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Early Outcome of Total Knee Arthroplasty in Patients with Tricompartmental Osteoarthritis of Knee Joint

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ABSTRACT:

Background: Total knee arthroplasty has been one of the most successful operations of present era not only in terms of gratifying results, but also in terms of the patient's satisfaction, range of movements and functions. Today, it is the most common knee reconstruction procedure performed. **Materials & Methods:** This study is a prospective and observational study, which was conducted in the department of Orthopedics SSG Hospital & Medical College, Baroda, Gujarat to analyze the early outcome of total knee arthroplasty in the patients with tricompartmental osteoarthritis of the knee joint. All the patients were evaluated clinically, functionally and radiologicaly according to the 'Knee Society Score' (KSS) before doing surgery and at the 6 months postoperative period. **Results:** The patients operated in our study had average 92.24 clinical score and 91.06 functional score at last follow up. The radiological examination at final follow up revealed overall valgus angle of 4.24 degrees, mean femoral angle was 94.84 degrees and mean tibial angle was 89.4 degrees. In lateral view mean femoral angle was 6.08 degrees and the mean tibial angle was 89.06 degrees. **Conclusion:** The present study shows that the results of total knee arthroplasty are good and satisfactory and provides good functional early outcomes to the patients in attaining the standard life.

Key-words: Total Knee Arthroplasty, Knee Society Score, Osteoarthritis, Knee surgery.

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INTRODUCTION

Total knee replacement is a highly successful operation to substitute for kinematic and dynamic function of the human knee against advanced arthritis. Osteoarthritis (OA) is a disease in which all structures of the joint have undergone pathologic changes and characterized by degenerative changes in articular cartilage of the joint and subsequent new bone formation (Osteophytes) at articular margin.[1] The prevalence of OA is less in adult age below 40 years of age and it rises strikingly with the age in older persons. The symptoms are frequently associated with significant functional impairment along with signs and symptoms of inflammation, stiffness, and loss of mobility.[2] Total Knee Arthroplasty (TKA) has become a highly successful joint reconstruction procedure. The various innovations in TKA have been suggested by various authors and new

trends in operative and peri-operative management has increased its acceptability by the surgeons.[3] In the last fifteen years, the quality of total knee arthroplasty has consistently improved, which resulted in decreasing the indication for other surgical procedures such as synovectomy, debridement, osteotomy and arthrodesis for osteoarthritis of the knee joint. Surgical outcomes, patient satisfaction, and implant survival have improved steadily since its inception.[4] This operation has become widely accepted to afford relief of pain, restoration of range of motion and function.[5] Initial results using older prosthetic designs reportedly failed either due to nonadherence to strict indication criteria, or to progression of osteoarthritis in the other compartments.[6-7]

MATERIALS AND METHODS

This prospective and observational study was carried out in the Orthopaedic Department of Shree Sayajirao Gaekwad Hospital, Baroda during the period between December 2014 to August 2015. The permission from the institutional Ethical and Scientific Committee and informed consent of the patients was taken before commencement of this study. Total 32 patients who were admitted for the surgery of TKAwith an average follow up period of 6 months were studied. All the patients of tricompartmental osteoarthritis of the knee joint were included in this study and the patients who were having any fracture around the arthritic knee joint, post traumatic unstable joint, fused knee joint and the revision cases of TKA were excluded from this study.

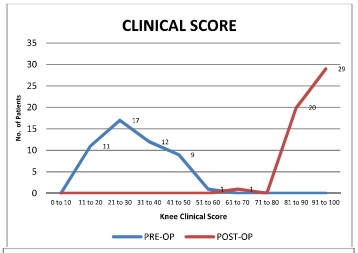
All the patients were informed and explained about the treatment plan and routine investigations were completed before doing surgery. Patient's X-ray of knee joint in AP standing and lateral view were taken with a long leg standing AP view (scanogram), which was helpful in determining the mechanical axis of the limb, especially that of femur because the valgus angle of the distal femoral cut is determined by the angle between the mechanical and the anatomical axis of the femur. The patients were operated for TKA using anterior midline skin incision and medial para-patellar knee arthrotomy in supine position on a straight table. The patients were encouraged to perform static quadriceps and hamstring exercises postoperatively. The flexion and extension exercises were performed, active and assisted, as early as possible as the pain became tolerable and patients began walking with the help of a walker by the third postoperative day and with the help of cane after 2 weeks. Postoperatively, all patients were periodically accessed clinically, functionally and radiologically according to the 'Knee Society Scoring[8]' system at 6 weeks, 3 months and 6 months intervals during follow up. The knee society clinical rating system (KSS)[9] was used to evaluate the patients preoperatively and postoperatively at 6 month follow-up. The scoring system combines a relatively objective knee score that is based on the clinical parameters and a functional score

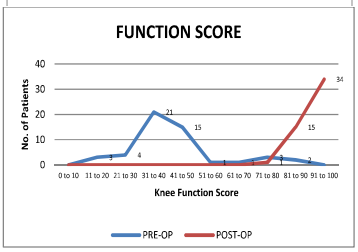
based on how patients perceive their knee function in relation to specific activities. KSS Scores of 100–85 points were considered excellent, 70–84 were considered as good results while 60–69 were considered as fair results and scores less than 60 were considered as poor results.

RESULTS:

In the present study, the most common age group was 51-60 years involving 39.39% of the patients. There was a female predominance and Male:Female ratio was 1:2. The 9 patients were operated for total knee replacement on the left side and 7 on the right side while 17 patients were operated on both sides. More than 80% of the patients in our study suffered from one or more systemic illnesses ranging from hypertension, ischemic heart disease and diabetes mellitus. Intra-operatively, no complications were encountered in any patient. Average blood transfusion for each surgery was 1 unit. In all the cases, posterior cruciate ligament substituting prosthesis was used. The common femoral prosthesis size, which was used in our study found to be of size-2 and that of the tibia was 2/12.5 mm. All patients in our study had osteoarthritis of knee with moderate to severe pain and decreased knee range of motion preoperatively. The average range of motion preoperatively was 73.5. A significant flexion deformity was seen in 2% of cases and significant extensor lag in 12% of cases. Preoperatively, 8% of the patients had varus alignment of more than 10 degrees and the rest 92% of patients had less than or equal to 10 degrees of varus alignment. In our study, 28% of the patients required some form of support to walk preoperatively and none of them were able to walk unlimited or climb the stairs up and down normally. The patellar resurfacing was done in only 10% of the cases.

In our study, 66% of the patients had no pain at final follow up and the rest 34% had mild pain. The average range of motion at final follow up was 117.12° and none of the patient had an extensor lag or flexion deformity of more than 10° on final follow up. The entire study group had a near normal anatomical valgus alignment of the knee joint of 5°± 5° at final follow up. The average postoperative valgus angle was 4.24 degrees in our study. On final follow up 34 percent of the patients could walk unlimited, 64% of the patients could walk 10-20 blocks comfortably without pain and the rest 2% could walk up to 5-10 blocks only. At final follow up 62% of the patients could climb the stairs up and down normally and 38% of the patients could climb up and down with hand support.





There was highly statistically (Paired t test, P < 0.0001) significant improvement in the KSS, from a preoperative mean score of 30.60 with a postoperative mean score of 92.24. As regards functional assessment score, there was also highly statistically (Paired t test, P < 0.0001) significant difference with improvement, from a mean preoperative knee function score (KFS) of 44.1 to a mean postoperative KFS of 91.06.

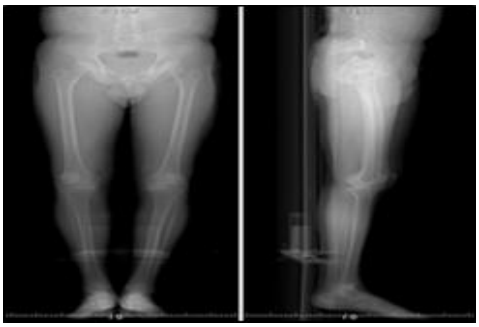


Fig-1: Scanogram

Fig-2: Post-Operative X-ray

Fig-3: Movements at 6 months follow up

On final follow up radiological examination revealed overall valgus angle of 4.24 degrees, mean femoral angle was 94.84 degrees & mean tibial angle was 89.4 degrees in AP view. In lateral view mean femoral angle was 6.08 degrees and mean tibial angle was 89.06 degrees. No radioluscencies were noted on follow up. We could achieve 98% excellent result and 2% good result in this study group.

DISCUSSION

Our study consisted of 50 total knee arthroplasties operated in Department of Orthopaedics, Sir Sayajirao Gaekwad General Hospital, Vadodara with an average follow up period of 6 months between December 2014 to August 2015. A maximum number of our patients were in the middle-aged group (5th decade). The male to female ratio in our series was approximately 1:2. Our ratio might be more because Indian females squat and sit cross-legged commonly during domestic works. Most of our patients, being middle-aged, were occupied into some physical activity and sedentary lifestyle and the majority of them were able to carry out their routine activities without any hindrance after recovery. At final follow up 62% of the patients could climb the stairs up and down normally and 38% of the patients could climb up and down with hand support. This could be due to short follow up in these patients. We think that they too would improve with time and would be able to walk and climb up and down the stairs finally. On final follow up, none of the patient in our study had an infection and hence we could achieve zero percentage infection rates. The use of laminar airflow, prophylactic antibiotic, minimizing the number of ingress and egress of operating room personnel and adhering to strict aseptic technique led in achieving a zero percentage infection rate.

We found all femoral and tibial components to be in the normal anatomical axis and overall valgus angle of 4.24 degrees. The average range of motion on final follow up

was 117.12 degrees. At final follow-up their overall functional outcome was excellent even at an average 6 months follow-up. Bhamre[10] reported results of 24 TKR with an average follow up of 6 months to 1 year in their study and the preoperative ROM was 90 degrees and was measured 110 degrees at final follow-up. They found in their work a significant improvement in KSS as the preoperative mean was 49 points and postoperative mean was 89 points. As regards to the KFS, they also reported significant improvement from 43 points (preoperative) to 75 points (postoperative). Suhail et al[11] reported in their study that KFS improved significantly to 87.1 points and KSS improved significantly to 87.90. The results of our study are almost similar to the previously published studies.[12-14]

S.no	Parameters	Present study	Radwan Study[12]
1	Number of patients	33	14
2	Age	Mean-60.85 yrs	Mean – 60 years
3	Sex	Male–11 Female-22	Male – 06 Female – 08
4	Score	KSS	KSS
5	Follow up period	6 months	1 year
6	Pain	Preop score-1.3 Postop score: 44.2	Preop score: 12.7 Postop score: 44.9
7	Range of motion	Preop-73.5 degree Postop-117.1 degree	Preop-94.7 degrees Postop-115.9 degree
8	Stability	Preop score- 18.2 Postop score-24.68	Preop score- 16.8 Postop score- 23.5
9	Knee society clinical score[15]	Preop score-30.60 Postop score-92.24	Preop score- 47.2 Postop score- 90.7
10	Knee society functional score	Preop score- 44.1 Postop score-91.06	Preop score- 35 Postop score- 87.5

In our study, we tried to evaluate the results of the fixed-bearing design as regards clinical, functional, and radiological results of TKR at 6 month postoperative interval. Evaluation of pain relief, range of movement, and improved function of all the patients was carried out, but assessment of implant durability was outside the scope of this study, because it requires longer follow-up.

CONCLUSION:

The present study shows that the total knee replacement is a safe option for tricompartmental osteoarthritis of the knee joint in the elderly patients with good recovery, in-spite of having several co-morbidities, and it is effective to give decades of trouble free life.

Conflict of Interest: None.

Source of Funding: Nil.

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