

■ Research Article

Uncemented and cemented hemiarthroplasty for femoral neck fracture with end-stage renal failure

Son dönem böbrek yetmezliği olan femur boyun kırıklı hastalarda çimentolu ve çimentosuz parsiyel kalça protezi sonuçları

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Abstract

Aim: The aim of this study is to evaluate the results of hemiarthroplasty performed with cemented and uncemented femoral stem in femoral neck fractures with ESRF.

Material and Methods: Patients aged over 65 years with ESRF who admitted to our clinic for femoral neck fractures between January 2019 and June 2021 and underwent hemiarthroplasty, included in the study. Group 1 included patients with ESRF who underwent hemiarthroplasty with cemented stem due to femoral neck fracture. And group 2 included patients with ESRF who underwent hemiarthroplasty with uncemented stem due to femoral neck fracture. Functional scores of the patients and femoral stem loosening rates were evaluated with Harris Hip Score and radiographs.

Result: 48 patients (21 male, 27 female) were included in the study. Twenty of the patients were treated with posterior approach and 28 were treated with anterolateral approach. The mean age of the patients was 78,6±11,32 years (range: 65-93 years).The mean follow up time was 28,9 months (24-36 months).There was no significant difference between loosening of cemented and uncemented stems (p= 0,087). The mean HHS of the patients was 69.5 for group 1 and 71.8 for group 2 (range 40-85). There was no significant difference between HHS of group 1 and 2 (p>0.05).

Conclusion: Patients with ESRF who underwent hemiarthroplasty due to femoral neck fracture have a higher complication risk. The loosening rates and functional scores of cemented and uncemented hemiarthroplasty are similar.

Keywords: Renal failure, femoral neck fracture, hemiarthroplasty

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Öz

Amaç: Çalışmanın amacı son dönem böbrek yetmezliği (SDBY) olan femur boyun kırıklı hastalarda çimentolu ve çimentosuz parsiyel kalça protezi uygulamalarının sonuçlarını değerlendirmektir.

Gereç ve Yöntemler: Çalışmamıza SDBY olan ve hastanemize Ocak 2019 ve Haziran 2021 tarihleri arasında femur boyun kırığı nedeni ile başvuran 65 yaş üstü hastalar dahil edildi. Grup 1'e SDBY olan ve femur boyun kırığı nedeni çimentolu parsiyel kalça protez yapılan hastalar dahil edilirken, Grup 2'ye SDBY olan ve femur boyun kırığı nedeni ile çimentosuz parsiyel kalça protezi yapılan hastalar dahil edildi. Hastaların fonksiyonel skorları, femoral stem gevşeme oranları, Harris kalça Skorları (HSK) ve radyografileri değerlendirildi.

Bulgular: Çalışmaya 21 erkek, 27 kadın toplam 48 hasta dahil edildi. Hastaların 20'si posterior yaklaşım ile, 28'i ise anterolateral yaklaşım ile tedavi edildi. Hastaların ortalama yaşı $78,6 \pm 11,32$ olarak belirlendi (aralık: 65-93 yaş). Ortalama takip süresi 28,9 aydı (24-36 ay). Çimentolu ve çimentosuz protezlerin gevşeme oranları arasında anlamlı bir fark izlenmedi ($p=0,087$). Grup 1 için ortalama HSK 69,5 iken, grup 2 için 71,8'di. HSK açısından iki grup arasında anlamlı bir fark yoktu.

Sonuç: SDBY olan ve parsiyel kalça protezi yapılan hastaların komplikasyon riskleri yüksektir. Yapılan çimentolu ve çimentosuz parsiyel kalça protezlerinin gevşeme oranları ve fonksiyonel sonuçları benzerdir.

Anahtar Kelimeler: Böbrek yetmezliği, femur boyun kırığı, parsiyel kalça protezi

Introduction

In patients with end-stage renal failure (ESRF), the incidence of femoral neck fracture is approximately 4 times higher than general population (1,2). The treatment of femoral neck fractures complicated with ESRF continues to pose a great challenge for orthopedists.

Although there is a high risk of complications, surgical treatment is recommended for patients with femoral neck fracture with ESRF. (3-5). Because of the high risk of failure in internal fixation, arthroplasty is generally recommended. (6-8). Compared to the general population, mortality rates after femoral neck fractures for patients with ESRF is high, and perioperative complications are frequent. (9-11). However, there is no consensus on the methods those provide the best results of arthroplasty in patients with femoral neck fractures complicated with ESRF.

Uncemented or cemented femoral stems can be use for hemiarthroplasty. There is no consensus for femoral stem selection. The advantages of the cementing are cement interdigitation into bone and instant fixation (12-13). And osteointegration with pressfit implant is more difficult and limited in ESRF patients. Because the normal physiology of the bone is impaired in this patient group (14). However, there are studies reporting good results with the use of cementless stems in hemodialysis patients (15).

The aim of this study is to evaluate the results of hemiarthroplasty performed with cemented and uncemented femoral stem in femoral neck fractures with ESRF.

Material and Methods

Patients aged over 65 years with ESRF who admitted to our clinic for femoral neck fractures between January 2019 and

June 2021 and underwent hemiarthroplasty, included in this retrospective study. Ethical approval was obtained before the study was conducted. (E1-21-2072). All researchers contributed to the study signed the final version of Helsinki's declaration.

Patients with femoral neck fractures, ESRF and minimum two years follow up were included the study. Patients whose data could not be accessed from the hospital record system, open fractures, multiple injuries, periprosthetic infections and pathological fractures were excluded from the study.

Group 1 included patients with ESRF who underwent hemiarthroplasty with cemented stem due to femoral neck fracture. And group 2 included patients with ESRF who underwent hemiarthroplasty with uncemented stem due to femoral neck fracture.

All of the patients received prophylactic antibiotic therapy (cefazolin sodium 1gr) before surgery. On the day before surgery, hemodialysis dependent patients underwent hemodialysis without heparinization. Patients underwent surgery using anterolateral or posterolateral approach. Cemented or uncemented femoral stem, 28 mm inner head and bipolar head were used for all patients. The case's senior surgeon decided which incision and stem to use. The cemented stems were performed with the first generation cementing technique. The suction drain was removed 24 hours after surgery. Sutures were removed on the 14th day after surgery. Low molecular weight heparin was used for 21 days. On the first day after the surgery, patients were mobilized with a walker. All patients were followed up at the 3, 6, 12, 24, 30 and 36 months after the surgery. Radiographs and Harris Hip Scores (HHS) of the patients were evaluated in every controls.

Patients age, gender, surgical approach, cement use, hemodialysis dependence, loosening and mortality were recorded from hospital record system. Aseptic loosening of the stem is defined as progressive radiolucency of more than 2 mm, progressive subsidence or migration of the implant (Figure 1). In addition, for cemented stems, cement mantle fracture indicated loosening.

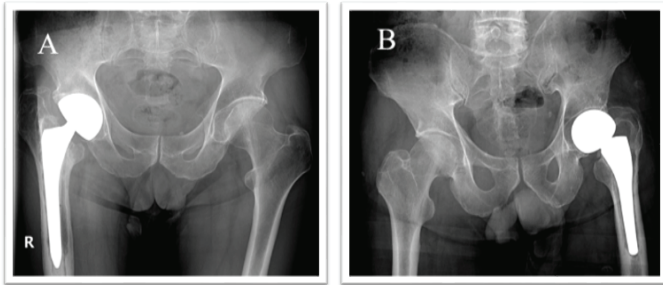


Figure 1. Cemented hip hemiarthroplasty with loosening (A), uncemented hip hemiarthroplasty with loosening (B)

Statistical analysis

For statistical analysis SPSS for Windows (SPSS Inc., Chicago, IL, USA) was used. Mann-Whitney U test was used to determine the relationships between parameters. The results were evaluated within 95% confidence intervals and $P < 0.05$ was considered significant.

Results

Seventy-eight patients with ESRF who underwent hemiarthroplasty due to femoral neck fracture were evaluated. Nineteen patients were excluded from the study because of death, 7 patients because of incomplete medical records and 4 patients because of septic loosening. So, 48 patients (21 male, 27 female) were included in the study. Twenty of the patients were treated with posterior approach and 28 were treated with anterolateral approach. The mean age of the patients was $78,6 \pm 11,32$ years (range: 65-93 years).

In group 1, 23 patients (11 male, 12 female) treated with cemented stem (19 posterior, 4 anterolateral approach). The mean age of group 1 was $80,4 \pm 11,94$ years (range 65-93 years). In group 2, 25 patients (10 male, 15 female) treated with uncemented stem (1 posterior, 24 anterolateral approach). The mean age of group 2 was $76,9 \pm 10,71$ years (range 65-91 years). The mean follow up time was 28,9 months (24-36 months). Stem loosening was detected in 7 patients (4 patients in group 1 and 3 patients in group 2). (Table 1) There was no significant difference between loosening of cemented and uncemented stems ($p = 0,087$). The mean HHS of the patients was 69.5 for group 1 and 71.8 for group 2 (range 40-85). There was no significant difference between HHS of group 1 and 2 ($p > 0,05$).

Table 1. Stem loosening rates of the patients

Fixation type	Loosening	No loosening	Total
Cemented	4 (%17,39)	19 (%82,61)	23
Uncemented	3 (%12)	22 (%88)	25
Total	7 (%15,55)	41 (%74,45)	48

Discussion

In the current study, ESRF with femoral neck fractures, which is one of the challenging cases of orthopedics, were evaluated. No significant difference was observed in loosening rates and HHS in cemented and uncemented hemiarthroplasty.

Kaneko et al conducted a study to long bone fracture incidence and risk factors in patients with hemodialysis. They reported that the incidence of long bone fractures was high and the most common fracture was femoral neck fracture (59.8%). And revealed that there was a greater fracture risk with cardiovascular disease, female gender, older age, more years receiving dialysis, and diabetes (2). In this study, most of the patients were female and average age of the patients was $78,6 \pm 11,32$ years.

In the light of current literature it could be said that, operative treatment is superior to conservative management for femoral neck fractures of patients with ESRF (3-5). However, higher complication and mortality rates were reported in surgical treatment of these patient group (3, 8, 16, 17). For our study, 19 patients were excluded from the study due to death and 4 patients due to septic loosening. Dislocation was observed in two of the patients who excluded from the study due to death and in one of the infected patients. In addition, superficial skin infection, arrhythmia and pulmonary thromboembolism were also observed in some patients. Stem loosening was detected for 7 of 48 patients in three years. Patients with ESRF who underwent arthroplasty due to femoral neck fracture have a higher risk of revision surgery.

The risk of revision surgery is high in the treatment of patients with ESRF and femoral neck fracture with internal fixation. (6, 7). Several authors have recommended arthroplasty because of lower complication rates compared to the treatment with internal fixation (8, 18). In the current study, all patients were treated with arthroplasty.

Another controversial issue in the treatment of ESRF patient group is whether cemented or uncemented arthroplasty is performed. Some authors recommend cemented, others uncemented arthroplasty (12, 14, 20). However, some authors concluded that for femoral neck fractures with ESRF, there is no difference in the loosening rates between uncemented and cemented hemiarthroplasty (16, 19). In the current study, there was no significant difference between loosening of cemented and uncemented stems.

There are some limitations for the current study. Firstly, our study has a retrospective design. Secondly, we have a small patient group. Thirdly, the surgeries were performed with different approaches (posterior and anterolateral). In the future, there is a need for a prospective, multicenter, large-scale study.

Conclusion

Patients with ESRF who underwent hemiarthroplasty due to femoral neck fracture have a higher complication risk. The loosening rates and functional scores of cemented and uncemented hemiarthroplasty are similar.

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