

# Cementless rectangular stems yield satisfactory results in osteoporotic bones

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## ABSTRACT

**BACKGROUND:** The present study aims to investigate the effects of osteoporosis on prosthesis survival by comparing the femoral stem survival rates of patients with poor and relatively good bone quality.

**METHODS:** We retrospectively investigated 61 patients with collum femoris fractures who were treated with cementless rectangular stems between 2011 and 2015 in the Orthopaedics and Traumatology Clinic of Taksim Training and Research Hospital. The preoperative pelvic anterior-posterior radiographs of the patients were evaluated. The patients were evaluated according to the Dorr classification, and no case with a type A femur was found. The patients were divided into two groups as advanced osteoporotic type C and moderate osteoporotic type B. Thirty patients were type B according to the Dorr classification and 31 were osteoporotic type C.

**RESULTS:** The femoral component survival was evaluated using the Engh and ARA criteria. The relationship of the ARA score with type B and type C groups was evaluated. The median ARA score was five (min 3-max 6) for both types. These two groups were also statistically compared concerning the ARA scores using the Mann-Whitney U test, which revealed no statistically significant difference ( $p=0.24 >0.05$ ). The Engh values, another criterion for the survival of femoral components, were also compared. The median Engh values were 16.5 (min 9-max 24) for the Dorr type B group and 14 (min 9-max 24) for the type C group. According to the Mann-Whitney U test, there was no significant difference between the Engh values of the two groups ( $p=0.061 >0.05$ ). Lastly, no statistically significant difference was found in the ARA or Engh loosening scores between the type C advanced osteoporotic group and the type B moderate osteoporotic group.

**CONCLUSION:** Our study supports the conclusion that cementless hip arthroplasty can be applied even in advanced elderly and osteoporotic patients without additional intraoperative or postoperative risks.

**Keywords:** Cementless rectangular stems; femoral neck fracture; hemiarthroplasty.

## INTRODUCTION

The incidence of femoral neck fractures has increased with the increasing elderly population in society. Even minor traumas may lead to fractures in the elderly due to osteoporosis. Arthroplasty is the preferred surgical method for these fractures to allow early mobilization and avoid non-union.<sup>[1-2]</sup>

There is no consensus on the optimal method for the fixation of the femoral component in hip hemiarthroplasty. Although cemented hemiarthroplasty is considered to allow early mobilisation due to better primary stability in osteoporotic bones,<sup>[3]</sup> the use of cement has been reported to cause intraoperative side effects, such as cardiac arrest and sudden cardiac death. In addition, the reported rates of fat embolism

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are higher in cemented arthroplasty.<sup>[4]</sup> It has been shown that low bone quality does not prevent osteointegration in cementless prosthesis.<sup>[5]</sup>

In this study, we retrospectively evaluated the clinical and radiological results of patients who had femoral neck fractures and were treated with hemiarthroplasty using cementless press-fit stems and unipolar head prostheses. The patients were divided into two groups according to the Dorr classification criteria. We aimed to investigate the effects of osteoporosis on the survival of cementless rectangular femoral stems by comparing patients with Dorr type C and those with Dorr type B.

## MATERIALS AND METHODS

In this study, we retrospectively evaluated 159 patients aged  $\geq 60$  years that were treated for femoral neck fractures between January 2011 and January 2015. The operations were performed in a single centre. The exclusion criteria were as follows: (a) pathological fractures (n=4), (b) total hip arthroplasty (n=24), (c) internal fixation (n=30), (d) mortality (n=32), and (e) subject unavailability (n=8). The remaining 61 patients underwent hemiarthroplasty with cementless rectangular femoral stems and unipolar head prostheses.

The Harris and Oxford hip scores were used for the clinical evaluation.<sup>[6,7]</sup> Pelvis AP and bilateral hip AP radiographs were taken for the radiographic evaluation.

Kwok's criteria were used to evaluate the technique of prosthesis application, including the size of the prosthesis head, varus/valgus alignment of the prosthesis, calcar positioning, and prosthetic height.<sup>[8]</sup> Radiographic measurements were performed using Orthosize<sup>®</sup>, a templating program developed by Biomet<sup>®</sup> (Warsaw, Indiana). The program was calibrated according to the head size used and the early leg length difference, lateral and vertical offsets, contralateral head diameter, and varus-valgus angles between the stem femoral shaft, which were measured on early postoperative radiographs. These values were scored according to Kwok's criteria.

The Dorr classification was used to evaluate the cortical bone quality.<sup>[9]</sup> In addition, the Engh score<sup>[10]</sup> and Agora Radiographic Assessment (ARA) criteria were used to evaluate the survival of the femoral component.<sup>[11]</sup> The radiological assessment was performed by an independent surgeon.

The preoperative cardiac status of the patients was assessed by the American College of Cardiology and the American Heart Association (ACC/AHA) guidelines.<sup>[12]</sup> Twenty-five patients were considered high risk (41%) and 36 intermediate risk (49%).

The femoral stems used in all cases had a laterally straight design and proximal press-fit design and comprised titanium

grit-blasted components (Biomet, Warsaw, IN). We modified the Engh evaluation criteria since there is currently no other criterion to evaluate the survival of press-fit stems. The highest scores were given in the presence of "a smooth interface" and "particle shedding."

Normality was determined using the Shapiro-Wilk test, Q-Q plot, histogram, and box-plot graphs. The data were expressed as median (minimum-maximum), frequency, and percentage values. The correlations between the variables were analysed by the Spearman correlation test. The Dorr classification system was used to divide the patients into two groups: type B and type C. The Engh and ARA loosening scores of the two groups were compared using the Mann-Whitney U test. The association between the Singh index and the Phillips acetabular score was evaluated by the Kruskal-Wallis one-way ANOVA. The significance level was set at  $p < 0.05$  in two-tailed tests. The data were analysed using NCSS version 10.

## RESULTS

Among the patients included in this study, 42 were female, and 19 were male. The mean age was 87.55 (60–113) years. In this study, the mean operating room time was 130 minutes, and the mean operation time was 64 minutes. The mean pre- and post-operative haemoglobin values were 11.8 and 10 g/dL, respectively. An average of 0.7 units of erythrocyte suspension was perioperatively transfused per patient. The mean follow-up period was 56 (38–73) months. Five patients developed postoperative dislocation within two months after the operation. The patients with dislocation underwent closed reduction under general anaesthesia. Three of these patients did not have recurrent dislocations. The tomographic evaluation of the remaining two patients with recurrent dislocations revealed the fracture of the posterior wall of the acetabulum. These patients underwent osteosynthesis with posterior plate-screws. No recurrent dislocation occurred after this operation.

In the sample, two patients developed stable fissures at the level of the trochanter minor stem insertion and were treated with cable osteosynthesis. Postoperative weight bearing did not reveal any instability in the stem. The postoperative radiographs of one patient revealed the avulsion of the greater trochanter of the femur, which did not restrict abduction and was observed to have healed without complications at the sixth-month follow-up.

One patient was admitted to the clinic with signs of infection in the early postoperative period after discharge from the hospital. The patient had a high sedimentation rate and a high CRP level, and there were Gram-positive cocci in the joint aspiration fluid. Stage I revision operation was performed due to early-stage diagnosis.

The mean Harris hip score of the patients was 68. According to the Harris hip scores, two cases (3%) were evaluated to

poor, 19 (32%) moderate, 12 (19%) good, and 28 (46%) very good or excellent outcomes. The mean Oxford score of the patients was 19.5i. While 30 patients scored 20 or lower, 31 patients had scores between 21 and 30.

According to the evaluation based on Kwok's criteria, the application of the prosthesis was considered to be excellent in 49% (30/61) of the patients, good in 27% (17/61), moderate in 21% (13/61), and poor in 2% (1/61).

The Harris, Oxford and Kwok values of the patients were statistically compared using the Spearman rho test. The correlations between the Harris and Oxford values ( $r_s=0.76$ ,  $p<0.001$ ), Harris and Kwok values ( $r_s=0.33$ ,  $p<0.001$ ), and Oxford and Kwok values ( $r_s=0.29$   $p<0.001$ ) were significant. The Harris and Oxford scores were highly correlated, while the correlations between the Harris and Kwok scores and the Oxford and Kwok scores were at a lower level.

Of the 61 patients included in this study, none required revision surgery for aseptic loosening during a mean follow-up period of 56 months (range: 38–73 months).

The Dorr classification was used to evaluate the cortical bone quality. There were no patients with type A according

to the Dorr classification. Thus, the patients were evaluated in two groups as advanced osteoporotic type C ( $n=31$ ) and moderately osteoporotic type B ( $n=30$ ) (Figs. 1 and 2).

The survival of the femoral component was evaluated using the Engh and ARA criteria in patients who were classified according to the Dorr classification in terms of cortical bone quality. The ARA scores in type B and type C groups were compared. The median ARA was five (min 3-max 6) in both groups. When the two groups were statistically compared using the Mann-Whitney U test concerning the ARA scores, no statistically significant difference was observed ( $p=0.24$ ).

The Engh values, another criterion for the survival of the femoral component, were also compared between the Dorr type B and C groups, and the median Engh values were found to be 16.5 (min 9-max 24) and 14 (min 9-max 24), respectively. The two groups were statistically compared using the Mann-Whitney U test, and no significant difference was found ( $p=0.061$ ).

## DISCUSSION

Hemiarthroplasty is widely used as the primary treatment method for femoral neck fractures. The initial stability of the

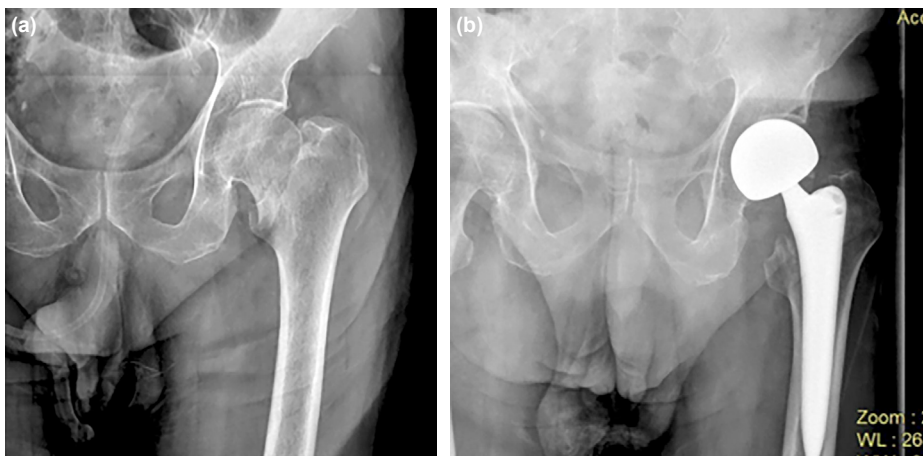


Figure 1. (a, b) A patient 72 years-old with Dorr C type femur.

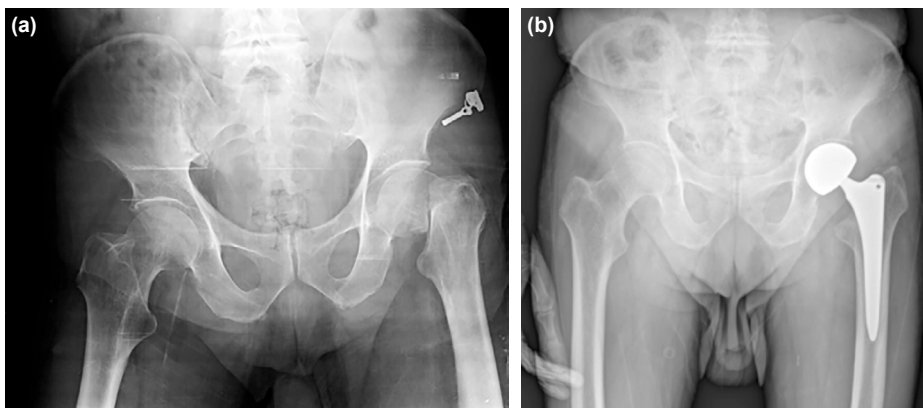


Figure 2. (a, b) A patient 68 years-old with Dorr B type femur.

femoral stem is an important factor for the long-term survival of implants. Cemented femoral stems provide stability with the use of polymethylmethacrylate (PMMA), which acts as the grout between the spongy bone and the prosthesis. Uncemented stems achieve press-fit fixation with the bone growing into the microdivots in the grit-blasted surface. However, the superiority of any type of fixation is still debatable in hemiarthroplasty. The generally accepted opinion is the use of cemented femoral stems in osteoporotic bones. In the literature, the findings reported by some studies reveal that cemented hemiarthroplasty is generally preferred to cementless hemiarthroplasty, while others suggest performing cementless hemiarthroplasty in elderly patients.<sup>[13-15]</sup>

Cementless hip arthroplasty has become the primary choice in the treatment of younger patients due to its more physiological and stable nature compared to cemented systems, easier and lower-risk application, and high rates of long-term survival. The use of cementless stems in elderly osteoporotic patients remains controversial; however, studies have confirmed its feasibility in patients with Dorr type C bones.<sup>[15-18]</sup> One study followed-up 114 patients aged  $\geq 80$  years after cementless total hip arthroplasty with the use of proximally coated stems and found that after two years, all patients had stable osseointegration without any requirement of revision surgery.<sup>[16]</sup> Another study reported that among the 72 hip arthroplasties (all with conical cementless stem) performed in 62 patients aged  $\geq 65$  years with an average follow-up duration of 13.2 years, there was no case requiring loosening-related revision, and only four patients developed mild anterior thigh pain. The Dorr femoral classification of these patients was as follows: type A, 20; type B, 19; and type C, 33.<sup>[17]</sup> In the current study, we divided the patients with cementless femoral stems and unipolar head prostheses into two groups according to the Dorr classification, and we compared the survival of their femoral stems. Of the patients in our sample, 30 had Dorr type B and 31 had Dorr type C bones. There were no Dorr type A cases due to the sample consisting of elderly patients. We evaluated the survival of the femoral components according to the ARA and Engh criteria and found no statistically significant difference between the two groups.

One of the most important issues to consider in treating elderly patients with femoral neck fractures is the possible requirement of revision surgery for any reason. The particulate debris from the wear of arthroplasty components and cement can create a foreign body response and lead to osteolysis. If the patient is already osteoporotic, osteolysis can reduce the femur to an eggshell-like thickness, making it even more susceptible to fractures. As mentioned earlier, the cementless surgical technique is recommended for the revisions of cemented prostheses.<sup>[19-21]</sup> In the case of femoral stem loosening, a periprosthetic fracture, or acetabular protrusion, the revision hip replacement will be more difficult if the initial treatment is cemented.<sup>[19,22,23]</sup> Clearing the cement from the femur and replacing it with a cementless prosthesis

will lead to extremely high blood loss and is associated with a high risk of perioperative complications, especially among elderly patients with various comorbidities.<sup>[19,22]</sup>

In the literature, researchers also criticize the use of cementless prostheses due to the possibility of several perioperative complications. The most important obstacle seems to be the insertion of press-fit femoral stems, especially among elderly patients with osteoporosis. Although diligence and surgeon experience reduce the technical risk, it does not eliminate the perioperative complications.<sup>[15,23]</sup> A study compared 33,205 patients with cemented or cementless femoral stems using the data obtained from the Norwegian Hip Fracture Register and the Swedish Hip Arthroplasty Register and found that the risk of intraoperative fractures and subsequent reoperation was higher in the cementless group. Although the surgical learning curve in the cementless press-fit stem application is longer than in the cemented groups, the long-term loosening-related revision rate is lower in careful and accurate applications.<sup>[24]</sup> In the current study, only two patients had fractures at the level of the trochanter minor stem intraoperatively and were treated with cable osteosynthesis. No complications occurred during the follow-up.

A 2006 study of 60 patients with severe osteoporosis aged  $\geq 80$  years compared rectangular-stem cementless implants with cemented implants and found that the latter had superior results regarding early complications and clinical scores.<sup>[16]</sup> In our study, 40 of 61 patients had good or excellent Harris hip scores.

Our findings support recent findings suggesting that cementless hip arthroplasty can provide satisfactory radiologic and clinical results without any additional intra- or postoperative risk, even in the elderly population and among osteoporotic cases.

The limitations of this study are as follows: (a) small sample size, (b) the relatively short follow-up period, (c) variability in age, gender, body mass index, and physical activity of the sample and d) lack of a control group that underwent cemented hemiarthroplasties.

## Conclusion

Cementless hemiarthroplasty applications can reduce the duration of surgery and the trauma caused by the operation while avoiding many side effects that cement may cause that could increase morbidity and may even lead to mortality. We recommend using stems with a rectangular cross-section in cementless applications with early intramedullary press-fit anchorage and good rotational stability, which will enable the patient to put weight on the leg soon after surgery and provide biological fixation later on.

Stems with a rectangular cross-section are a good treatment option, even in Dorr type C bones with advanced osteopo-



rosis, given that they have more rotational stability and less likely to loosen or require revision surgery.

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**Conflict of Interest:** None declared.

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## REFERENCES

1. Thorgren KG, Hommel A, Norrman PO, Thorgren J, Wingstrand H. Epidemiology of femoral neck fractures. *Injury* 2002;33:C1–C7. [\[CrossRef\]](#)
2. Öztürk İ. Kalça kırıklarında prognozu etkileyen risk faktörleri. *Acta Orthop Traumatol Turc* 1997;31:374–7.
3. Lennox IA, McLauchlan J. Comparing the mortality and morbidity of cemented and uncemented hemiarthroplasties. *Injury* 1993;24:185–6.
4. Dorr LD, Glousman R, Hoy AL, Vanis R, Chandler R. Treatment of femoral neck fractures with total hip replacement versus cemented and noncemented hemiarthroplasty. *J Arthroplasty* 1986;1:21–8. [\[CrossRef\]](#)
5. Bezwada HP, Shah AR, Harding SH, Baker J, Johanson NA, Mont MA. Cementless bipolar hemiarthroplasty for displaced femoral neck fractures in the elderly. *J Arthroplasty* 2004;19:73–7. [\[CrossRef\]](#)
6. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end-result study using a new method of result evaluation. *J Bone Joint Surg Am* 1969;51:737–55.
7. Dawson J, Fitzpatrick R, Carr A, Murray D. Questionnaire on the perceptions of patients about total hip replacement. *J Bone Joint Surg Br* 1996;78:185–90. [\[CrossRef\]](#)
8. Kwok DC, Cruess RL. A retrospective study of Moore and Thompson hemiarthroplasty. A review of 599 surgical cases and an analysis of the technical complications. *Clin Orthop Relat Res* 1982;169:179–85. [\[CrossRef\]](#)
9. Dorr LD, Wolf AW, Chandler R, Conaty JP. Classification and treatment of dislocations of total hip arthroplasty. *Clin Orthop Relat Res* 1983;173:151–8. [\[CrossRef\]](#)
10. Engh CA, Massin P, Suthers KE. Roentgenographic assessment of the biologic fixation of porous-surfaced femoral components. *Clin Orthop Relat Res* 1990;257:107–28. [\[CrossRef\]](#)
11. Epinette JA. Radiographic assessment of cementless hip prostheses: the “ARA” scoring system. *European J Ortho Surg & Trauma* 1999;9:91–4.
12. Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof E, Fleischmann KE, et al; American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery); American Society of Echocardiography; American Society of Nuclear Cardiology; Heart Rhythm Society; Society of Cardiovascular Anesthesiologists; Society for Cardiovascular Angiography and Interventions; Society for Vascular Medicine and Biology; Society for Vascular Surgery. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery): developed in collaboration with the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. *Circulation* 2007;116:e418–99. Erratum in: *Circulation* 2008;117:e154.
13. Fokter SK, Fokter N. Hip Fracture in the Elderly: Partial or Total Arthroplasty?. In: *Recent Advances in Hip and Knee Arthroplasty*. Fokter SK, editor. Shanghai, China: InTech; 2012.p.43–54. [\[CrossRef\]](#)
14. Khan RJ, MacDowell A, Crossman P, Keene GS. Cemented or uncemented hemiarthroplasty for displaced intracapsular fractures of the hip—a systematic review. *Injury* 2002;33:13–7. [\[CrossRef\]](#)
15. Taylor F, Wright M, Zhu M. Hemiarthroplasty of the hip with and without cement: a randomized clinical trial. *J Bone Joint Surg Am* 2012;94:577–83. [\[CrossRef\]](#)
16. Chang JD, Yoo JH, Chang KY, Park BM. Cementless Zweymüller Stem for the Treatment of the Hip Fracture in Patients Older than 80 with Severe Osteoporosis: Case Control Study with Cemented Stem. *J Korean Hip Society* 2006;18:447–53. [\[CrossRef\]](#)
17. Keisu K, Orozco F, Sharkey P, Hozack W, Rothman R. Primary cementless total hip arthroplasty in octogenarians: two to eleven-year follow-up. *JBJS* 2001;83:359–363. [\[CrossRef\]](#)
18. Reitman RD, Emerson R, Higgins L, Head W. Thirteen year results of total hip arthroplasty using a tapered titanium femoral component inserted without cement in patients with type C bone. *J Arthroplasty* 2003;18:116–21. [\[CrossRef\]](#)
19. Zweymüller KA, Lintner FK, Semlitsch MF. Biologic fixation of a press-fit titanium hip joint endoprosthesis. *Clin Orthop Relat Res* 1988;235:195–206. [\[CrossRef\]](#)
20. Zweymüller KA. Good results with an uncoated grit-blasted tapered straight stem at ten years. *Interactive Surg* 2007;2:197–205. [\[CrossRef\]](#)
21. Moreland JR, Bernstein ML. Femoral revision hip arthroplasty with uncemented, porous-coated stems. *Clin Orthop Relat Res* 1995;319:141–50. [\[CrossRef\]](#)
22. Engh CA, Glassman AH, Griffin WL, Mayer JG. Results of cementless revision for failed cemented total hip arthroplasty. *Clin Orthop Relat Res* 1988;235:91–110. [\[CrossRef\]](#)
23. Ng ZD, Krishna L. Cemented versus cementless hemiarthroplasty for femoral neck fractures in the elderly. *J Orthop Surg (Hong Kong)* 2014;22:186–9. [\[CrossRef\]](#)
24. Gjertsen JE, Fenstad AM, Leonardsson O, Engesaeter LB, Kärrholm J, Furnes O, et al. Hemiarthroplasties after hip fractures in Norway and Sweden: a collaboration between the Norwegian and Swedish national registries. *Hip Int* 2014;24:223–30. [\[CrossRef\]](#)

## ORJİNAL ÇALIŞMA - ÖZET

## Sementsiz karekesit stemler osteoporotik zeminde de oldukça iyi sonuçlar verir

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**AMAÇ:** Kemik kalitesi ileri derecede bozuk olan ve nispeten iyi olan hastaların femoral stem sağkalım oranlarını karşılaştırarak osteoporozun protez sağkalımı üzerindeki etkisini araştırmak.

**GEREÇ VE YÖNTEM:** 2011–2015 yılları arasında ortopedi ve travmatoloji kliniğinde femur boyun kırığı tanısıyla sementsiz karekesit femoral stem ve unipolar baş ile tedavi edilen, son kontrollerine gelen ve en az üç yıllık takip sonuçları elimizde olan 61 hasta belirlendi. Radyografik değerlendirme için hastaların ameliyat öncesi grafilerinden pelvis AP grafilerine bakıldı. Kortikal kemik kalitesini değerlendirmek amacıyla Dorr sınıflaması kullanıldı. Dorr sınıflamasına göre tip A olan hastamız yoktu. Çalışmaya dahil edilen hasta grubu ileri osteoporotik tip C ve ilımlı osteoporotik tip B olmak üzere iki gruba ayrıldı. Hastalarımızın 30 tanesi Dorr sınıflamasına göre tip B, 31 tanesi tip C idi.

**BULGULAR:** Dorr sınıflamasına göre kortikal kemik kaliteleri açısından sınıflandırdığımız hastalarda femoral komponentin sağkalımları Engh ve ARA kriterleri kullanılarak değerlendirildi. Dorr sınıflamasına göre Tip B ve Tip C gruplarının ARA skoru ile ilişkisi karşılaştırıldı. Dorr tip B grubunda ARA; medyan 5 (min 3–maks 6), tip C grubunda medyan 5 (min 3–maks 6) olarak bulundu. Bu iki grup istatistiksel olarak Mann-Whitney U testi ile kıyaslandı. Her iki grup arasında ARA skorları açısından istatistiksel olarak anlamlı fark saptanmadı ( $p=0.24 >0.05$ ). Yine benzer şekilde her iki grup arasında femoral komponent sağkalım kriteri olan Engh değerleri karşılaştırıldı. Dorr tip B olan grupta Engh değerleri; medyan 16.5 (min 9–maks 24), Dorr tip C grubunda; medyan 14 (min 9–maks 24) olarak bulundu. Bu iki grup istatistiksel olarak Mann-Whitney U-testi kullanılarak karşılaştırıldı. Her iki grubun Engh değerleri arasında anlamlı farklılık saptanmadı ( $p=0.061 >0.05$ ). Bizim verilerimizde ileri osteoporotik olarak kabul ettiğimiz tip C grubu ile ilımlı osteoporotik kabul ettiğimiz tip B grubu arasında hem ARA skorları, hem de Engh gevşeme skorları açısından femoral komponentlerdeki gevşeme değerlendirildiğinde istatistiksel olarak anlamlı fark saptanmadı.

**TARTIŞMA:** Çalışmamız sementsiz kalça artroplastisinin ileri yaşlı, osteoporotik hastalarda dahi, ameliyatta ve ameliyat sonrası ilave riskler getirmeden, hem de radyolojik ve klinik sonuçları bakımından da yüzdürücü bir şekilde uygulanabilirliği sonucunu desteklemektedir.

**Anahtar sözcükler:** Femur boyun kırığı; hemiarthroplasti; karekesit sementsiz stem.

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