

Results of unicompartmental knee replacement

Talal M. Bakhsb, MBBS, FACHARTZ.

ABSTRACT

Objective: To present the results of medial unicompartmental knee replacement of patients admitted at a university Hospital in Jeddah, Saudi Arabia.

Methods: Of the 99 patients who received medial hemiarthroplasty of the knee since 1989 to 2005, 90 patients (132 operations) with a minimum follow up of one year were evaluated at King Abdul-Aziz University Hospital in Jeddah. Only one patient (2 prostheses) was lost for follow up. Eleven patients (11 prostheses) died after an average time of 108.5 months (36-180 months). Scores were registered according to the Knee Society Clinical Rating System.

Results: There was a significant improvement in all functional scores postoperatively throughout the follow up period. One patient developed symptomatic deep vein thrombosis in the calf of the operated leg. There were no other perioperative complications. Twelve patients (14 prostheses) underwent conversion to total knee replacement due to either aseptic loosening of the tibial component (1 prosthesis) or polyethylene wear (3 prostheses) or progression of degenerative disease in the lateral compartment (7 prostheses). Two of these 12 patients (3 prostheses) were operated on at another hospital and no information on the reason for operation is available.

Conclusion: Unicompartmental knee replacement can be used successfully for the treatment of medial gonarthrosis. Given the proper patient's selection and technical expertise, hemiarthroplasty can give results comparable to or even better than high tibial osteotomy or total knee replacement.

Saudi Med J 2007; Vol. 28 (7): 1062-1064

From the Department of Surgery, King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Received 5th September 2006. Accepted 14th March 2007.

Address correspondence and reprint request to: Dr. Talal M. Bakhsb, Department of Surgery, King Abdul-Aziz University Hospital, PO Box 80215, Jeddah 21589, Kingdom of Saudi Arabia. Tel. +966 (2) 6408215. Fax. +966 (2) 6408347. E-mail: drbakhsb@hotmail.com

Degenerative disease limited to the medial compartment of the knee joint is not infrequently seen in Saudi Arabia. In my experience, 20-25% of the patients with established gonarthrosis have a well-preserved lateral joint compartment. Treatment options range from analgesic anti-inflammatory drugs to joint debridement, intra-articular injections, high tibial osteotomy and joint replacement. The patient's age, occupation, activity level, co-morbidities, and expectations are important considerations in the initial choice of treatment.

In this paper, we evaluate the results of replacing the medial joint compartment with cemented sled prosthesis (ENDO® sled prosthesis, manufactured by W. Link GmbH, Hamburg, Germany).

Methods. One hundred and forty-three cemented sled prostheses were implanted to 99 patients between 1989 and 2005 at King Abdul-Aziz University Hospital, Kingdom of Saudi Arabia. The indication to operate was given when: a) The patient was limited in his/her daily activity in spite of sufficient amounts of analgesia. b) The x-rays show a well-preserved lateral joint space and surface. c) The cruciate and collateral ligaments are well preserved. d) A flexion contracture or a varus deformity do not exceed 20 degrees.

Only patients with a minimum follow up of one year (132 prostheses in 90 patients) were considered in this study. The patient's demographics are summarized in Table 1.

All patients were suffering from primary osteoarthritis of the knees. Of the 48 patients who had one knee replaced by this type of prosthesis, 14 had another type of prosthesis on the other side. Operations were carried out under general or epidural anesthesia. Tourniquet was used except in a few cases. All patients received prophylactic heparin subcutaneously, starting the day before surgery and continued until discharge from the hospital and prophylactic antibiotics intravenously, starting on call to the operating room and continued until the wound drain was removed (2-3 days). Operatively, the medial parapatellar incision and subvastus approach was chosen routinely. The technical steps were carried out according to the manufacturer's recommendations. Gentamycin loaded bone cement was used in all cases. All operations

were carried out by the same surgeon. Isometric and isotonic exercises were started on the first postoperative day. Weight bearing mobilization was allowed on the first postoperative day or even earlier if a patient wishes it. After discharge from the hospital follow up was in the outpatient clinics by the surgeon himself. Outpatient physical therapy visits were rather the exception. The pre- and postoperative scores were recorded according to the Knee Society Clinical Rating System.¹ Scores were collected preoperatively and postoperatively at 3 months interval in the first year, at 6 months interval in the second year and then yearly.

The analysis of results was based on the follow up of 90 patients (132 knees) who were seen regularly or interviewed on the phone on June 2006 including 11 patients (11 knees) who were followed up until they deceased of unrelated disease (average follow up 108.5 months). One patient (2 knees) is lost for follow up after leaving Saudi Arabia 4 years postoperatively. The mean follow up was 85.4 months (12-204 months).

Statistical analysis was carried out using the Statistical Package for Social Sciences, version 10.0 for windows.

Table 1 - Patients demographics.

Demographics	Males	Females	Total
Count	19	71	90
Mean age (years)	66.1	57.1	59.1
Mean body mass index	29.9	30.9	30.6
Side: Right	10	57	67
Left	14	51	65

Table 2 - Means of knee scores.

Item	Preoperative score	Follow up score
Pain	10.2	41.2
Range of motion	18.4	22.1
Anteroposterior stability	9.9	9.9
Mediolateral stability	10.9	14.5
Walking distance	19.8	36.2
Stairs climbing	25.1	36.2
Total positive score	94.3	160.1
Extension lag	0	0
Flexion contracture	2.4	0.2
Axial deviation (varus)	6.2	0
Walking aids	4.8	1.6
Total negative score	13.4	1.8
Grand total score	80.9	158.3

Results. The mean preoperative values for each of the sub-scores of the Knee Society Clinical Rating System¹ are summarized in Table 2. The table includes in contrast to the mean values at the time of completion of this study. Figure 1 shows graphically, the development of the average scores for pain, range of movement, walking distance and stairs climbing, over the follow up period. Only one patient showed during hospitalization signs and symptoms of deep vein thrombosis in the calf of the operated leg. This was confirmed by Doppler ultrasound. She was treated accordingly. Follow up showed patent deep venous system. No other complication was observed in the perioperative period. In the follow up of the patients 3 knees were diagnosed to have polyethylene wear of the tibial implant (after 36, 84, 132 months), 1 had a loose tibial implant (after 84 months), and 7 had progression of the degenerative disease in the lateral compartment (after 36-144 months). All 11 knees (2 male, 8 female patients) were converted to total knee replacement. No complication was encountered in these patients during or after the conversion. They are all on regular follow up. Two female patients (3 prostheses) reported to have transferred to other surgeons due to pain (after 72 months in 1 and 24 months in the other patient). The operative findings at conversion were not known.

Discussion. These results show that unicompartmental knee joint replacement (UKR) is an effective method of treatment for patients suffering from medial gonarthrosis. Given the proper patient selection and sufficient technical expertise of the surgeon it has comparable or even better results to high tibial

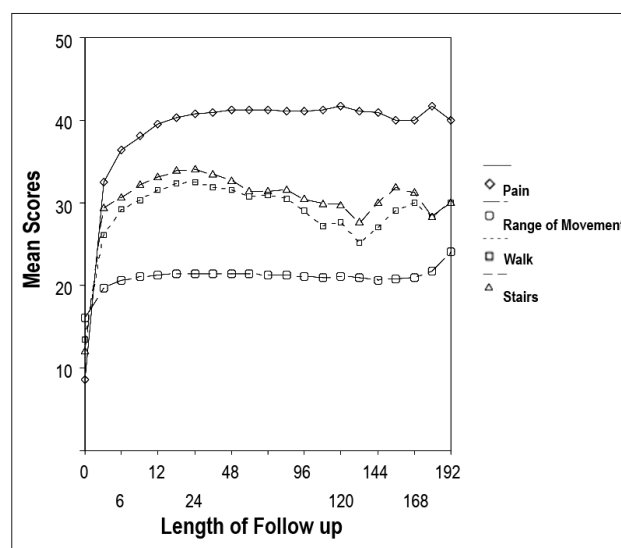


Figure 1 - Development of functional scores.

osteotomy (HTO) or total knee replacement.²⁻¹¹ The main advantage of this procedure over HTO is that it allows immediate weight bearing and flexion exercises. The main advantage over TKR is that revisions are much easier and require standard implants and techniques because of the preservation of bone stock.^{12,13} Revision rate after primary UKR is approximately 10% at 10 years.¹⁴⁻¹⁷ Most patients (including 14 of the 48 patients with unilateral replacement who have a total knee replacement on the other side) have bilateral degenerative disease, but that pain is more prominent on one side. Therefore, simultaneous bilateral hemiarthroplasty is rather the exception (4 out of 99 patients). In this series, patients' preference was the reason for the simultaneous procedure, including one case of staged replacement in the same admission.

A closer look at the group of patients who were revised to total knee replacement shows that revision due to wear of the polyethylene occurred in patients who were younger than the average age of the total group (48.3 versus 59.1 years) and had a higher body mass index (36.7 versus 30.6). This is to be seen with caution, as the number of patients is too small to allow a definite judgment. In counseling younger patients, I do stress on the possibility of conversion to total knee replacement after approximately 10 years, yet, not advising them to decrease their activity but to maintain their weight.

Acknowledgment. *The author did not receive any payment or other benefits or agreement to receive such benefits from any commercial entity. I would like to thank Mrs. Joy De Silva for secretarial assistance in preparing the manuscript. Thanks also to the statistics department of the hospital for assistance in analyzing the data.*

References

1. Insall JN, Dorr LD, Scott RD, Svott WN. Rationale of the Knee Society Clinical Rating System. *Clin Orthop Relat Res* 1989; 248: 13-14.
2. Newman JH, Ackroyd CE, Shah NA. Unicompartmental or total knee replacement? *J Bone Joint Surg Br* 1998; 80: 862-865.
3. Kisslinger E, Justin HP, Wessinghage D. Better than their reputation? 5 to 20 years outcome with single compartment knee joint endoprotheses in medial osteoarthritis of the knee. *Z Orthop Ihre Grenzgeb* 2001; 139: 97-101.
4. Meyer M, Machner A, Pap G, Neumann HW. Is unicompartmental knee prosthesis a current possibility in primary management of varus gonarthrosis? A prospective matched-pair study. *Z Orthop Ihre Grenzgeb* 2000; 138: 204-208.
5. Hasegawa Y, Ooishi Y, Shimizu T, Sugiura H, Takahashi S, Ito H, et al. Unicompartmental knee arthroplasty for medial gonarthrosis. *Arch Orthop Trauma Surg* 1998; 117: 183-187.
6. Christensen NO. Unicompartmental prosthesis for gonarthrosis. *Clin Orthop Relat Res* 1991; 273: 165-169.
7. Gidwani S, Fairbank A. The orthopaedic approach to managing osteoarthritis of the knee. *BMJ* 2004; 329: 1220-1224.
8. Callaghan J. Unicompartmental knee replacement. *Clin Orthop Relat Res* 2005; 430: 272-273.
9. Broughton NS, Newman JH, Baily RAJ. Unicompartmental replacement and high tibial osteotomy for osteoarthritis of the knee. *J Bone Joint Surg Br* 1986; 68-B: 447-452.
10. Nieder E. Sled prosthesis, rotating knee and hinge prosthesis Model St. Georg and Endo Model. *Orthopade* 1991; 120: 170-180.
11. Bakhsh TM. Results of total knee replacement using a cemented stemmed prosthesis. *Saudi Med J* 2006; 27: 661-666.
12. Iorio R, Healy WL. Current concepts review. Unicompartmental arthritis of the knee. *J Bone Joint Surg Am* 2003; 85-A: 1351-1364.
13. Rajasekhar C, Das S, Smith A. Unicompartmental knee arthroplasty. *J Bone Joint Surg Br* 2004; 86-B: 983-985.
14. Lewold S, Robertsson O, Knutson K, Lindgren L. Revision of unicompartmental knee arthroplasty. *Acta Orthop Scand* 1998; 69: 469-474.
15. Ackroyd CE, Whitehouse SL, Newman JH, Joslin CC. A comparative study of the medial St. Georg Sled and Kinematic total knee arthroplasties- Ten-year survivorship. *J Bone Joint Surg Br* 2002; 84-B: 667-672.
16. Case RD, Ackroyd CE, Newman JH. The outcome of knee replacement in patients under 60 years of age. *J Bone Joint Surg Br* 2001; 83-B: 244.
17. Ackroyd CE. Medial compartment arthroplasty of the knee. *J Bone Joint Surg Br* 2003; 85-B: 937-942.