be not affected by ASA scores however it must be considered that the mean ASA scores of both groups were high between 3 and 4. We think that, in the extremes of old age, the sensitivity of ASA scoring may not be powerful enough to distinguish the risk of mortality.

In a study of 2660 elderly patients with hip fracture, the effect of operating time on mortality was evaluated and 30-day mortality was determined as 10.7% for patients for whom the surgery had been delayed for more than 4 days, compared to 7.3% in those delayed 1-4 days. The group delayed >4 days also had significantly increased mortality at 90 days and 1 year (15). In the current study, the mean time to operation of the patients in both groups were 6.7 days and in both periods, the critical time was seen to be >4 days. There are also authors who advocate that the critical period is the first 2 days (16,17). According to the data in literature, that the time to operation was longer in the current study and such subject can be considered as a weak point.

In a study, a comparison was made of the results of cemented and uncemented hemiarthroplasty in patients aged 61-104 years with hip fractures

and the use of cemented prosthesis was not reported to have any effect on mortality (18). Similarly, in a systematic review, it was found that the majority of studies determined no significant difference in long-term mortality rates between cemented and uncemented choices (follow-up of 3 months-4 years) (19). However, Anderson et al, Muirhead-Allwood et al, Lennox and McLauchlan described an increased mortality rate in the cemented group in the early post-operative period. The results of the current study showed an increase in mortality from the use of cemented hemiarthroplasty. Additionally, in the current study we evaluated the patients older than 85 years, which is an important difference from the mentioned studies(20-22).

It has been reported that postoperative mortality rates can be estimated by quantifying the patient's physiological status and comorbid diseases (4). Therefore, several scoring methods have been created taking comorbid factors as the base, which would be of benefit in the prediction of mortality (23,24). Various comorbid factors make a significant contribution to mortality. Meyer et al concluded that as the number of comorbid diseases increases in patients with hip fractures, so there is a significant increase in mortality (25). However, in the current study, in the extremes of old age, mortality rates seem to be not affected by number of comorbid diseases.

We think that the effect of comorbid diseases on mortality should be evaluated separately, rather than number. However, in the current study, unfortunately, there were an insufficient number of patients to be able to evaluate each disease separately and to be able to make a well-qualified statistical evaluation, so this point is the major limitation of this study. The determination of the effect of each comorbid disease on mortality, would provide a great contribution to literature: Precautions could be taken in the follow-up of the related disease and treatment modalities could be developed. Further studies of larger series with control groups are required to be able to make strict conclusions. In addition, as the current study

focused solely on mortality, no evaluation was made related to morbidity.

In conclusion, the mortality rates of older male patients aged over 85 years with a cemented prosthesis applied for a hip fracture were higher. Special attention should be paid to these patients in the treatment and rehabilitation period. We think that as the only modifiable variable, uncemented systems should be selected, if possible, for the prosthesis to be used.

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