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Original Research Article

TOTAL KNEE ARTHROPLASTY IN ADVANCED OSTEOARTHRITIS OF KNEE – A REVIEW STUDY

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Abstract

Background: The aim of this study was to study the clinical and functional outcome of total knee arthroplasty using knee society score and to find association between knee functional score and knee clinical score. **Materials and Methods:** A prospective analysis of 50 cases of osteoarthritis knee patients was conducted at Department of Orthopedics, Narayan Medical College & Hospital, Jamuhar, Rohtas, Bihar over a period of two years that was March 2019 to February 2021. This duration included the diagnosis of OA, performing TKA and then follow-up of the case of a period of 6 months. Those patients who underwent total knee arthroplasty were assessed clinically and functionally using knee society score. **Result:** The majority of the patients were from the age group of 59-68 years which accounts for 59.5% of patients in our study. The youngest patient was 47 years of age and the oldest patient was 71 years. The mean age was 62 years. There was a male predominance with male female ratio of 2.2:1 in our study, accounting for 65% of the patients. The mean preoperative knee clinical score (KCS) was49.4±13.8 which was increased to an average postoperative score of 88.1 ±5.6 at the end of 6 month. **Conclusion:** Total knee arthroplasty is a relatively safe and sure procedure in the hands of the experienced surgeons.

INTRODUCTION

In most arthritic knees, some degree of instability, deformity, contracture or combination of these elements, can be found.[1-3] The common causes of arthritis of the knee include osteoarthritis (OA), rheumatoid arthritis (RA), juvenile rheumatoid arthritis, post traumatic arthritis or secondary osteoarthritis and other types of inflammatory arthritis.

Osteoarthritis (OA) is a chronic degenerative joint disease and a major cause of disability in the elderly people.[4] The rapid increase in the prevalence of this disease suggests that OA will have a growing impact on health care and public health systems in the near future.[5] The joints most commonly involved include the hip; knee; distal interphalangeal, proximal interphalangeal, and first carpometacarpal joints of the hand; and cervical, thoracic, and lumbar spine. The concept of improving knee joint function by modifying the articular surfaces has received attention since the 19th century. The surgical techniques vary from soft tissue interposition arthroplasty to resection arthroplasty to surface replacement arthroplasty. In surface replacement arthroplasty different types of prosthesis were developed to address the complex knee kinematics.

Total knee arthroplasty (TKA) is now a reliable treatment for severe arthritis. 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. Total joint replacement (TJR) for the management of OA is considered to be one of the most cost-effective operations performed, with well-documented improvements in patient benefits, reducing pain and improving physical function.[6-10] with the advent of these varied types of prosthesis it became necessary to conduct studies for assessing the outcome of different prosthesis. Hence different scoring systems were devised for assessing the outcome of total knee replacement. The knee society score system is subdivided into a knee score that rate only the knee joint itself and a functional score that rates the patient's ability to walk and climb stairs. The dual rating system eliminates the problem of declining knee scores associated with patient

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infirmity.[11] The aim of this study was to study the clinical and functional outcome of total knee arthroplasty using knee society score and to find association between knee functional score and knee clinical score.

MATERIALS AND METHODS

A prospective analysis of 50 cases of osteoarthritis knee patients was conducted at Department of Orthopedics, Narayan Medical College & Hospital, Jamuhar, Rohtas, Bihar over a period of two years that was March 2019 to February 2021. This duration included the diagnosis of OA, performing TKA and then follow-up of the case of a period of 6 months. Those patients who underwent total knee arthroplasty were assessed clinically and functionally using knee society score.

Inclusion Criteria

Moderate to severe knee pain, angular knee deformity, knee stiffness (extension lags and flexion contractures) with decreased range of motion, unilateral/bilateral knee involvement

Exclusion Criteria

Active infection of knee or anywhere in the body, revision arthroplasty, young patients less than 45 years of age, vascular problems (deep vein thrombosis), having periprosthetic fracture, previous implant in knee joint, MRSA positive patients, secondary osteoarthritis-post traumatic/post inflammatory/post infection, patients not consenting for the study.

Once the patients agreed to participate, informed consent was taken and the subjects were then included in the study. Detailed history of all patients was taken. All patients were assessed clinically and functionally using the knee society score. [5] The preoperative medical evaluation of all patients was done to prevent potential complications that can be life-threatening or limb threatening. Any limb length discrepancies were noted. Presence of any hip and foot deformities was assessed. The extensor mechanism was assessed for any quadriceps contractures. The knee deformities were examined forany fixed varus or valgus deformities or presence of any fixed flexion contracture. Thorough preoperative evaluation was done of all patients. Total knee arthroplasty was performed by same surgical team under general or regional anesthesia, patient in supine position with knee flexed to 90 degrees. Pneumatic tourniquet was used for all the patients to stop blood flow during the surgery, while suction drain was applied after the surgery. After completion of surgery the patient's knee was immobilized in a Jones compressive bandage and a knee immobilizer immediately post operatively. The patients were started on IV antibiotics and DVT prophylaxis in the form of subcutaneous low molecular weight heparin. Passive movements and weight bearing were started in all patients 2 days after the surgery, when the drain was taken out.

The patient was assessed 3 weeks post operatively for any signs of hematoma or other operative consequences like infection. Once postoperative infection was ruled out clinically the patient was assessed clinically, functionally and using the knee society score at an interval of 1, 3 and 6 months. Descriptive data are expressed as frequency and percentages, and means with SD. A value of $P<0.05$ was considered statistically significant. Statistical analyses were performed using SPSS 20.0.

RESULTS

The majority of the patients were from the age group of 59-68 years which accounts for 59.5% of patients in our study. The youngest patient was 47 years of age and the oldest patient was 71 years. The mean age was 62 years. There was a male predominance with male female ratio of 2.2:1 in our study, accounting for 65% of the patients.

Table 1: The knee clinical score and knee functional score (N = 50).

Score	Pre-operative	1st months post-operative	3rd month post-operative	6th month post-operative
KCS	49.4±13.8	65.9 ± 11.2	78.4 ±8.7	86.1 ±5.6
P value		<0.0001	<0.0001	<0.0001
KFS	32.8 ± 11.8	56.7 ± 10.9	74.9 ± 9.2	84.4 ± 9.6
P value		<0.0001	<0.0001	<0.0001

Table 2: Association between knee functional score and knee clinical score (N = 50)

KCS	KFS			
	Excellent	Good	Fair	Poor
Excellent	29	8	0	0
Good	0	7	2	0
Fair	0	0	3	0
Poor	0	0	0	1

The mean preoperative knee clinical score (KCS) was49.4±13.8 which was increased to an average postoperative score of 88.1 ±5.6 at the end of 6 month as given in [Table 1]. According to the knee society clinical scoring system of the 50 patients assessed in this study, 37 patients (74%) had excellent, 8 patients (16%) had good, 3 patients (6%) had fair and 2 patient (4%) poor results. Similarly, the mean preoperative knee functional score (KFS) was32.8 ±11.8 which was increased to an average

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postoperative score of 84.4±9.6 at the end of 6 months seen in Table 1 and according to the knee society functional scoring system, 37 patients (74%) had excellent,8 patients (16%) had good, 3 patients (6%) had fair and 2 patient (4%) poor results. There was significant increase in KCS and KFC score during follow up at 1st, 3rd and 6th months' interval. One patient developed infection post operatively. Association between knee functional score and knee clinical score was done preoperatively at 1st, 3rd and 6th months with Spearman rank correlation coefficient. Spearman 'r'value was 0.418, 0.516, 0.451, 0.717 ($p < 0.05$). Thus, there was significant association between knee functional score and knee clinical score at every interval. Out of the 37 patients who had excellent knee clinical scores, 29 patients (80.5%) had excellent knee functional scores, 8 patients (20.05%) had good knee functional scores. Out of the 8 patients who had good knee clinical scores, 7 patients (90%) had well and 1 had fair (10%) knee functional score, 3 patients (100%) had fair knee clinical and functional scores. One of the patients developed infection and had a poor score as given in [Table 2].

DISCUSSION

This prospective study was conducted to assess the clinical and functional outcome of TKA using knee society score and to find association between knee functional score and knee clinical score. Nowadays, total knee arthroplasty is becoming a standard treatment for arthritic knee in terms of relief from knee pain free as well as it stabilizes the knee with an appropriate range of motion and associated with substantial functional improvement. Significant advances have occurred in the type and quality of the metals, polyethylene, and, more recently, ceramics used in the prosthesis manufacturing process, leading to improved longevity. As with most techniques in modern medicine, more and more patients are receiving the benefits of total knee arthroplasty (TKA).[12,13] These advances in the knee implant design and the surgical techniques for total knee replacement achieved successful results in reducing the pain and providing with a stable joint. After total knee arthroplasty, good relief was observed in older patients who were having difficulty in mobility because of degenerative arthritis. 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 substituting design was found to be effective.[14]

In our study, 59 to 68 years (59.5%) was the most common age group followed by 50 to 59 years (37.5%) with male predominance. This is in accordance to study conducted by Wood et al.[15]

The knee society score is used to assess the outcome of total knee arthroplasty. The knee society score rating system is a logical outgrowth of the hospital for special surgery rating system. In our study, on clinical and functional evaluation of the patients, assessed by the KSS score significant improvement was observed in both KCS and KFS score during follow up at 1st, 3rd and 6th months as compared to preoperative value. There was significant association between KFS and KCS at every interval.

Similarly in the study conducted by Farahini et al significant improvement in knee society score was observed.[16] Our findings also correlate well with study conducted by Yaratapalli et al showing increased in Knee society score after TKA.[17] In our study, only one (5%) patient showed postoperative infection leading to poor KCS and KFS score in this patient.

Buz-Swanik ET al, found that after total knee arthroplasty, most of the patients were able to reproduce joint position and significantly improve in mobility was observed. These changes may result due to retensioned capsuleligamentous structures and reduced pain and inflammation. There was also significant improvement in the balance index postoperatively. The group treated with the posterior stabilized prosthesis more accurately reproduced joint position when the knee was extended from a flexed position. Retention of the posterior cruciate ligament does not appear to significantly improve proprioception and balance compared with those functions in patients with a posterior stabilized total knee design.[18] Barrack et al found that total knee arthroplasty with retention of the patella yielded clinical results that were comparable with those after total knee arthroplasty with patellar resurfacing.[19] Barrack et al 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.[20] 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.[21] In our study, none of the patella was resurfaced. All patellas were circumferentially denervated. None of the patients reported anterior knee pain in our study.

CONCLUSION

Total knee arthroplasty is a relatively safe and sure procedure in the hands of the experienced surgeons. Treatment with total knee arthroplasty resulted in greater pain relief and functional improvement after 6 months. It 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

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postoperative knee clinical score and knee functional score.

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