

# Evaluation of primary total knee arthroplasty in rheumatoid knee

## Abstract

**Introduction:** Rheumatoid arthritis (RA) is a chronic inflammatory disorder of the synovium resulting in joint destruction. The knee is among the most commonly affected joints in RA and advanced arthritis of the involved joint is associated with poor prognosis contributing to patient pain and disability. In advanced disease, total knee arthroplasty (TKA) has proven to be the most successful intervention that reduces knee pain and improves physical function in RA patients.

**Materials and methods:** A total of 34 total knee arthroplasties were performed in a tertiary care centre for rheumatoid arthritis of the knee joint with a posterior stabilized knee. Patients were regularly followed up and were assessed at the end of two years for the function of the knee joint, quality of life, ability to walk and perform routine daily activities, local signs of infection, activity of the disease and general condition.

**Results and conclusion:** The difference in the average knee society score and the difference in the average knee available range of motion were found to be statistically significant at end of 3 years. There is a significant improvement in functional scores of the knee. However, there will be involvement of multiple joints, associated systemic complications and further progression of the disease. Because of the above said reasons overall functional outcome of the patient might not be significant improvement when compared to excellent clinical outcome of the operated knee.

**Keywords:** Total knee arthroplasty, rheumatoid arthritis, knee

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## Introduction

Rheumatoid arthritis (RA) is a chronic inflammatory disorder of the synovium resulting in joint destruction. The knee is among the most commonly affected joints in RA and it is estimated that about 90% of patients with RA will eventually involve knees Joint.<sup>1</sup> There has been a considerable improvement in understanding the pathogenesis and treatment of RA. Highly effective biologic therapies have been used for more and more individuals and hence very few patients of RA suffer end-stage joint destruction.<sup>2</sup>

Approximately one out of four affected individuals develop advanced arthritis of the affected joints contributing to pain and overall disability.<sup>3</sup> Majority of patients will be disabled 20 years from primary diagnosis resulting in gross compromise of occupational activities as well as activities of daily living.<sup>4</sup>

In advanced disease, Total Knee Arthroplasty (TKA) has proven to be the most time tested intervention that reduces knee pain and improves physical function in RA patients. These patients have high potential for perioperative and postoperative complications as they are immune-compromised. Considerations regarding preoperative evaluation and surgical techniques must be taken into account in order to improve the results of TKA.<sup>5</sup>

## Materials and methods

Between March 2012- July 2014 a total of 34 TKA were performed in a tertiary care centre for rheumatoid arthritis of the knee joint. 14 patients ( 11 females and 3males) underwent unilateral knee arthroplasty and 10 ( 9 females and 1 male) patients underwent bilateral knee arthroplasty, out of which 3 patients underwent surgery for both the knee at the same sitting and the remaining 7 patients were

operated at an interval of 2 months to 1.5years after the surgery for one knee. The age of the patients ranged between 29years to 62years with a mean age of 42.4 years. Out of the 34 operated knees, 19 were left knee and 15 were right knee. All the patients were diagnosed with Rheumatoid arthritis prior to planning for the procedure and the duration between diagnosis and procedure ranged from 2.8 years to 19.4years with an average of 11.6years. Out of the 24 patients, 18 patients had radiological evidence of arthritis of the contralateral knee joint or either of the hip joints on presentation. Apart from the fact that most of the presented patients were on non-steroidal anti-inflammatory drugs (NSAIDs), 19 patients were on disease modifying anti-rheumatic drugs (DMARDs) prior to surgery and 5 patients had never been treated for rheumatoid arthritis before. No patients were on biological response modifiers. 12 out of 19 patients on DMARDs were also on corticosteroid therapy. The DMARDs were withheld at least 48 hours prior to surgery and started 3 days after surgery in all patients. Perioperative dose adjustment of glucocorticoids was done for needed patients to prevent Addison's disease. Diabetes, hypertension and hypothyroidism were the common associated medical comorbidities of the patients. All the patients were thoroughly evaluated clinically and radiologically and planned for total knee arthroplasty following necessary medical clearance.

All patients were given one pre operative dose of antibiotic (Inj. Cefuroxime 1.5gms) and the same was given post operatively for two days. All patients were operated by the same team of surgeons using standard medial para patellar approach with Cruciate substituting knee. Suction drain was removed on the first post operative day and the patients were made to walk full weight bearing with the help of walker. Dressings were changed at regular intervals and observed for any soakage or discharge.

Patients were regularly followed up and were assessed at the end of two years for the function of the knee joint, quality of life, ability to walk and perform routine daily activities, local signs of infection, activity of the disease and general condition.

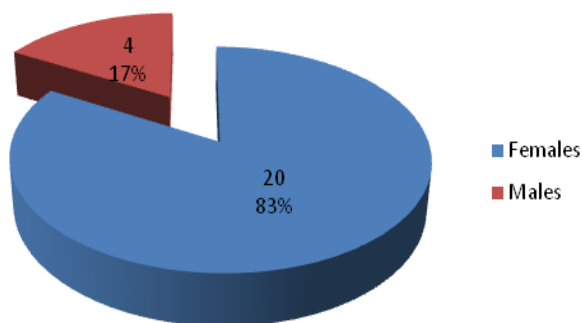
### Results

The summary of results is tabulated below. The difference in the average knee society score and the difference in the average knee available range of motion were found to be statistically significant (Table 1) (Graph 1).

**Table 1** Pre and Post Operative knee society score and P values

	Pre op	Post Op(Follow up at 3 years)	P- value
Average Knee Society Score	55.64	76.79	<0.05
Average Knee ROM	50.88	90.88	<0.05
No. of patients with knee flexion <90 deg	33	7	NA

### Sex Distribution



**Graph 1** Sex Distribution.

### Data analysis

Descriptive statistics of Knee society score and available range of knee motion were analyzed with SPSS version 20.0 software and presented in terms of mean with standard deviation. Paired-T test was used to compare the scores before and after the procedure. P value <0.05 was considered statistically significant.

### Discussion

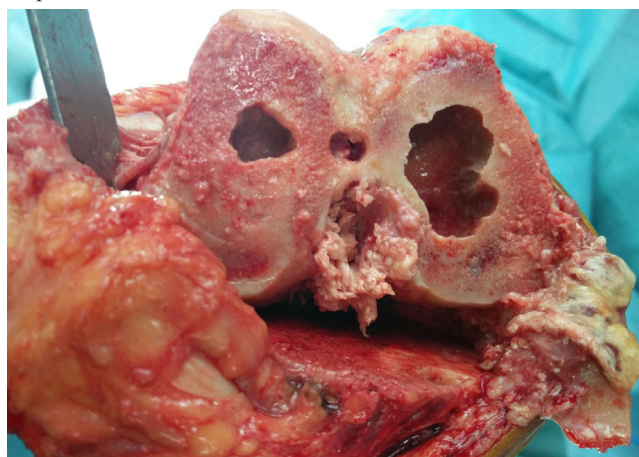
RA patients are often younger by 10 or more years than osteoarthritis OA patients at the time of TKA. Following the advent of recent medication for RA, the longevity for RA patients can be compared to the general population and hence the best possible implantation technique should be used. Bone quality is generally poor in RA patients. Poor bone quality occurs due to the combined effect of inflammatory disease process itself, disuse of the part of the body due to pain and chronic use of steroids. For these reasons, in RA patients, cemented TKA is preferred over un-cemented or hybrid TKA.<sup>6-8</sup>

RA knees are notorious with respect to flexion deformity when compared to OA knees. These deformities are corrected by posterior

soft tissue release rather than resection of additional distal femoral bone as it would elevate the joint line. In contrast to OA patients in whom an almost complete resolution of flexion contracture is required at the time of surgery, RA patients undergoing TKA can be left accepted with mild post operative flexion deformity.<sup>9,10</sup>

Appearance of Cysts following bone resection was one of the common intra-operative findings which were noted. Cysts were mostly found in femoral condyles which required impaction bone grafting (Figure 1) (Figure 2). Resected bone itself was used as bone graft. In our study we encountered cysts in ten knees. Defects in Proximal Tibia were not common One patient had severe Posteromedial Tibia condylar defect which needed Tibia stem and wedge application.

In RA patients, management of synovium during TKA has also been a concern. In the presence of active inflammatory synovitis, complete synovectomy is recommended because recurrent synovitis after TKA may occur in this patient group and complete synovectomy in such patients may lead to improvement knee pain. However limited synovectomy should be considered in the presence of inactive, quiet synovitis as it may induce fibrotic reaction. Three patients had undergone open synovectomy before TKA. Previously medial Parapateller skin incision was used. We used midline incision for TKA. Gap between two were just 5cm (Figure 3). There was no wound complications.



**Figure 1** Intra operative picture showing cyst in femoral condyle.



**Figure 2** Cyst has been filled with impaction bone grafting.



**Figure 3** Previous para-median Scar showing open synovectomy and Midline incision of Knee Replacement.

Lateral structures are contracted in fixed valgus knees with relative laxity of the medial structures. Fixed valgus is common in rheumatoid knees. Adequate lateral release is very important. Correction of such deformity usually consists of step by step release, such as in the pie-crust technique, progressing from division of the iliotibial band to the lateral collateral ligament at its femoral origin.

One patient in our study developed discharging sinus from the operated knee following redness and swelling after 9 months of surgery. The patient was on glucocorticoid therapy before and after the procedure. The pus sample from the knee was sent for microbiological investigation and Methicillin sensitive Staph. Aureus was grown. Arthrotomy and debridement was done and prolonged appropriate antibiotic was administered for 6 weeks. Since patient did not give consent for two staged revision surgery, regular dressing for sinus and wound care was advised.

Two patients had brown, thick synovial fluid collection inside the joint intraoperatively. Intra operative grams staining showed gram positive cocci in clusters and hence arthroplasty was abandoned. Complete synovectomy was done and supported with appropriate post operative antibiotics for 3 weeks. TKA was done for one of them and another was lost to follow up.

One patient who was operated for total knee arthroplasty had severe ipsilateral ankle arthritis with planovalgus foot deformity.

Rehabilitating the patient was difficult due to the ankle pathology and pan-talar arthritis was performed. We recommend Wilkinson et al.<sup>11</sup> for surgical sequence for lower limb reconstruction: forefoot, hip, knee, hind foot and then ankle, which they deemed the order of “reliability” of the procedures and ease of rehabilitation.

Various authors have expressed their concerns regarding substituting or retaining Posterior cruciate ligament (PCL) in patients with RA. Though PCL is extra synovial and RA is a synovial pathology, long time destruction of joint and pannus formation might lead to destruction of PCL leading to knee instability. Laskin reviewed 178 RA patients at an average of 8.2 years follow-up and demonstrated a 50% instability rate with PCL retaining implants in contrast to a 1% instability rate with the PCL sacrificing implants.<sup>4</sup> Goldberg et al.<sup>12</sup> & Kristensen et al.<sup>7</sup> demonstrated a 0% to 14% instability rate for PCL sacrificing implants respectively. Gill et al.<sup>13</sup> and Meding et al have also shown similar rates of instability for PCL retaining implants (1.5% and 9.9% respectively).

## Conclusion

Knee replacement for arthritis of knee secondary to rheumatoid disease is a time tested procedure and results are promising. There is a significant improvement in functional scores of the knee. However, there will be involvement of multiple joints, associated systemic complications and further progression of the disease. Because of the above said reasons overall functional outcome of the patient might not be significant improvement when compared to excellent clinical outcome of the operated knee itself.

## Acknowledgements

None.

## Conflict of interest

Authors declare there is no conflicts in publishing the article.

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