

Unicompartmental knee replacement in patients aged 70 years and older

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Summary

Introduction: The management of isolated unicompartmental osteoarthritis in the patient aged 70 years and older is an issue of debate. The purpose of the present study was to retrospectively evaluate the outcomes of patients aged over 70 years who underwent unicompartmental knee replacement (UKR) for the treatment of isolated unicompartmental osteoarthritis. The hypothesis was that this represents a safe and viable procedure leading to improved functional outcome in elderly patients affected by isolated unicompartmental osteoarthritis.

Methods: 22 consecutive medial compartment UKRs performed between 1998 and 2008 were retrospectively evaluated. Mean age was 74 years (range 70-93 years). Patients were evaluated preoperatively and after an average follow-up of 6.2 years (range 2 to 8). Assessment included KOOS score, WOMAC score, Knee Society Score. Standard X-rays were performed prior to surgery and at follow-up.

Results: Twenty patients showed a statistically significant improvement in all parameters. One patient who was 93 years old at the time of surgery died for unrelated causes. One patient required conversion to a total knee arthroplasty.

Discussion: UKR is a safe and clinically effective

procedure, which has been proven valuable for the treatment of elderly patients with isolated unicompartmental osteoarthritis and with initial degenerative signs in the other compartments.

Conclusion: Age more than 70 does not appear to be a contraindication to the procedure.

Level of evidence: IV (case series).

KEY WORDS: unicompartmental osteoarthritis, medial knee osteoarthritis, unycondilar knee replacement, elderly people.

Introduction

Unicompartmental knee replacement (UKR) is being used increasingly for the treatment of end stage arthritis affecting one compartment in the knee and it is considered an attractive alternative to osteotomy or total knee replacement (TKR) in patients with isolated unicompartmental osteoarthritis¹. This is because clinical studies have shown that, if appropriate indications and techniques are used, UKR tends to give a quicker recovery, reduced invasiveness and blood loss lower costs, fewer and less severe complications and better knee kinematics than a total knee replacement (TKR)²⁻⁶. In fact, compared with TKR, UKR has shorter inpatient stays, lower mortality, lower incidence of major complications such as infection and better outcome scores, although adjusted change scores are similar⁷.

Absolute contraindications to UKR include multiple compartmental osteoarthritis, rheumatic diseases, varus/valgus malalignment, flexion deformity, and instability⁸.

There is, however, debate about relative contraindications for UKR, in particular whether UKR should be offered to patients with a high body mass index (BMI) and in elderly patients.

As TKR in older age is related to worse function (particularly among women)⁹, UKR in the patient aged 70 years and older is an issue of debate. However, surprisingly little data regarding this type of procedure in the elderly patients is available¹⁰.

The purpose of the present study was to retrospectively evaluate the clinical outcomes and medium to long-term survival of fixed-bearing UKR in patients aged 70 years and older. The hypothesis was that this represents a safe and viable procedure leading to improved functional outcome in elderly patients affected by isolated unicompartmental osteoarthritis.

Materials and methods

Patients recruitment

27 consecutive medial compartment UKRs performed between 1998 and 2008 in our Department. Mean age was 74 years (range 70-93 years). See Table I for a detailed overview of patient demographics and pre-operative data. Comorbidities are presented in Table II. None of the patients had chronic cognitive impairment. Patients were graded according to Ahlbäck classification of arthritis (Tab. III). Written informed consent was obtained for all patients.

Surgical technique

A tibial incision was performed medially to the patellar tendon. An Allegretto unicompartment fixed bearing prosthesis (Zimmer Inc., Warsaw, IN, USA) was implanted in all patients using standard minimally-invasive technique.

An evaluation of flexion-extension balance was performed using provisional components.

After having cleaned the bone surfaces, the definitive femoral and tibial component were positioned. The fixed bearing was then inserted and haemostasis was controlled after deflating the tourniquet. A drainage was positioned, the wound was closed with bioabsorbable sutures and a sterile dressing was applied.

Table I. Patient demographics and anthropometric data.

Age at surgery (SD) (yr)	74.1 (SD:10.2)
Gender Male Female	84
BMI (SD)	25.8 (SD:3.2)

SD: standard deviation

Table II. Overview of comorbidities.

Anemia	4 (16%)
Bowel cancer	1 (4%)
Chronic pulmonary disease	5 (21%)
Diabetes	8 (34%)
Hypertension	17 (71%)
Hypothyroidism	4 (16%)

Table III. Number of patients according to Ahlbäck grade.

Grade 1	-
Grade 2	-
Grade 3	4
Grade 4	15
Grade 5	5

Follow-up assessment

Patients were evaluated pre-operatively and after an average follow-up of 6.2 years (range 2 to 8).

Assessment included KOOS score¹¹, WOMAC score¹², Knee Society Score¹³. Standard X-rays were performed in order to verify the grade of osteoarthritis in the lateral compartment and the presence of loosening of the components. The patients' evaluations were performed by the same equipe.

Statistical analysis

Data extracted were analyzed using the program SPSS Version 19.0 (SPSS Inc., Chicago, IL, USA). Paired *t*-test (two sided test and $\alpha=0.05$) was utilized to compare the pre-operative and follow-up status. Differences with a *p*-value <0.05 were considered statistically significant.

Results

Twenty-two patients (81%) were successfully contacted and re-evaluated at follow-up. One patient which was 93 years old at the time of surgery died at 36 months following bowel cancer. One patient (5%) required conversion to a total knee arthroplasty. Twenty patients showed a statistically significant improvement in all parameters ($p<0.05$) (Tab. IV). No major complications were reported.

Discussion

The last few decades have seen a general increase in the number of elderly patients being referred to orthopaedic surgeons for the treatment of unicompartmental knee osteoarthritis.

UKR represents a definitive procedure with outcomes that are comparable to TKA in the treatment of knee arthritis¹⁴⁻¹⁶, and is now routinely performed in the young and physically active subjects, with the higher early failure risk seeming to lead to a preference for TKR in the elderly¹⁰.

In fact, some surgeons have reservations in offering partial knee replacement because of a fear of an increased risk of peri-operative complications.

However, recent studies have shown lower risk profile of UKR compared to TKR. Morris et al. retrospectively reviewed morbidity and mortality rate 90 days following UKR in 828 patients and found it to be a safe procedure with a low rate of serious complications, including one deep vein thrombosis and three non-fatal myocardial infarctions. No deaths were reported¹⁷.

Similarly, Brown et al. showed that UKR had lower postoperative morbidity compared to TKR with a risk of complications of 4.3% for UKR vs 11% for TKR¹⁸.

In our case series we did not report any major complication, since one patient died of unrelated causes.

Fear of reduced survival of UKR compared to TKR exists because of the small area of the bone-implant

Table IV. Overview of the results of clinical assessment.

	Pre-operative	Post-operative	p-value
KOOS score (mean, SD)	61.8 (SD: 9.4)	80.2 (SD: 11.2)	p< 0.001
KSS objective (mean, SD)	51.1 (SD: 10.1)	84.7 (SD: 9.2)	p< 0.001
KSS functional (mean, SD)	45.6 (SD: 9.4)	76.2 (SD: 9.8)	p< 0.001
WOMAC index (mean, SD)	70.4 (SD: 11.5)	81.8 (SD: 8.8)	p< 0.001

SD: standard deviation



Figure 1. Pre-operative X-ray showing isolated medial osteoarthritis.



Figure 2. X-ray at follow-up showing implant.

interface. Sebilo et al.¹⁹ reviewed the outcome of 862 medial compartment replacements and found a significantly increased 10-year survival rate for the prosthesis in those over the age of 70 (88.3%) vs those

younger than 70 (76.7%). They also found the over 80s had a significantly better improvement in both the KSS objective and functional scores than those under 80.

In our case series UKR demonstrated favourable outcomes in most of the patients regardless of age in terms of knee function and patient satisfaction, with results comparable to those observed in younger patients as reported in other studies.

Our survival rate of 95% reflects the successful outcomes of the study of Marya et al. who report an implant survival rate of 96.4% 3 years following UKR in octogenarians using our same type of implant²⁰.

Our results have also proven to be satisfying in patients with initial degenerative arthritis (Ahlbäck grade I to II) in the lateral compartment and on the patellar surface. No presence of loosening of the implant was detected at X-ray and the grade of osteoarthritis in the lateral compartment did not significantly increase. Only one patient required conversion to a total knee arthroplasty.

Limitations of the present study include its retrospective nature, the lack of a control group, and the relatively small sample size. The limited number of patients is due to the fact that this approach requires adopting highly selective indications as criteria for patient selection. Further randomized trials are needed to substantiate these findings.

Conclusions

On the basis of our results, we can conclude that UKR is a safe and clinically effective procedure, which has been proven valuable for the treatment of elderly patients with isolated unicompartmental osteoarthritis and with initial osteoarthritis in the other compartments. Age more than 70 does not appear to be a contraindication to the procedure.

Ethics

The Authors declare that this research was conducted following basic ethical aspects and international standards as required by the journal and recently update in²¹.

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