ORIGINAL RESEARCH PAPER

Orthopaedics

A STUDY OF SHORT TERM FUNCTIONAL & RADIOLOGICAL OUTCOME IN PATIENTS UNDERGONE CRUCIATE RETAINING TOTAL KNEE REPLACEMENTS

KEY WORDS: ''Knee society score", "PCL Retaining Total Knee Replacements''," Knee Functional Score".

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ABSTRACT

Introduction: Osteoarthritis of knee is a chronic and painful disease without a known medical cure. Osteoarthritis causes pain and loss of movement in the knee that lead to difficulty in performing daily activities. The surgical management of Osteoarthritis varies from soft tissue interposition arthroplasty to surface replacement arthroplasty.

Methodology:

Aim: To access the Short Term Functional & Radiological Outcome in Patients Undergone PCL Retaining Total Knee Replacements. The retrospective study conducted from July 2013 to September 2014, analyzed 30 cases of TKR, with 28 cases of Osteoarthritis of knee and 2 cases of Rheumatoid arthritis of knee in the age group of 40 to 70 years. All patients were taken X-rays of the replaced knee with prosthesis, antero posterior view and lateral view followed at 6 weeks, 3 months, 6 months and 1 year post-operatively. All patients were clinically and functionally evaluated with Knee society score.

Results: In our study of 30 patients who underwent Total Knee Arthroplasty using posterior cruciate retaining design, majority of the patients were from the age group of 66-70 years .The average post - op Knee Clinical Score in this study was 86.7. According to the Knee Society Functional Scoring system, of the 30 patients assessed, 23 patients (76.7%) had Excellent, 6 patients (20%) had Good, and 1 patient (3.3%) had Fair results.

Conclusion: Total Knee Arthroplasty improves the functional ability of the patient and the ability of the patient to get back to pre-disease state, which is to have a pain free mobile joint, as reflected by the improvement in the post-op Knee Clinical Score and Knee Functional Score.

INTRODUCTION

Arthritis is the most common disabling disease that affects millions of people in our country. The common causes of knee arthritis include Osteoarthritis (OA), Rheumatoid Arthritis (RA), Juvenile Rheumatoid Arthritis, Post traumatic Arthritis, Secondary Osteoarthritis and other types of inflammatory arthritis. The incidence of osteoarthritis is increasing with increase in ageing population.

Osteoarthritis is a chronic and painful disease without a known medical cure. Osteoarthritis causes pain and loss of movement in the knee that lead to difficulty in performing daily activities. Medicines can relieve the pain but they cannot cure the underlying pathology. In most arthritic knees, some degree of instability, deformity, contracture or a combination of these elements, can be found. (1, 2, 3)

By 19th Century the idea of Changing the articular Surface to obtain better functional outcome was started. Though there are many advances in biomedical technology in last 20 years, persons with destructed joints by osteoarthritis find renewed hope in Total Knee Arthroplasty.

The surgical management of Osteoarthritis varies from soft tissue interposition arthroplasty to surface replacement arthroplasty. In surface replacement arthroplasty different types of prosthesis were developed to address the complex kinematics of the knee joint. Various systems are available with specific features regarding the geometry of the components, the degree of conformity of the articulating surface and the anchoring technique. Various implant designs such as cruciate substituting and cruciate retaining prosthesis are available to improve the functional outcome.

The goals of Total Knee Arthroplasty include
1. Pain relief.
2. Restoration of normal limb alignment and
3. Restoration of the functional range of movement.

The Functional & Clinical outcome based upon the following factors
1. Surgical Technique
2. Design & Ability of the implant to Reproduce Knee Function
3. Postoperative Rehabilitation

The Alignment of Femoral & Tibial Component determines the Outcomes. (4) Range of motion and stability are the two key factors in the success of total knee arthroplasty. Both features relate intimately to the kinematics of the knee joint. 6-Primary mal alignment and of the femoral component, in particular may lead to

1. Patella mal tracking.
2. Anterior knee pain and
3. Flexion instability.

The rotational alignment of the femoral component can be measured post operatively by
1. Conventional radiographs.
2. Axial two-dimensional (2D) CT scan and
3. Axial three-dimensional (3D) reconstructed CT scan.

It is measured post operatively by the angle between transepicondylar axis of femur and posterior condylar line of the prosthesis.(5) The functional outcome of Knee Replacement can be assessed by using the Knee Society Score System.

METHODOLOGY

Aims &Objective: To Study of Short Term Functional & Radiological Outcome in Patients Undergone Cruciate Retaining Total Knee Replacements.

Materials and methods:

A retrospective study was done in a government medical college hospital, Madurai. Inclusion criteria were Patient undergone Total Knee Replacements in Govt Rajaji Hospital from July 2013 to September 2014, in the age group of 40-80 Years. Both Males & Females are included in the study, who suffered from Primary Osteoarthritis Knee and Rheumatoid Arthritis. We excluded patients with Septic Arthritis, Ankylosing Spondylitis, TB Arthritis Knee, previous history of ipsilateral proximal tibial, distal femoral fractures and stiffness of the ipsilateral hip or ipsilateral hip replacement. Source of data was obtained from the Patients undergone Total Knee Replacements in Govt Rajaji Hospital,

Madurai from July 2013 until September 2014. The following details like, Subjective History, Clinical evaluation, Standard AP & Lat View X rays of knee joint taken at 3 months, 6months and 1 year Post operatively were obtained from the patients. The implant used for the surgery was PCL sparing femoral & tibial component for Total Knee Replacement.

The score used to measure the Functional & Radiological Outcome were Knee Society score, Knee functional score & Knee Clinical score. Post operatively patient's knee was immobilized with Jones compressive bandage and a knee immobilizer immediately. All patients were started on IV antibiotics and DVT prophylaxis in the form of subcutaneous low molecular weight heparin.

1st post op day, patient was taught static quadriceps exercises. 2nd post op day, the dressing was debulked and wound inspected. Patient was taught static quadriceps exercises and ankle mobilization exercises. 4th post op day, knee flexion was started and patient was taught dynamic quadriceps exercises. Patient was made to walk full weight bearing within the limits of pain. IV antibiotics were given for the first 6 days post op and then switched over to oral antibiotics for the next five days. DVT prophylaxis was given for the first five days post operatively. On 12th post op day, sutures were removed and patient was advised to continue regular physiotherapy.

Patients were followed up at 6 weeks, 3 months, 6 months, 1 Year respectively and evaluated clinically, functionally and radiologically using Knee society score.

RESULTS:

Among the 30 patients studied, maximum numbers of patients were in the age group of 66-70 years (23.3%) with age group ranging from 40- 70 years with the mean age as 57.5.

Most of the study participants (70%) were females and 30% were males, with the predominance of female patients. 53% of the patients were having problem with their left side of their knee joint.

Table I: Comparison of indication

Indications	Frequency	Percentage
Osteoarthritis	28	93.3
Rheumatoid Arthritis	2	6.7
Total	30	100

Among 30 Cases studied, 28 patients (93.3%) had osteoarthritis and 2 patients (6.7%) had Rheumatoid Arthritis (table I). Knee Society score was used to measure the functional outcome of the patients both clinically and functionally. Average Knee Clinical score was found to be 86.7 and average Knee Functional score was found to be 87.5 as shown in table II. It signifies the maximum number of patients having excellent outcome. Evaluation of Clinical outcome using Knee Clinical Score shows 19 patients (63.4%) with excellent outcome, 10 with Good and 1 with fair outcome respectively. (Table III)

Table II: Knee Society score:

Post-operative score	N	Mean	Median	Mode	SD	Minimum	Maximum
Knee clinical score	30	86.7	88.5	90	7.2	69	97
Knee functional score	30	87.5	90.0	90	7.3	65	100

Table III: Knee clinical score and Knee functional score:

	Knee functional score			
Knee clinical score	Excellent	Good	Fair	Total
Excellent	19	0	0	19
Good	4	6	0	10
Fair	0	0	1	1
Total	23	6	1	30

Radiological results:

The ideal placement of the tibial component was defined as 90 +/- 5 deg to the long axis of the tibial shaft on both the antero-posterior and lateral X-rays. The desired placement of the femoral component was 5 +/- 5 deg of valgus on the antero-posterior X-rays. Considering the given range of placement of components, the placement of tibial component in both AP and Lateral views was 90 degrees and the placement of femoral component in AP view was 5 degrees of valgus. In our one year follow up of the study the component position and knee alignment was well maintained. There was no significant radiolucency seen in X-rays taken in short term follow up of the cases.

Discussion:

Total Knee Arthroplasty is generally an effective procedure and is associated with substantial functional improvement. Elderly patients who were having difficulty in mobilizing knee because of degenerative arthritis found good relief of pain and range of motion after Total Knee Arthroplasty.

There was a substantial relief of joint pain, increased mobility, correction of deformity and an improvement in the quality of life of the patients following Total Knee Arthroplasty. With the varied amount of implant designs available the posterior cruciate Retaining design was used in this study and found to be effective. (6) Buz Swanik found that following total knee arthroplasty, patients were able to reproduce the joint position and improve the mobility significantly. These changes may result from the re-tensioned capsulo-ligamentous structures and reduced the pain and inflammation.

Retention of the posterior cruciate ligament plays a vital role appear to significantly improve proprioception and balance compared with those functions in patients with a posterior stabilized total knee design. In our study, none of the patella were resurfaced. There was no anterior knee pain in any of our subjects. Robert L Barrack et al. (7,8) concluded that postoperative anterior knee pain is related either to the Component design or to the details of the surgical technique, such as component rotation, rather than to whether or not the patella is resurfaced.

Nutton concluded that knee function was not improved by patella resurfacing when compared to a matched group of patients without resurfacing. [9]

Wood et al concluded that total knee arthroplasty with patellar resurfacing exhibited inferior clinical results as compared to total knee arthroplasty with patellar retention. Total knee arthroplasty with patellar resurfacing exhibited significant limitation of knee extension, which was significantly associated with the presence of post-surgery anterior knee pain.

The Knee Society Score system separates findings in the operated knee with findings in the patients function. The system is subdivided into a knee clinical score that rates only the knee joint itself and a knee functional score that rates the patient's ability to walk and climb stairs. As such the knee clinical score is not artificially affected by co-morbid conditions. The scoring system combines a relatively objective knee clinical score that is based on the clinical parameters and a knee functional score based on how the patients perceives that knee function with specific activities.

In our study there was significant improvement of Knee Clinical Score and Knee Functional Score following Total Knee Arthroplasty. The Knee Society Roentgenographic evaluation and scoring system was developed for uniform reporting of roentgenographic results of Total Knee Arthroplasty.

In our one year follow up study, the component position and knee alignment was well maintained. Long term follow up results are needed to strengthen the study.

CONCLUSION

Total Knee Arthroplasty improves the functional ability of the patient and the ability of the patient to get back to pre-disease state, which is to have a pain free mobile joint, as reflected by the

improvement in the post-op Knee Clinical Score and Knee Functional Score. Though short –term follow up of our study shows excellent outcome of patients both radiologically and functionally and long term follow up is essential for assessment of radiological outcome and patient reported pain and satisfaction following Total knee arthroplasty.

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