İzmir Tıp Fakültesi Dergisi
Journal of Izmir Faculty of Medicine

İzmir Tıp Fak Derg. 2023;2(3):129-134

Klinik Araştırma
DOI:10.57221/izmirtip.1294210

Dizde Medial Kompartman Artrozlu Hastalarda Uygulanan Unikondiler Diz Artroplastisi Cerrahisinin Kısa-Orta Dönemde Retrospektif Sonuçları

Short-Mid Term Retrospective Results of Unicondylar Knee Arthroplasty Surgery Applied in Patients with Medial Compartment Arthrosis of the Knee

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ABSTRACT

Aim: The aim of this study was to compare of preoperative and postoperative clinical and radiological findings of the patients with medial compartment arthrosis who underwent the surgery of the unicondylar knee prosthesis.

Materials and methods: Between January 2014 and December 2017 in a single center, patients who underwent Unicondylar Knee Arthroplasty surgery due to medial compartmental arthrosis were included in this study. Retrospectively, demographic data, weight-bearing anteroposterior-lateral knee x-ray graphics, orthoroentgenogram, Knee Society Score (KSS) and Visual Analog Score (VAS) scores, and preoperative and postoperative knee range of motions were recorded.

Results: Fourty-four knees of the 38 patients were evaluated, the mean age of the 44 cases was 57.09 years. Of the 44 cases, the mean follow-up period was 40.08±11.96 months. According to the KSS, the preoperative score was 55.64±10.35 and postoperative 83.32±7.79; the KSS function score was 83.75±10.51 before the operation and 93.98±7.66 postoperatively. The mean range of motion was 107.61±10.02 degrees preoperatively and 118.52±9.62 degrees postoperatively.

Conclusion: The short-mid-term results of our cases are similar as literature which compares KSS and the radiographical evaluation. Unicondylar knee arthroplasty can be performed in selected appropriate cases.

Keywords: Unicondylar knee artroplasty; medial arthrosis; unicondylar knee surgery.

ÖZ

Amaç: Bu çalışmanın amacı medial kompartman artrozlu unikondiler diz proteziameliyatı geçiren hastaların ameliyat öncesi ve ameliyat sonrası klinik ve radyolojik bulgularının karşılaştırılmasıdır.

Gereç ve yöntem: Ocak 2014-Aralık 2017 tarihleri arasında, tek bir merkezde, medial kompartman artrozu nedeniyle, Unikondiler Diz Artroplastisi ameliyatı olan hastalarçalışmaya alındı. Retrospektif olarakdemografikveriler, yüklenmede anteroposterior-lateral diz grafisi, ortoröntgenogram, Diz Derneği Skorlaması (KSS) ve Görsel Analog Skorlaması (VAS) skorları, ameliyat öncesi ve sonrası diz hareket açıklıkları kaydedildi.

Bulgular: Otuz sekiz hastanın 44 dizi değerlendirildi, 44 olgunun yaş ortalaması 57.09 idi. Kırk dört olgunun ortalama takip süresi 40.08±11.96 aydı. Diz Derneği Skorlaması Skorlamasına göre preoperative skor 55.64±10.35, postoperatif 83.32±7.79; KSS fonksiyon skoru ameliyat öncesi 83,75±10,51, ameliyat sonrası 93.98±7.66 idi. Ameliyat öncesi ortalama hareket açıklığı 107.61±10.02 derece, ameliyatsonrası 118.52±9.62 derece idi.

Sonuç: Olgularımızın kısa-orta dönem sonuçları KSS ile radyografik değerlendirmeyi karşılaştıran literatür ile benzerlik göstermektedir. Uygun seçilmiş vakalarda unikondiler diz artroplastisi yapılabilir.

Anahtar Kelimeler: Unikondiler diz artroplastisi; medial artroz; unikondiler diz cerrahisi

This study was presented as a free paper at Turkey National Orthopaedics Congress, 2019

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Geliş Tarihi:09.05.2023
Kabul Tarihi:26.08.2023

Degenerative changes in the knee start from the medial compartment in 80-90% of patients (1). Consequently, Unicondylar Knee Arthroplasty (UKA) or High Tibial Osteotomy (HTO) surgeries during this stage offer advantages. With improved short to medium term outcomes, UKA emerges as a viable alternative to Total Knee Arthroplasty (TKA) for the young, active, and obese population, yielding excellent results (2).

During this time, the success rates of UKA have significantly improved, especially when considering patient selection and adherence to technical details (3). Unicondylar Knee Arthroplasty can be applied minimally invasive, causes less blood loss, preserves bone stock, and has almost normal knee kinematics (4).

The aim of this study was to compare the clinical and radiological findings of the UKA applied to patients with medial compartment arthrosis before and after the operation, to evaluate the effects of pain level reduction or loss, and clinically compare the preoperative and postoperative periods of Knee Society Score (KSS), KSS function score, Visual Analog Score (VAS), and radiologically compare the hip-knee-ankle angle (mechanical axis) and range of motion (ROM).

Materials and Methods

Between January 2014 and December 2017, patients with medial unicompartmental arthrosis treated with 3rd Phase Oxford UKA at a single center were retrospectively included in our study. Ethical approval was obtained from the committee, and the study followed the Declaration of Helsinki principles. The preoperative examination, measurement and scoring records of all patients were evaluated and surgery was performed by two physicians in our clinic. Patients were evaluated with their Body Mass Index (BMI) scale and age and divided into two groups within the associated data. Knee Society Scoring, KSS function scoring, and VAS were evaluated before surgery and 9-12 months after surgery.

Postoperative patients' blood values were monitored three days after the operation. Low molecular weight heparin (LMWH) and antiembolic stocking was used to prevent potential deep vein thrombosis. Cefazolin was administered for prophylaxis half an hour before surgery. Aspirate drains were removed within 24 hours, and isometric quadriceps exercises were started on the 1st postoperative day. On the first day, partial weight-bearing was allowed with a walker and continued with full load weight-bearing in the follow-ups. Preoperative and postoperative leg length radiographs (Figure 1), anteroposterior and lateral knee radiographs with weight-bearing were obtained. Inclusion and exclusion criteria are strictly applied to all patients (Table 1

Statistical Methods

All data were collected and organized in Microsoft Excel; analyses conducted using theStatistical Package for the Social Sciences 21.0 package program (SPSS Inc, IBM, Chicago, IL). The compatibility of numerical variables to normal distribution was tested by Shapiro-Wilk Test.Demographic data were described using mean, standard deviation, range values and minimum-maximum values. Wilcoxon Signed Ranks Test was used to compare the median values of preoperative and postoperative measurements. Two independent medians were compared by independent t-tests. The study was conducted at a 95% confidence level ($p < 0.05$ statistically significant difference was accepted).

Figure 1: Preoperative orthorontgenogram of a patient

Results

In this study, the patient group consists of 38 patients and 44 knees. Unicondylar knee arthroplasty was applied to both knees of 6 patients (15.7%) in different sessions, to the right knee of 18 patients (47.3%) and to the left knee of 14 patients (36.8%). Fourty-four knees were evaluated separately on a case basis. The average age of 44 cases at the date of operation was 57.09±6.7. Seven (15.9%) cases were male and 37 (84.1%) were female. The mean follow-up time was 40.08±11.96 months. Surgery was applied for only degenerative arthritis. Preoperatively measured mean hip-knee-ankle angle was 170.6 ± 3.29 degrees, the mean ROM was 107.61 ± 10.02 degrees, KSS was average 55,64 ± 10,35, KSS function score was average 83.7 ± 10.51, and VAS was average 7.61 ± 1.48. In postoperative measurements, the mean hip-knee-ankle angle was 176.1 ± 3.57 degrees ($p < 0.001$), the mean ROM was 118.52±9.62 degrees ($p < 0.001$), KSS was average 83.3 ±7.79 ($p < 0.001$), KSS

function score average was 93.98 ± 7.66 (p <0.001) and the mean VAS score was 1.27 ± 1.67 (p <0.001), and a statistically significant difference was observed between preoperative and postoperative measurements. Fourty-four cases were divided into two groups according to BMI and age (Table 2). The BMI groups were divided into ≤30 kg/m2 and >30 kg/m2. Thirty cases were in the ≤30 kg/m2 group and 14 cases were in the >30 kg/m2 group.

The age group was also divided into two group as 55 year-old and younger and older than 55 year-old cases, and there were 22 cases in both groups. We evaluated the comparisons of KSS, KSS function score, and ROM between the two groups, both preoperatively and postoperatively, as shown in Table 2.

Comparing BMI groups preoperatively and postoperatively, there was no statistical difference between measurements of KSS (p = 0.744), KSS functional score (p = 0.697) and ROM value (p = 0.744) (table 2)

Comparing age groups preoperatively and postoperatively, there were no statistical difference between measurements of KSS (p = 0,068), KSS functional score (p = 0,053) and ROM value (p = 0,932) (table 2)

Table 1: Inclusion and exclusion criterias for the study

Inclusion Criterias	Exclusion Criterias
Bone-on-bone appearance on radiographs in the medial compartment (Figure 2)	Anterior cruciate ligament deficiency
Full thickness cartilage in the lateral compartment	Knee joint infections
Complete intact articular surface posterior to medial tibial plateau	Patients with inflammatory arthritis (Rheumatoid arthritis, Gout arthritis etc.)
Manually correctable Varus deformity (at 20 ° flexion)	Arthrosis at patellofemoral and lateral compartment
Existence of a complete and functional ACL	Extension restriction above 15 degrees
Patients with isolated arthrosis in the medial compartment of the knee.	Severe lateral meniscus pathology
Patients with arthrosis in the medial compartment of the knee who do not respond to conservative treatment	Patients who do not have appropriate, sufficient and accessible data
Patients with appropriate, sufficient and accessible data	
Patients who have regular follow-ups after surgery	

Table 2: Comparing groups preoperatively and postoperatively

Group		Total	KSS			KSS FUNCTION			ROM		
		n	PRE	POST	P	PRE	POST	P	PRE	POST	P
BMI	≤30	30	56,23	84,67	0,744	85,33	95,5	0,697	108,5	118,83	0,248
	>30	14	54,36	80,43		80,36	90,71		105,71	117,86	
AGE	≤55	22	52,91	84,45	0,068	80,45	94,77	0,053	107,5	118,64	0,932
	>55	22	58,36	82,18		87,05	93,18		107,73	118,41	

(KSS: Knee Society Score; BMI: Body Mass Index; ROM: Range of Motion)

Discussion

Unicondylar knee arthroplasty is a valuable surgical option for treating medial compartment arthrosis (5). The long-term success of unicondylar knee replacement depends on strict patient selection criteria and successful surgical technique. The benefits of UKA over TKA are a better ROM, faster recovery process and higher patient satisfaction (6,7). The literature has shown that the results of UKA are as successful as TKA in 10-14 years (8). We aim to evaluate and contribute to the literature about short and mid term results of the UKA surgery and compare patients with age and BMI.

According to the literature, there is still no consensus about the ideal degree of the Hip-Knee-Ankle (HKA) angle after UKA. According to the results of many studies, it was predicted that the alignment being <174 degrees or> 180 degrees increases the risk of early implant failure and revision, and therefore the HKA angle of 177 ± 3 degrees provides an acceptable alignment (9,10).

In a study, patients were grouped as an alignment line passing through varus, knee center and valgus and there was statistically no difference in postoperative KSS scores in these groups (11). In a study by Mullaji et al.,

postoperative axis was in the acceptable range (174-180 degrees) in 91 of 122 cases (75%), varus (<174) in 17 knees (14%), and valgus in 14 knees (11%) (12). In a study conducted by Burnette et al. in 2014, it was stated that the alignment correction of more than 5 degrees after UKA surgery increased the risk of revision (13). For this reason, the degree of deformity in the mechanical axis before surgery particularly affects the success of UKA surgery (12-14). Vasso et al. reviewed 125 knees who underwent medial UKA and observed that the International Knee Society (IKS) score of the patient group whose alignment line passing through a mild varus was better than the other group (15).

In our study, the mean HKA angle increased postoperatively and mild correction was achieved in the operations. In the preoperative controls, 35 of them were found to have varus (<174 degrees) (79.5%), nine cases (20.5%) were between 174-180 degrees. In the postoperative follow-up, 28 (63.6%) of the cases had an acceptable mechanical axis degree (174-180 degrees), four (9%) had valgus (> 180 degrees) and 12 (27.2%) was found to be varus (<174 degrees). As a result of our study, the fact that 28 cases (63.6%) were within acceptable limits may give results similar to the literature, but it may explain that the preoperative HKA angle was lower due to the high rate of varus than the literature and not appropriate for overcorrection.

Some studies have shown that for high BMI patients who underwent UKA, the results are less favourable (16-19), in contrast, in a study, obese patients had a longer prosthesis life compared to non-obese patients in their 20-year follow-up (20). In our study, BMI was evaluated in two separate groups and both groups found a significant increase in postoperative KSS and KSS function scores. Post-operative KSS and KSS function values of patients with BMI≤30 were better than those of patients with BMI>30, but between the two groups, no statistical difference was found.

It has been reported that UKA and TKA surgery can provide better function and better survival in young patients (20,21). The advantages of UKA when compared to TKA include protection of cruciate ligaments, preservation of the bone stock of the contralateral compartment and better functional results (16, 22).

In a study by Parratte et al., Medial UKA was applied to 35 knees under 50 years of age and followed for an average of 9.7 years and stated that UKA surgery was beneficial in this age group, but as a result of 10 years of follow-up, TKA could give better results in the young age group (23). In a multi-center study, 512 patients over the age of 60 and 53 patients under the age of 60 were compared and the survival rate was reported to be lower in the group under 60 years of age (24).

In our study, patients were divided into two groups, 55 years old and under and above 55 years old, and postoperative KSS and KSS function scores were significantly increased compared to the preoperative scores and were found to be statistically significant, but when both groups were evaluated together, similar results were observed and no statistical difference was found.

In a study, ROM was compared before and after surgery in 294 knees. During follow-up, a decrease in the mean value of ROM from 116 degrees to 113 degrees was observed (25). However, in many studies in the literature, an increase was found in the mean value of ROM after surgery (11,15,16,26). In our study, in the BMI≤30 and BMI>30 group, the postoperative mean value of ROM increased and was found to be statistically significant, but no statistically significant difference was observed between the two groups when compared with each other. Similarly, although the mean ROM of the groups ≤ 55 and> 55 years of age showed a statistically significant increase postoperatively, no significant difference was found between the groups when the two groups were compared with each other. We attribute the positive difference here to the attention to technical details while performing surgery with the appropriate indication in UKA surgery, preservation of the ligaments and restoration of the ligament balance of the knee.

Major problems stated for UKA are component loosening, polyethylene damage, and the progression of arthrosis in other compartments. In a study by Naudie et al. it was reported that early failure was attributed to excessive correction of deformity in the mechanical axis, and late failure due to aseptic loosening and polyethylene component due to excessive contact stress (27). Another major cause of UKA failure is unexplained stubborn pain. For this reason, the revision procedure is frequently applied, but it has been shown to be ineffective and unnecessary (17).

We can attribute the good results we got in our study especially to strict patient selection. Aseptic loosening was not observed in the follow-up of any of our patients, but after the operation, infection signs were observed in a total of three knees. Intravenous (IV) antibiotic therapy, debridement and insert replacement were performed in these patients. One of them had no growth in the deep tissue culture, and the complaints completely regressed with treatment. Methicillin Resistant Staphylococcus aureus (MRSA) growth was observed in the culture of one patient and the patient's complaints completely disappeared with the same treatment. In one patient, no growth was detected in the deep tissue cultures, the pain persisted despite the treatment, and the cause of the pain could not be revealed. Primary TKA was applied at the end of a one-year follow-up and after one year again, there was still no regression in his pain after TKA application. After that, the patient had a revision TKA

operation in another center and there was still no regression in his pain after one year of the revision. In our study, UKA revision rate was found to be 2.6% as a result of primary TKA application due to unexplained persistent pain in one of 44 cases.

The weaknesses of our study can be stated as the insufficient average follow-up period (40,08 months), the low number of patients and the number of knees undergoing surgery, and the difference in gender distribution.

In conclusion, it was observed that the results of UKA surgery performed in our clinic were compatible with the literature, and patients benefited from this surgery at a high rate. The positive aspects of our study are using up-to-date scoring systems such as KSS, KSS function score and VAS before and after surgery, performing operations in a single center, using one type of prosthesis and same rehabilitation program to all patients in the postoperative period.

Çalışmada hibe veya destek kullanılmamıştır. Yazarların herhangi bir çıkar çatışması yoktur. Tüm yazarlar, çalışmanın tüm aşamalarında katkıda bulunduklarını beyan etmişlerdir. Tüm yazarlar, çalışmanın tasarımına katkıda bulunmuşlar ve makalenin son halini onaylamışlardır.

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