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ORIGINAL RESEARCH

To assess the clinical and radiological outcomes of patients with osteoarthritis knee undergone total knee arthroplasty.

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ABSTRACT

Background: Many total knee arthroplasties in osteoarthritis Knees are being performed nowadays. The clinic-radiological profile of these cases is varied. The study is to assess the clinical and radiological outcome in cases of osteoarthritis knee that have undergone total knee arthroplasty (TKA).

Materials & methods: The randomly selected 64 patients, who had undergone TKR for osteoarthritis knee during the preceding 36 months were studied, retrospectively. Their records were evaluated in depth after getting ethical clearance. The preoperative routine and clinical assessment data were noted from the records. Wherever needed, the patients were also examined and interviewed physically during their follow-up at their convenience and after taking the individual's due consent. It was to fill the gaps wherever felt. The data and results thus collected were recorded in a Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Student t-test and Pearson's correlation were used for evaluation of the level of significance.

Results: According to KL grading, 28.13 per cent and 26.56 per cent of the patients were of Grades 3 and 4, respectively while 25 per cent and 20.31 per cent of the patients were of Grades 2 and 1, respectively.

Conclusion: It seems possible that the relationship between clinical and radiographic osteoarthritis severity and postoperative outcomes might be relatively unrelated to the relationship seen between preoperative KSS and postoperative outcomes. To understand and establish this relationship, further work is needed.

Keywords: Osteoarthritis, KSS, TKR.

INTRODUCTION

The knee joins the leg and thigh and is the largest joint in the human body. It is an essential component of efficient bipedal movements such as walking, running, and jumping. The knee joint is a compound synovial joint having components of the tibiofemoral and the patella-femoral joint. It primarily serves as a hinge joint which allows flexion and extension as well as various other movements to give stability, locking and range of movement. The complex functional joint mechanism is supported by ligaments namely anterior and posterior cruciate ligaments (ACL &PCL), medial and lateral collateral ligaments (MCL&LCL), medial and lateral meniscus etc. The function and stability of the knee depend on muscles, bones, ligaments, cartilage, synovial tissue, synovial fluid, and other connective tissues. The main

stabilizing ligaments of the knee are cruciate ligaments. The ACL attaches to the lateral condyle of the femur and the inter-condyloid eminence of the tibia and prevents anterior translation of the tibia on the femur. The PCL is attached from the medial condyle of the femur to the posterior intercondylar area of the tibia, which checks the forward displacement of the femur on the tibia.[1]

Osteoarthritis is a systemic disease, affecting joints which get wear and tear due to movement and load sharing. Knee osteoarthritis is the most common type of arthritis diagnosed. Primary osteoarthritis is more common in females and in the elderly due to degenerative changes. The prevalence rate of OA is increasing due to an increase in longevity of life leading to the increased population of elderly. Obesity also adds to this, especially in the Indian population. Approx.13% of females and women and 10% of the male population of 60 years and older have symptomatic knee osteoarthritis. In the population older than 70 years, the prevalence rate is as high as 40%. It is a multifactorial, progressive disease that may eventually lead to disability of varying degrees. The clinical symptoms of osteoarthritis vary from individual to individual. With passing years in the elderly population, it becomes frequent, severe and debilitating. The rate of progression also varies from individual to individual. The symptomatology of OA includes knee pain of varying degrees, gradual in onset which worsens with activity, knee stiffness and swelling. The pain usually occurs on walking, and joint movement activities especially after rest or sitting long duration. There is no definitive treatment, however, reduction in body weight and strengthening exercises of muscles around the knee have a definitive role in the management. The treatment for OA knee begins with preventive, conservative and progresses to surgical treatment viz., PFO, HTO and arthroplasty, which have their limitations. Contrary to RA and other inflammatory conditions, medications slow down the progression of arthritis, and there are no proven disease-modifying agents for the treatment of knee osteoarthritis currently exist.[2,3] Interestingly, not everyone who shows radiographic changes of knee osteoarthritis will be symptomatic. One study found that only 15% of patients with radiographic findings of knee OA were symptomatic. Not factoring in age, the incidence of symptomatic knee osteoarthritis is roughly 240 cases per 100,000 people per year. [2-5] Hence, this study was conducted to assess the correlation between clinical and radiological findings in subjects with osteoarthritis knee who underwent total knee arthroplasty.

Material & Method

The randomly selected 64 patients who underwent total knee arthroplasty over 36 months were included in the study. After due clearance from Institute's ethical committee, the records of these cases were reviewed. The records of patients with primary or secondary arthritis with or without deformities who have already undergone TKR were reviewed. The adult population of the age group 45-90 years were included. The pre-operative routine and clinical assessment data were noted the gaps in the record were filled by collecting details while individuals visited OPD during follow-up and as per patient's convenience after due consent. Patients were interviewed and clinically examined, wherever needed. Following surgery correlation between 'pre-op Knee Society Score' (KSSi) and 'Radiological Severity'(RS) with 'change in Knee Society Score' (ΔKSS) is measured. All the results were recorded in a Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Student t-tests and Pearson's correlation were used for the evaluation of the level of significance.

Results

According to KL grading, 18 cases (28.13%) and 17 cases (26.56%) were of Grade 3 and Grade 4 respectively while 16(25%) and 13(20.31%) of the patients were of grade 2 and

grade 1 respectively. The mean preoperative KSS was 117.76 while postoperative KSS was found to be 211.68. Comparing the results statistically significant increase in KSS postoperatively was seen.

Table 1: Distribution of patients according to KL grading

KL Grading	Number	Percentage
Grade 1	13	20.31
Grade 2	16	25.00
Grade 3	18	28.13
Grade 4	17	26.56
Total	64	100

Table 2: Preoperative and postoperative KSS

KSS	Mean	SD	p-value
Preoperative	117.76	32.75	0.000 (Significant)
Postoperative	211.68	12.78	

While correlating change in KSS with preoperative KSS values, a significant negative correlation was seen. This implies that lower KSS values were associated significantly with higher changes in KSS values. i.e., better outcome in terms of KSS score postoperative.

Table 3: Correlation of change in KSS with preoperative KSS values

Pearson's correlation	r- value	p-value
Values	-0.9775	0.0001 (Significant)
Interpretation	Strong significant negative correlation	

While correlating change in KSS with preoperative KL grading, a significant positive correlation was seen. This implies that higher KL grading was associated significantly with higher change in KSS values i.e. better outcomes in terms of KSS score postoperative.

Table 4: Correlation of change in KSS with preoperative KL grading

Pearson's correlation	r- value	p-value
Values	0.8588	0.0001 (Significant)
Interpretation	Strong significant positive correlation	

DISCUSSION

The total knee arthroplasty (TKA) is to re-establish the normal mechanical axis with a stable prosthesis that is well fixed. This is achieved by both bone resection and soft tissue balance. With the improved implant, design and better surgical techniques and increased surgical skills among operating doctors, surgical outcomes, patient satisfaction and implant survival have improved steadily. Now, the operation has become widely accepted to afford relief of pain, restoration of range of motion (ROM), stability, and function.

The medial parapatellar approach was used which provides better visualization of the surgical field, reduced tissue trauma due to avoidance of excessive tissue compression by retractors, reduced surgical time and a shorter learning curve for surgeons. The posterior-stabilized condylar knee prosthesis which is a modification of the total condylar knee prosthesis; is the "gold standard" for TKA longevity. It is a "posterior cruciate ligament-substituting" prosthesis, which has a tibial and femoral component articulation, that allows for femoral

rollback during knee flexion. This mechanism makes it both clinically and mechanically better.[6-8] Hence, this study was conducted to assess the clinical and radiological assessment of subjects with osteoarthritis knee in total knee replacement.

In the present study, according to KL grading, 18(28.13%) and 17(26.56%) of the patients were of Grade 3 and Grade 4 respectively while 16(25%) and 13(20.31%) of the patients were of grade 2 and grade 1 respectively. The mean preoperative KSS was 117.76 while postoperative KSS was found to be 211.68. On comparing the results, there was a statistically significant increase in KSS postoperatively. Keeney JA et al 2011 systematically reviewed the literature to assess in terms of performance, and durability of the procedure and outline guidance for TKA in young patients. The literature between 1950 and 2009 for all studies reporting on TKAs for patients younger than 55 years that documented clinical and radiographic assessments with a minimum 2-year follow-up was searched. Thirteen studies, reporting on 908 TKAs performed for 671 patients, met the criteria. Mean Knee Society clinical and functional scores increased by 47 and 37 points, respectively. Implant survivorship was reported between 90.6% and 99% during the first decade and between 85% and 96.5% during the second decade of follow-up. [9]

In the present study, while correlating change in KSS with preoperative KSS values, a significant negative correlation was seen. This implies that lower KSS values were associated significantly with higher change in KSS values i.e., better outcomes in terms of KSS score postoperative. While correlating change in KSS with preoperative KL grading, a significant positive correlation was seen. This implies that higher KL grading was associated significantly with higher change in KSS values, i.e., better outcomes in terms of KSS score postoperative. Lewis GN et al 2015 provided a systematic review and meta-analysis of predictor variables associated with persistent pain after total knee arthroplasty (TKA). Included studies were required to measure predictor variables prior to or at the time of surgery, include a pain outcome measure at least 3 months post-TKA, and include a statistical analysis of the effect of the predictor variable(s) on the outcome measure. Counts were undertaken of the number of times each predictor was analyzed and the number of times it was found to have a significant relationship with persistent pain. Separate meta-analyses were performed to determine the effect size of each predictor on persistent pain. Outcomes from studies implementing uni- and multivariable statistical models were analyzed separately. Thirty-two studies involving almost 30000 patients were included in the review. Preoperative pain was the predictor that most demonstrated a significant relationship with persistent pain across uni- and multivariable analyses. In the meta-analyses of data from univariate models, the largest effect sizes were found for: other pain sites, catastrophizing, and depression.[10] Kuroda Y et al, 2016 included forty-nine consecutive patients (79 knees) with a mean age of 74.8±7.3years were prospectively included in the study and evaluated preoperatively and one year postoperatively. Most categories showed significant improvements after TKA. The preoperative functional activities score was positively correlated with the postoperative symptoms, functional activities, and objective score. Each category of the 2011 KSS scores correlated with others postoperatively. All patient-derived scores except for patient expectation significantly improved postoperatively. The more functionally active patients before receiving TKA acquired more successful objective and functional outcomes, and the postoperative knee condition was directly influenced by each subscale of the 2011 KSS.[11]

Conclusion

While correlating change in KSS with preoperative KL grading, a significant positive correlation was seen. This implies that higher KL grading was associated significantly with higher change in KSS values. i.e. better outcome in terms of KSS score postoperative. It seems possible that the relationship between clinical and radiographic OA severity and

postoperative outcomes might be relatively unrelated to the relationship seen between preoperative KSS and postoperative outcomes. The limitation of the study is less number of cases and shorter post-operation duration It requires further study on a larger population to understand and establish this relationship.

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