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Research article

A SHORT TERM OUTCOME OF STANDARD CRUCIATE RETAINING ARTHROPLASTY IN PRIMARY OSTEOARTHRITIS OF KNEE

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ABSTRACT

Total condylar prosthesis, which was developed in 1974, was subsequently modified to a posterior cruciate substituting the posterior stabilized version in around 1978 for the purpose of improving stair climbing, better range of knee motion, prevention of posterior subluxation and more conforming knee kinematics. But, this prospective study was performed in our institute, to assess the clinical and functional outcomes of standard cruciate retaining arthroplasty in primary osteoarthritis of knee. **Methods:** 29 patients who are diagnosed primary osteoarthritis knee underwent Cruciate retaining knee arthroplasty and followed up for a period of 2-3 years. **Results:** In our study patients were evaluated according to Knee society scoring system, which showed preoperatively poor grade and post operatively showed 73% excellent, 17 % good and 10% fair results with no poor results. **Conclusion:** We concluded from our study that cruciate retaining knee arthroplasty provides pain relief, good range of motion, deformity correction, no instability and no other complications.

Keywords: Total knee arthroplasty, Cruciate retaining, Posterior cruciate ligament, Knee Society Scoring.

INTRODUCTION

Total knee arthroplasty (TKA) has provided pain relief and improved knee function for a variety of arthritic conditions with good long term results.¹⁻¹²

However, one of the most commonly cited reasons for retaining the PCL is to preserve femoral rollback, which improves extensor efficiency by lengthening the moment arm and improves the range of flexion by minimizing the potential for impingement of the femur on the tibial component.¹³⁻²¹

Physiologic rollback in the normal knee is a complex combination of rolling, gliding and rotation of the femoral condyles relative to the tibial plateau that results in a net posterior movement of tibiofemoral contact in flexion.^{14,15,17,22-24} Normal rollback is dependent on the integrity of the cruciate ligaments, which form a four-bar planar linkage between the femur and tibia that constrains the relative

movements of the articular surfaces.²³⁻²⁵ During TKA, the ACL is resected and the complex complementary geometry of the articular surfaces is altered.

Therefore, the normal interaction of the four-bar linkage mechanism and the articular surface is lost and rollback cannot occur. However, under these circumstances, if appropriately tensioned, the retained PCL can exert a beneficial checkrein effect to counteract the naturally occurring shear forces which would otherwise result in anterior translation of the femur on the tibia in flexion.²⁶ This prospective study was performed to assess the clinical and functional outcomes of Cruciate retaining TKA.

MATERIALS AND METHODS

This study was started after the approval of Ethics Committee of Meenakshi Medical College Hospital

And Research Institute. The prospective study conducted on 29 patients with 30 symptomatic Tricompartmental OA knees in the Department of Orthopedics at Meenakshi Medical College Hospital and Research Institute, Kanchipuram. Patients aged between 45-70 years presented with symptomatic knees who are not relieved by conservative management underwent Cruciate retaining TKA during the period of June 2011 to June 2014. There were 18 females and 11 male patients were evaluated pre operatively and post operatively according to knee society scoring³³. There were 14 Type II diabetic patients included in this study. All the cases with primary osteoarthritis with joint space narrowing were included in the surgery. Rheumatoid arthritis with severe ligament damage of PCL and patients who are unfit for surgery were excluded from our study. Patients, prior to knee replacement, should be clinically screened for active infection. After obtaining informed consent from patients, they were posted for surgery.

Surgical technique: Under strict aseptic precaution, Combined spinal and epidural anesthesia were given to all patients. Patient in supine posture, parts painted and draped. All cases operated without using a tourniquet. Prophylactic intravenous antibiotics were used in all patients. Through midline skin incision, medial parapatellar arthrotomy, all the knees were exposed. PCL was retained and appropriately tensioned by partially releasing from femoral attachment especially anterolateral fibers. Tibial cuts were made perpendicular to mechanical axis. Entry point made in the distal femur, and distal cut made in 5degree/6degree valgus. Finishing cuts as per femoral size required. After trial reduction, patellar tracking were checked and final components were cemented. Patients were operated by the same surgeon, using instrumentation provided by the manufacturers (genesis II - Smith & Nephew, AGC – Biomet, & Gemini – Link). Since the tourniquet was not used, majority of transfusions were administered intraoperatively one unit and within 48 hours post operatively one unit if required. There were no adverse reactions.

Postoperatively, all patients received anticoagulation. On 2nd post operative day, after drain removal resistive quadriceps exercises, ankle pump exercises, range of motion exercises and weight bearing were done as tolerated. The patients were called back for

review at 1st month, 3rd month 6th, 1st year and 2nd year (Short-term follow up study). Precautions to be taken after surgery was deep knee bending after 110 degrees should be avoided. Sitting on floor with crossed legs and squatting should be avoided.

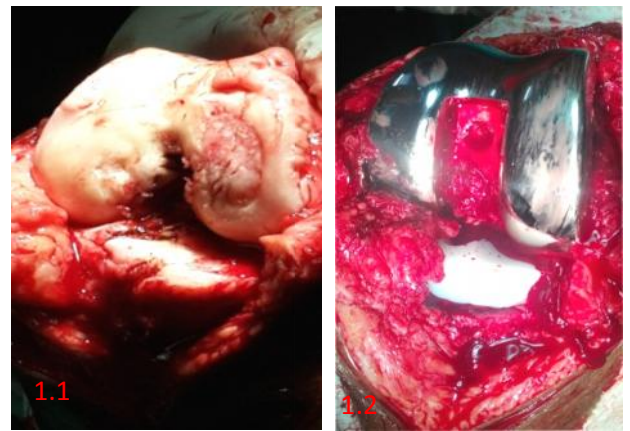


Fig 1.1: Intra op – PCL retained **1.2:**Prosthesis fixation (AGC-Biomet)

The knee society scoring³³ was used for assessment of preoperative and postoperative clinical and radiological outcome at each follow up. This study aims to assess the effectiveness and efficiency of a Cruciate retaining TKA, and to evaluate clinical and functional outcome.

RESULTS

In our study, there were 18 females and 11 males and out of which bilateral TKA was done in 1 case at same sitting. Maximum belonged to 60 – 69 years with mean age 65.86 years and females are more for surgery in the ratio of 3:1. Mean operating time was 1hour 30 min (range 1 hr 10 min to 1hr 50 min). Average amount of blood in the drain post operatively was 220 ml (range 150-280 ml). Mean follow up duration was 2 yrs. Mean knee society score preoperatively was 52 and postoperatively at 1st month – 68, 3rd month -74, 6th -78,1st year-81 and at 2nd year - 84. There were over 90% excellent results according to knee society score³³ in patients with normal or weak quadriceps. There was varus deformities in all cases, with an average angle of 20 degrees (range 10-30 degree), which was corrected to physiological valgus (2-7 degree). This was achieved in 90% of cases (Fig.2.1-3.2). Range of knee motion is considerably increased from a preoperative mean of 60 degrees to a post operative mean of 100 degrees at the end of two years. (Fig.4.1-4.2)



Fig 2.1: Pre Operative - Antero Posterior View Fig 2.2: Lateral view



Fig 3.1: Post Operative - Antero posterior View 3.2: Lateral view

Though diabetes mellitus increases the chances of infection, but no complication occurred in our study. During the 2 year period of follow up there was no case of loosening of tibial or femoral component. All cases were having poor grade preoperatively according to knee society scoring system and postoperatively, there were 22 excellent, 5 good and 3 fair results in our study. (Fig.5)



Fig.4.1 Post operative-Sitting 4.2: Standing

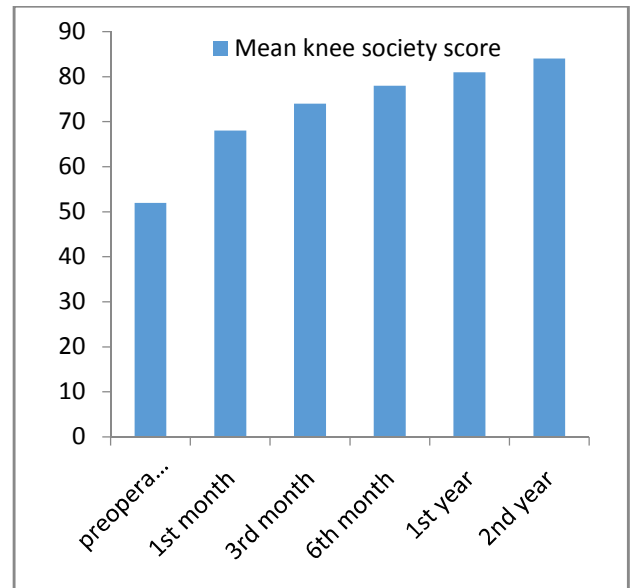


Fig.5 Results graded according to Knee society score³³ (Y axis – mean knee society score)

DISCUSSION

Osteoarthritis causes a lot of physical and mental trauma to the patient because of pain and deformity. TKA has emerged as a boon for patients suffering from osteoarthritis and other deformities of knee when conservative treatments have failed. The proponents of CR claim that it acts as a Biologic stabilizer and is capable of absorbing the shearing forces and reduces the stresses at the prosthesis-bone interface^{5, 27-32}. Andriacchi et al^{27, 30} demonstrated that patients who received TKA with PCL preservation were better at stair climbing than those who sacrificed PCL.

According to this study, we were able to achieve the physiological valgus of 2-7 degrees in all the cases. We never used tourniquet. No cases were observed with tibial or femoral component loosening. In our study the follow up was done at 1st month, 3rd month, 6th month, 1st year and 2nd year. The results were 73% excellent, 17% good, 10% fair and no poor results at the end of two years and these results are obtained not only due to surgical skills but also because of better antibiotics, proper sterilized environment, early ambulation and physiotherapy. There were no major complications in our study. Limitation of our study is short term follow up, where long term study is required.

CONCLUSION

This study concludes that Cruciate retaining knee arthroplasty in primary Osteoarthritis showed good outcomes, good pain relief, good deformity correction, good range of motion and no major complications.

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Conflict of interest: Nil.

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