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Original Article

Simultaneous ipsilateral knee arthroscopy and unicondylar knee arthroplasty is effective for bicompartmental symptoms

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ABSTRACT

Background: Patients with unicompartmental radiographic arthritis but bicompartmental symptoms pose a clinical challenge. Some surgeons may perceive it as a contraindication for unicondylar knee arthroplasty (UKA). We investigated patient outcomes 2 years after simultaneous ipsilateral arthroscopy and UKA as compared to a similar group of patients who had total knee replacement (TKA) for a similar clinical presentation.

Methods: We identified 9 patients with simultaneous ipsilateral arthroscopy and UKA between 2004 and 2013, and 12 clinically similar patients treated with TKA.

Results: At 1- and 2-years, SF-12 physical scores were significantly improved in the UKA-scope group than in the TKA group (47.2 vs 40.3, $p = 0.042$; 48.3 vs 32.6, $p = 0.026$). WOMAC pain score, WOMAC stiffness score, WOMAC function and KSFS were significantly improved in the UKA-scope group at 2 years as compared to the TKA group (98.7 vs 63.8, $p = 0.030$), (90.1 vs 43.8, $p = 0.013$), (92.3 vs 55.2, $p = 0.027$ and (92.3 vs 55.2, $p = 0.027$), respectively). Change in score from baseline for KSFS, SF-12 physical and WOMAC stiffness were significantly improved in the UKA-scope group at 2 years compared to TKA, (28.3 vs −5, $p = 0.041$), (13.6 vs 3.0, $p = 0.026$), (52.6 vs −6.3, $p = 0.025$), respectively.

Conclusion: This study shows that patients with isolated compartment radiographic disease but with bicompartmental symptoms can benefit from UKA and simultaneous arthroscopy. Further, TKA for isolated compartment radiographic disease in this limited series had poorer outcomes. We obtain MRI selectively when physical exam and radiographic findings suggest isolated arthritic disease in patients with bicompartmental symptoms.

1. Introduction

Unicondylar knee arthroplasty (UKA) is an established treatment option for symptomatic osteoarthritis isolated to one compartment. Advocates of UKA suggest preservation of bone stock, knee kinematics and accelerated postoperative recovery as reasons for its use.[1,2] Radiographic evidence of osteoarthritis such as joint space narrowing, osteophyte formation and malalignment of lower limb helps determine an indication for joint arthroplasty. There is little hesitation for diagnosis and treatment recommendations when symptoms, physical exam, and radiographs support isolated disease. Likewise, patients are not indicated for UKA when symptoms and signs suggest poly-compartment degeneration because of concerns of failure and conversion to total knee. A conflict arises when the other compartment pathology is not due to degenerative arthritis but instead due to synovitis, cartilage flaps, or mechanical meniscus tears that are responsive to arthroscopic procedures. Though total knee arthroplasty (TKA) is an excellent treatment option for degenerative knee arthritis, a more limited surgery, if effective, may be preferable. Additionally, and increasingly important to our healthcare system, UKA is less costly than TKA.[3–5]

Arthroscopic debridement, lavage, partial meniscectomy, and chondroplasty for osteoarthritic knees have had unpredictable outcomes.[6–10] Simultaneous arthroscopic anterior cruciate ligament (ACL) reconstruction and UKA has been successful.[11–14] TKA shortly following arthroscopy has been associated with poorer outcomes and higher complications.[15] There is little literature related to arthroscopic treatment of meniscal tears at the time of UKA.[16] We hypothesize that the simultaneous UKA and

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arthroscopic treatment of symptomatic meniscus tears and synovitis is an effective treatment, and better than TKA for patients with isolated compartment radiographic disease and bicompartmental symptoms.

2. Material and methods

A retrospective review of our joint registry was carried out after obtaining Institutional Review Board approval. Inclusion criteria consisted of treatment with simultaneous ipsilateral arthroscopy and UKA. Ten patients treated with 11 such simultaneous procedures were identified between May 2004 and November 2013. Two patients were excluded due to lack of follow-up, yielding 8 patients and 9 simultaneous UKA-scope procedures for our case cohort. Our comparison group comprised 12 patients over the same time frame treated with TKA who presented with bicompartmental symptoms but only unicompartmental radiographic disease. One patient in UKA –scope group had the same procedure on both knees staged by one year. All were performed by two fellowship-trained arthroplasty surgeons at a single institution.

Patient demographic data including age, gender, body mass index (BMI), American Society of Anesthesiologist score (ASA), ambulatory status, and range of motion were collected for both groups. In addition, MRI findings were collected for the UKA-scope group. We examined the surgical intervention, operative time, length of stay, physical therapy outcomes, disposition, range of motion, average visual analogue (VAS) pain scores and complications, conversions, or revision surgery for each group. Patient reported outcomes on the KSFS, WOMAC, and SF-12 were analyzed preoperatively and postoperatively at 3 months and yearly thereafter.[17–19] The minimum follow-up was 2 years for both groups.

There were 8 patients and 9 knees in UKA-scope group and 12 patients in TKA group, with each group consisting of 66.7% and 75% females respectively. The mean age was 59.3 (range, 40–84) years in the UKA-scope group and 67 (range, 50–85) years in the TKA group, ($p = 0.10$). Mean body mass index (BMI) was 31.6 kg/m^2 and 33 kg/m^2 respectively for UKA and TKA groups, respectively ($p = 0.97$). Patient demographic characteristics for both groups are shown in Table 1.

In the UKA-scope group five operations were performed on the right and four on the left side. Seven were medial compartment and two were lateral compartment arthroplasties. In one medial arthroplasty, the patellofemoral joint was also replaced. The latter case was not excluded because it fit the thesis that the opposite tibio-femoral compartment pathology but amenable to arthroscopy rather than arthroplasty, and a total knee arthroplasty was avoided. All nine knees were diagnosed with osteoarthritis of one compartment and meniscus pathology in the other compartment. Two knees had previous arthroscopic intervention for meniscus tears. All eight patients had preoperative MRI films revealing meniscus tearing in the non-replacement tibio-femoral compartment (Table 2). Intraoperative arthroscopic findings showed grade 1 to 2 chondromalacia of lateral compartment in six patients, grade 3 chondromalacia of the patellofemoral (PF) in one knee and grade 4 chondromalacia of the PF joint in one knee in which the PF joint was replaced. Seven knees underwent arthroscopic lateral meniscectomy and two underwent medial meniscectomy. Preoperative outcome measure scores, 2 years scores and change in scores for KSFS (Table 3), SF-12 P (Table 4) and WOMAC (pain and stiffness) (Table 5) are shown in tables. There were no statistically significant differences between the baseline scores of the two groups using Student *t*-test.

A midline incision with medial parapatellar approach was used for TKA and medial UKA. Lateral *para*-patellar arthrotomy was used for lateral UKA. In UKA-scope group, arthroscopy was performed first without the use of tourniquet. All implants were cemented and utilized a fixed bearing polyethylene liner. The patella was resurfaced in all TKA cases. Rehabilitation for all patients consisted of supervised physical therapy for strengthening and range of motion, weight bearing as tolerated, and assistive gait aid as required.

Routine follow-up visits and assessments occurred at 2 weeks, 3 months, and yearly thereafter. Patient reported outcomes were recorded at each visit. Preoperative scores, postoperative scores, and change in scores were analyzed. Change in score represents the effect of the intervention as per recent studies.[20–23]

2.1. Statistical methods

Descriptive statistics included mean, standard deviation and ranges for continuous variables like age, BMI, ASA and all patients reported outcome measures. Discrete variables like gender, side of surgery and medial vs lateral compartment in UKA are expressed as frequencies and percentages. Comparisons between study

Table 1
Demographic Data for two groups.

Variable	Procedure		p value
	UKA-scope (n = 9)	TKA (n = 12)	
Gender (% Male)	66.7	75	0.015[a]
Age (years)[c]	59.5 ± 15.7	67 ± 10	0.097
BMI	31.8 ± 6.8	33	0.69
Diagnosis			
OA	8	12	
Post infectious arthritis	1	0	
ASA[c]	2 ± 0.5	2.1 ± 0.5	0.714
Average 3 day pain score[c]	1.8 ± 1	2.2 ± 1.5	0.527
Follow-up time after surgery[c]	3.8 ± 2.9	2.4 ± 2.5	0.263
Operative time[c]	132 ± 16.8	109.2 ± 21.9	0.019[b]
Operative side			
Right	5	2	0.061
Left	4	10	
Compartment involved on radiographs			
Medial	7	9	0.882
Lateral	2	3	

[a] Chi-square test.
[b] Student *t*-test.
[c] Values are expressed as Mean ± Standard deviation (SD): UKA = unicompartmental knee arthroplasty, TKA = total knee arthroplasty.