RESEARCH ARTICLE

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The Short-Term Results of Unicondylar Knee Prosthesis in Patients with Body Mass Index Over 35

ABSTRACT

Objective: To evaluate the short-term results and complications of unicondylar knee prosthesis in obese patients with medial compartment arthrosis.

Methods: Unicondylar knee prosthesis was applied to 41 patients (36 females, 5 males; average age 56 years) with BMI >35 for the treatment of medial compartment arthrosis. Cementless Oxford phase 3 prosthesis was applied to all patients. Joint range of motion before and after surgery, VAS, OKS, and the KSS part 1 and part 2 scores of the patients were examined.

Results: Flexion was measured as mean 115° (90°- 135°) preoperatively, and 120° (90° - 130°) postoperatively, extension as mean 0° (-10°- 0°) preoperatively and 0° (-15° - 0°) postoperatively, with no significant difference determined. The KSS Part 1 score was mean 58 (range, 36-82) preoperatively, and 85 (range, 57 - 96) postoperatively (p <0.001). The KSS part 2 score was 50 (range, 35- 80) preoperatively and 90 (range, 51 -100) postoperatively (p <0.001). The Oxford score was mean 16 (range, 9 - 30) preoperatively, and 38 (range, 20 - 44) postoperatively (p <0.001). The differences between these scores were determined to be statistically significant. Complications developed in a total of 3 (%7,3) patients as periprosthetic joint infection in 1 patient (2.4%) and insert dislocation in 2 patients (4.9%).

Conclusions: The study findings demonstrated that the application of unicondylar knee prosthesis is effective and successful in obese patients treated for medial gonarthrosis. There is a need for further long-term studies to confirm these results.

Keywords: Unicondylar Knee Prosthesis, Medial Gonarthrosis, Obesity

Beden Kitle İndeksi 35 Üstü Olan Hastalarda Unikondiler Diz Protezi Kısa Dönem Sonuçlarımız

ÖZET

Amaç: Bu çalışmada medial kompartman artrozlu obez hastalarda unikondiler diz protezinin kısa dönem sonuçlarınının ve komplikasyonlarının değerlendirilmesi amaçlandı.

Gereç ve Yöntem: Medial kompartman artrozu tanısıyla BKİ >35 olan 41 hastaya (36 kadın 5 erkek;ort.yaş 56) unikondiler diz protezi uygulandı.Tüm hastalara Oxford faz 3 çimentosuz protez kullanıldı.Hastalar ameliyat öncesi ve sonrası eklem hareket açıklığı, VAS, OKS, KSS part 1 ve KSS part 2 skorlamasına göre değerlendirildi.

Bulgular: Hastaların preop fleksiyonları ortalama 115 (90; 135) derece postop fleksiyonları ortalama 120 (90; 130) derece, preop ekstansiyonları ortalama -5 (-10; 0) derece postop ekstansiyonları ortalama -5 (-15; 0) derece olup anlamlı fark saptanmamıştır.Hastaların preop KSS Part 1 58 (36; 82) postop 85 (57; 96)(p <0.001), preop KSS Part 2 50 (35; 80) postop 90 (51; 100) (p <0.001), preop Oxford skoru 16 (9; 30) postop 38 (20; 44) (p <0.001) olup istatistiksel olarak anlamlı bulunmuştur.1 hastada (%2.4) periprostatik eklem enfeksiyonu ,2 hastada (%4.9) insert çıkığı olmak üzere toplamda 3 hastada(%7,3) komplikasyon saptandı.

Sonuç: Bulgularımız,obez hastalarda unikondiler diz protezi uygulamasanın medial gonartroz tedavisinde kısa dönemde etkili ve başarılı olduğunu göstermektedir.Uzun dönem sonuçlar için daha uzun takip süreli çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Unikondiler Diz Protezi, Medial Gonartroz, Obezite

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INTRODUCTION

Knee osteoarthritis is one of the most common joint problems (1). Prolonged life expectancy, an increase in obesity rates and more frequent sedentary lifestyles have caused an increase in knee osteoarthritis (2). Generally, knee osteoarthritis starts in the medial compartment, and unicondylar knee prosthesis (UKP) is an effective treatment method for unicompartmental arthrosis (3, 4).

Patient selection plays an important role in the success of UKP. Despite the view in literature that obesity decreases functional results and implant survival in UKP (5.6), recent studies have shown successful results for obese patients (7, 8). The effect of body mass index (BMI) on functional results and complications after UKP remains controversial.

The aim of the our study was to evaluate the short-term results of patients with BMI >35 who were applied with UKP for a diagnosis of medial compartment arthrosis.

MATERIAL AND METHODS

Approval for the study was granted by the local Ethics Committee (Ankara City Hospital Ethics Committee,ethics committee number-72300690-799) and informed consent was obtained from all patients. A retrospective examination was made of the prospectively collected data of 153 patients applied with UKP between October 2015 and January 2019.

The patients included in the study were with medial compartment arthrosis; <10° varus deformity, < 15° flexion contracture, intact anterior cruciate ligament, and deformity which could be corrected as determined with stress tests. Patients were excluded from the study if they had a history of surgery on the ipsilateral knee, if arthrosis in the affected knee had developed asssociated with post-traumatic deformity or septic sequelae, if they had an inflammatory disease, or could not be contacted during the follow-up period. A total of 41 patients who met these criteria and who had a body mass index above 35 who participated in a final follow-up examination for clinical and radiological evaluation were included in the study.

Preoperatively, all patients were evaluated with orthoroentgenogram, standing anterior-posterior and lateral radiographs and to determine that any varus deformity could be corrected and that there was sufficient lateral cartilage thickness, anterio-posterior radiographs were taken. Postoperatively, the patients were evaluated radiologically with orthoroentgenogram and standing anterior-posterior and lateral radiographs. At the final follow-up examination, patients were evaluated functionally with joint range of motion (ROM), visual analog scale (VAS), the Oxford Knee Score (OKS) and the Knee Society Score (KSS) part 1 and part 2. The VAS is the most widely used tool for estimating both severities of pain and to judge the extent of pain relief (7). The VAS pain scale is an 11-point scale ranging from 0 to 10 with the “worst possible pain” being labeled with a 10 and a “sad face” and “no pain” labeled as a 0 and a “happy face.” The OKS is a 12-item questionnaire specifically designed and developed to assess function and pain after knee arthroplasty (9). The KSS consists of two parts: a knee score, which rates the knee in terms of pain, range of movement, and stability, and a function score, which rates the ability of the patient to walk, the use of ambulatory aids and the ability to climb stairs (10). The KSS, the subjective component of the Knee Society Score, is common in usage and has been validated in numerous studies as a reliable way to evaluate post-operative outcomes after knee arthroplasty.

Surgical Technique: All the patients were administered 2 gr cefazolin prophylaxis 30 mins before the operation. The knee to be operated on was prepared with a knee holder on a standard table so that the knee was in at least 120° flexion. A minimally invasive technique under tourniquet was applied to all patients. A longitudinal incision of 8-10 cm was made, starting from 2 cm above the superior edge of the medial patella and extending to the medial tibial tubercle. The joint was entered with a medial parapatellar arthrotomy, then when it was checked that the anterior cruciate ligament was intact and functional, it was decided to continue with the medial UKP operation. Osteophytes were removed from the intercondylar notch and medial, then the tibial and femoral cuts were made.

After equalisation of the flexion and extension gaps, the components were placed cementless. A mobile polyethylene insert of appropriate thickness was placed, the layers were closed in sequence and the operation was terminated. An Oxford Phase 3 type medial unicondylar prosthesis with a mobile insert was used in all patients (Oxford Knee, Biomet, Swindon, UK). On postoperative day 1, active knee movements were applied and the patients were mobilised with support.

Statistical Analysis: Data obtained in the study were analysed statistically using Statistical Package for the Social Sciences (SPSS) Statistics for Windows, vn 22.0 (IBM, Armonk, NY, USA) and MS-Excel 2016 software.

Conformity of continuous variables to normal distribution was assessed with the Shapiro Wilk test and graphic methods. Data that did not meet parametric assumptions were stated as median (minimum-maximum) values. In the comparisons of two dependent variables, as the distribution of differences was examined and parametric assumptions were not met, the Wilcoxon test was applied. A value of $p<0.05$ was accepted as statistically significant.

RESULTS

The median age of the patients was 56 years (47-75) and median BMI was calculated as 38.2 (35-45).

The mean follow-up period was 23 months (12-38). The demographic data of the patients are shown in Table 1.

Table 1. Demographic Data of the Patients

	Median (minimum; maximum)
Age (years)	56 (47;55)
Follow-up period (months)	23 (12;38)
BMI	38.2(35;45)
Affected side	
Right	20 (58.8%)
Left	21 (51.2%)
Gender	
Female	36 (87.8%)
Male	5 (12.2%)
COMPLICATIONS	
None	38 (92.7%)
Infection	1 (2.4%)
Insert displacement	2 (4.9%)

Shapiro Wilk test results; BMI: body mass index

Flexion was measured as mean 115° (90°-135°) preoperatively, and 120° (90°-130°) postoperatively (p=0.176), extension as mean -5° (-10°-0°) preoperatively and -5° (-15°-0°) postoperatively(p=0.886), with no significant difference determined (Table 2).

Table 2. Comparison of preoperative and postoperative evaluation criteria

	Preoperative	**Postoperative**	**Test**	**Statistic**
	Median (min; max)	**Median (min; max)**	**Z**	**p**
Flexion (degrees)	115 (90; 135)	120 (90; 130)	1.354	0.176
Extension (degrees)	-5 (-10; 0)	-5 (-15; 0)	0.144	0.886
KSS Part 1	58 (36; 82)	85 (57; 96)	4.976	**<0.001**
KSS Part 2	50 (35; 80)	90 (51; 100)	5.578	**<0.001**
Oxford Knee Score	16 (9; 30)	38 (20; 44)	5.580	**<0.001**
VAS Score	7 (4; 9)	2 (0; 4)	5.552	**<0.001**

Z= Wilcoxon test results KSS: knee society score,VAS: visual analogue scale

The VAS scores of the patients decreased by mean 5 points postoperatively and the difference from the preoperative values was determined to be statistically significant (p<0.001) (Table 2). The KSS Part 1 score was mean 58 (36-82) preoperatively, and 85 (57 - 96) postoperatively **(p<0.001)**. The KSS part 2 score was 50 (35- 80) preoperatively, and 90 (51 -100) postoperatively **(p <0.001).**

The Oxford score was mean 16 (9 - 30) preoperatively, and 38 (20 - 44) postoperatively **(p <0.001)**. The differences between these scores were determined to be statistically significant (Table 2). Complications developed in a total of 3 patients as periprosthetic joint infection in 1 patient (2.4%), and insert dislocation in 2 patients (4.9%). In 1 of these cases, a thicker insert was applied, and in the other, semi-restricted revision knee prosthesis was applied because of the development of internal lateral ligament failure.

DISCUSSION

The results of this study showed that a significant improvement was obtained postoperatively in the knee scores of obese patients applied with the Oxford phase 3 UKP. Postoperative complications developed in 3 (7.3%) patients. Plate et al reported mean OKS of 34 at 6 months after UKP operation and stated that it was not related to BMI (11). Woo et al also reported that obesity had no effect on UKP results (12). In a study of 254 patients with a minimum follow-up period of 7 years, Cavaignac et al reported that there was no correlation between obesity and KSS part 1 and KSS part 2 (13). In our study, the mean OKS of 38 was consistent with previous findings in literature.

There are several studies in literature showing the effect of BMI on UKP survival. It has been reported that a high BMI reduces implant survival in fixed implant prostheses (14, 15). In contrast, it has been suggested that because of the mobile insert in Oxford UKP, obesity does not affect the short and mid-term results of prosthesis survival (16,17).

Although Deshmukh and Scott reported patient weight of >90 kg to be a contra-indication (18). Murray et al reported that even high BMI values of 45-50 were not a reason to restrict UKP used with a mobile insert (16). Many studies have claimed that excessive weight leads to early implant loss by increasing the stress in the implant interface (5, 6,19), but there are also studies stating the opposite (20-22). In a 5-year study of patients with BMI >30, Kuipers et al reported a survival rate of 84.7% for the Oxford UKP (22). In another study by Seth A et al, the Oxford UKP survival rate in patients with BMI >40 was reported as 91.7% at the end of 2 years, and 86.3% at the end of 5 years (23). In a mean 5.6 year follow-up of 1000 cases applied with Oxford UKP, Pandit H et al reported a prosthesis survival rate of 96% (17). In a large-scale study of 25,334 UKP and 75, 996 total knee prosthesis (TKP) patients, TKP survival was reported to be 94.6%, and UKP 87%. The most common reason for revision in UKP cases is aseptic loosening (24). In our study, the mean prosthesis survival rate at the end of 2 years was found to be 92.7%. The long-term success of UKP can be maintained with knee kinematics similar to those of a healthy knee. Several clinical and biomechanical studies have shown that with careful patient selection and appropriate surgical technique, ROM was better following UKP than TKP. There are studies that have reported that UKP in the correct placement is 40% more resistant to knee loading than normal knees (25). Woo et al reported that all periprosthetic fractures associated with UKP included the tibial plateau, and these fractures were seen 3-fold more in patients with BMI >35 compared to normal weight positions (12). In our study, no periprosthetic fractures occurred in any patient.

Previous studies have reported higher infection rates in obese patients than in normal weight patients following joint replacement (25). Similarly, morbidly obese patients have been stated to be at higher risk of medical complicatios than normal weight patients (5). In our study, prosthesis infection was seen in 1 (2.4%) patient .No systemic complications developed postoperatively in any of the current series, who comprised 8 cases of ASA 1, 20 of ASA 2, and 13 of ASA 3.

In conclusion, the results of the current study demonstrated that BMI was not a contra-indication for UKP, and did not increase the complication rate compared to that of a normal weight patient population. Nevertheless, there is a need for further long-term follow-up studies with a greater number of cases to provide long-term results.

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