

To Assess the Functional outcome of Inflammatory arthritis of Knee following a Total Knee Replacement in a Tertiary Care Centre

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KEYWORDS

Functional outcome,
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ABSTRACT

Introduction : Inflammatory arthritis, particularly RA, can lead to significant joint destruction and functional impairment, necessitating interventions such as TKA. Despite medical therapy, severe joint damage may occur, warranting surgical intervention. This study assesses the functional outcomes post-TKA in patients having inflammatory arthritis. **Materials and Methods:** Patients who received TKA for inflammatory arthritis were included in this prospective observational cohort research, specifically RA, between 2019 and 2023 at Saveetha Medical College, Chennai. Clinical, radiological, and functional results have been assessed using the American Knee Society scoring system. IBM SPSS version 22.0 was utilized for analysis of data, $p < 0.05$ is the threshold for statistical significance. **Results:** Twenty TKAs have been performed for RA, with all patients successfully followed up. The mean age of the patients was 58.5 years, and the majority were female. Before TKA, the average length of RA was 7.24 years, and all patients were in stage IV illness. Preoperative and postoperative knee society scores showed significant improvement, with average scores of 58.15 and 96.15, respectively. Functional scores also demonstrated substantial enhancement post-TKA, with an average increase of 130%. Radiological assessment revealed no evidence of lysis in any patient. **Conclusion:** Significant inverse relationship among the postoperative functional score and the length of the disease and the involvement of other joints. Utilizing the American Knee Society and functional scoring systems allows for objective prediction of surgical success. This can motivate surgeons and treating physicians to enhance care for RA patients.

1. Introduction

TKA (Total Knee Arthroplasty) is a widely performed orthopaedic procedure used for the treatment of severe arthritis of the knee joint, whether caused by inflammatory arthropathy or osteoarthritis. Osteoarthritis accounts for over 90% of TKA cases. When cartilage damage occurs in the patellofemoral, lateral compartment, or medial joint, it leads to severe suffering as well as deformity, necessitating joint replacement when conservative measures like anti-inflammatory medications, lifestyle changes, and physiotherapy fail to provide relief.[1] One type of inflammatory arthritis that can cause severe pain and functional impairment is rheumatoid arthritis (RA), which can erode joints and damage cartilage. If not diagnosed and treated early, irreversible bone and cartilage damage can lead to loss of function, deformity as well as severe pain. Historically, during the course of their disease, more than 50% of RA patients have had orthopaedic surgery, most frequently arthroplasty [2-4]. Ten to twenty years after the onset of the disease, in spite of treatment with biological agents, DMARDs (Disease-Modifying Anti-Rheumatoid Medications), and anti-inflammatory agents, substantial joint cartilage destruction can still happen, primarily as a result of synovial inflammation.[5,6] Total knee replacement in RA patients has significantly improved pain and function by addressing severe joint restrictions.

Hence, research is conducted to assess the functional result of TKA in cases of “inflammatory arthropathy.

2. Methodology

Study Type: Prospective Observational Cohort Study

Scheme of Research:

Individuals with inflammatory arthritis who underwent total knee arthroplasty between 2019 to 2023 under the Department of Orthopaedics, Saveetha Medical College, Chennai. They gave their informed consent before being registered. Patients specifically having RA who received total knee replacement

during this period were followed up in the outpatient department. Clinical, radiological, and functional results were evaluated as per the American Knee Society scoring system.

Methodology:

- **Patient Identification:** Eligible patients' hospital numbers were obtained from the Computerised Hospital Information Processing System as well as the Operation Theatre register.
- **Follow-up:** Patients were contacted via mail and telephone to attend follow-up appointments in the Ortho OPD.
- **Assessment:** functional as well as Clinical scoring was carried out using the American Knee Society score during follow-up visits. Plain radiographs of both knees (lateral views as well as AP) have been taken, and a joint radiological assessment was performed
- **Data Collection:** Preoperative functional and American Knee Society scores were retrieved from previous inpatient charts. Additional variables recorded included:
 - Age of the patient
 - Patient Sex
 - BMI (Body Mass Index)
 - Duration of RA (Rheumatoid Arthritis)
 - Duration and use of medical management with Methotrexate (DMARDs)

Variables Analysed:

- **Body Mass Index (BMI):** Determined “by dividing weight in kilos by squared height in meters. The following categories were in place:
- Underweight: BMI <18.5
- Normal weight: BMI 18.5-24.9
- Overweight: BMI 25-29.9
- Obesity: BMI ≥ 30
- **Intake, Dosage, and” Duration of Steroids:** Analysis of steroid intake, dosage, and duration.
- **Category of Patient:** Categorization of patients based on specific criteria.

Inclusion Criteria:

- Patients with positive RA factor underwent total knee replacement (TKR) for RA in CMCH Orthopedics Unit III.
- patients with knee inflammatory arthritis that is seronegative.
- Patients willing to take part in the research.

Exclusion Criteria:

- patients with osteoarthritis underwent TKR.
- Patients unwilling to participate in the study.

The collected data are utilized with IBM SPSS version 22.0. continuous. Mean +/- standard deviation (SD) is used to express variables, whereas numbers, as well as percentages, are used for the expression of categorical variables. $P < 0.05$ was the threshold for statistical significance.

3. Result and Discussion

Twenty total knee replacements (TKR) were conducted for rheumatoid arthritis (RA) over the past 2 years. Of these, all twenty patients responded in person, for follow-up. Every surgery was carried out by the same surgical teams affiliated with Saveetha Medical College, Orthopaedics Department. The study participants' average age was 58.5 years, with a SD of ± 11.008 . (ranging from 38 years to 74 years). Five patients fell within the age range of 51-60 years, while nine patients were over 60 years old. Four patients have been aged between 41-50 years, and four were under 40 years old. Only seven patients were male, whereas the majority were female. Nine patients received left knee replacements, and eleven had their right knees replaced. Four of the patients had undergone a replacement surgery within a five-year period of the disease, Nine had an illness duration of 6-10 years, and seven TKR procedures had been conducted after ten years of illness duration. Every patient that had been recruited had the disease in stage IV. Following radiological assessment, no patient showed any signs of lysis as observed in the X-ray pictures. (Table 1)

The mean knee society scores for the pre-operative patients were 58.15 (ranging from 55 to 62) and post-operative mean knee society scores were 96.15 (ranging from 94 to 98) (Figure 1)

Knee Functional Score of pre-operatives as well as post-operative score (Table 2).

Post-operative follow up was done at 2 weeks, 6 weeks initially and further follow up carried out every month and assessed with radiological study and functional outcome with knee society score.

Factors such as age, body mass index, duration of rheumatoid, usage of methotrexate and involvement of other joints influenced in the post-operative knee functional score.

Discussion

Twenty TKRs were done for rheumatoid arthritis, and all twenty of them could be followed up on. Our study's average patient age of 58 years shows clearly that TKR for RA is carried out at a younger age. According to one study, the average age of patients receiving total knee replacement (TKR) for osteoarthritis was 67 years (62) while in another, it was 75.1 years (63).

Rheumatoid arthritis causes a knee pathological process that begins very early and progresses to more severe stages, necessitating an arthroplasty earlier than osteoarthritis.

Previous studies have indicated that the average age of TKR in RA is 43.2 years (52), 52 years (48), 61.3 years (64), and 62.8 years (51). Ten participants, or the majority, were in the 51–60 age range. TKR was performed for RA on a greater number of women ($n = 20$) than males ($n = 8$). Ladies are three times more likely than men to be impacted by RA. This observation may be explained by additional hormonal variables and genetic factors (X-related) involved in the disease's development (65). In previous research, 82% of those who received TKR for RA were female, 18% were male (51) and in another study, 80% of participants were female and 20% were male (48). Women experience higher incidences of TKR than men do when they have osteoarthritis (63).

The length of RA is a semi-indirect measure of the disease's stage and severity. The average length of illness in our sample before TKR was 7.24 years. Patients with RA in stages III & IV who do not significantly improve with medication (DMARDs, STEROIDS) are more likely to have TKR in order to reduce discomfort and enhance their functional level. Every patient enrolled in the research was at stage IV of the illness, which is marked by deformities, soft tissue contractures, severely limited motion range, and arthritis. The follow-up period following the index TKR was 36 months on average, with a range of 3 to 88 months. About nine individuals had other joints implicated, which will affect the patient's functional result. The symptomatic, non-replaced opposite knee belonged to about fourteen patients.

Significant progress has been observed in the American Knee Society scores. The mean score prior to surgery was 58.15, while the mean score following surgery was 96.15. The scores showed a 70% improvement following the TKR. When calculating scores, factors such as joint stability, motion range,

as well as pain are taken into account. It has been discovered that TKR considerably improves knee society scores (p 0.000).

The average functional score before surgery was 38.6, and after surgery it was 86.22, indicating a 130% rise in the RA. The patient's mobility as well as usage of aids were considered. The scores significantly improved with TKR (p 0.000).

Rodriguez et al. (54), 104 knees, classes 3 and 4 of the illness, follow-up on average of 12.7 years. Excellent was the score in 81% of cases, fair in 16%, and poor in 3%.

A follow-up duration of 12.7 years was averaged for 104 knees with class 3 and class 4 illnesses in the study by Rodriguez et al. [7]. In 81% of cases, the results were outstanding, in 16%, they were fair, and in 3% of cases, they were bad.

Sharma et al. [8] conducted a study involving 63 total knee replacements (TKRs). The mean follow-up revealed functional as well as clinical scores of 90 and 59, respectively, with a movement range of 104°.

In the study by **Trieb et al.**, [9] which included 68 knees, the mean follow-up duration was 11.2 years. The Knee Society score was reported as 77.2, while the functional score was 75.3.

Parvizi et al. [10] investigated 25 knees with juvenile rheumatoid arthritis (JRA) over a mean follow-up period of 10.7 years. The researchers noted notable enhancements in knee scores, rising from 27.6 to 88.3, and in functional scores, rising from 14.8 to 39.2.

In the study by **Kyun Woo et al.**, [11] which involved 179 knees with a mean follow-up duration of 10.1 years, notable improvements were observed. Functional scores increased from 43.6 to 82.3, while Knee Society scores went from 47.5 to 91.2.

The study conducted by **Rodriguez et al.** [12] involved 104 knees with class 3 and 4 diseases, with an average follow-up period of 12.7 years. The scores were excellent in 81% of cases, fair in 16%, and poor in 3%.

4. Conclusion and future scope

Compared to individuals receiving TKR for osteoarthritis, rheumatoid arthritis (RA) patients had a lower average age of 54. Before the index, TKR, the average length of disease was eight years, and all enrolled patients were in stage IV of the disease at that time. Of the patients who were recruited, eight were men and the bulk, or n = 20, were women. Following TKR, RA patients' Knee Society and functional scores significantly improved. The average Knee Society scores increased from 58.15 points preoperatively to 96.15 points postoperatively. Similarly, the average functional scores increased from 38.6 points preoperatively to 86.22 points postoperatively. There was a noteworthy positive connection between the postoperative Functional score and the usage of steroids. The postoperative functional score was significantly correlated negatively with the involvement of other joints and the duration of the disease. Utilizing the American Knee Society as well as functional scoring systems allows for objective prediction of surgical success. This can motivate surgeons and treating physicians to enhance care for RA patients.

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