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EVALUATION OF MID TERM OUTCOME AND COMPLICATIONS OF TOTAL KNEE ARTHROPLASTY IN PATIENTS OF RHEUMATOID ARTHRITIS

Orthopaedics

Dr Rajesh Turkar Assistant Professor, Deptt. Of Orthopaedics, N S C B Medical College, Jabalpur

Dr Ruchir Khare* Assistant Professor, Deptt. Of Biochemistry, N S C B Medical College, Jabalpur *Corresponding Author

Dr. Vinod Padmanabhan Chief Orthopaedic Surgeon, SreeSudheendra Medical Mission Hospital, Ernakulum, Kerala, India

ABSTRACT

Introduction: Rheumatoid arthritis (RA) is a chronic inflammatory disorder characterized by synovial hyperplasia and resulting joint destruction. Total Knee Arthroplasty (TKA) is the gold standard treatment for patients with advanced osteoarthritis but in RA it poses some unique challenges. We have studied the outcome and complications in patients of RA undergone total knee arthroplasty

Aim & Objectives: To study the midterm outcome and complications of total knee arthroplasty in patients of rheumatoid arthritis

Material & Methods: This was a retrospective study of 148 total knee replacements performed in 89 patients with rheumatoid arthritis. Our study was a single centre study. Patients were enrolled into study based on the scrutiny of hospital's operative records.

Results & Observations: In 58 patients (64.44%) arthroplasty was performed for their both knees in single stage. Pain is the main complaint of all RA patients. 52% patients had varus deformity, 22.3% had valgus deformity, and rest didn't have any deformity in coronal plane. 40.5% knees had fixed flexion deformity. KSS and functional outcome is good if intra operatively we found injury to extensor mechanism or major deformity correction required by extra bony as well as soft tissue procedure.

Conclusions: TKA is a procedure which significantly reduce the pain due to rheumatoid arthritis and increase the ROM in patients who were having FFD or ROM less than 90o. Intraoperative complication like injury to collateral ligaments, extensor tendon injury, fractures are common in patient with Rheumatoid Arthritis

KEYWORDS

Total knee arthroplasty, Rheumatoid arthritis, Knee society Score

I. Introduction:

Rheumatoid arthritis (RA) is a chronic inflammatory disorder characterized by synovial hyperplasia and resulting joint destruction. It is the most common form of inflammatory arthritis and affects 1% of men and 3% of women. The knee is among the most commonly affected joints in RA, and it is estimated that up to 90% of patients with RA will eventually have the involvement of the knees.

Total Knee Arthroplasty (TKA) is the gold standard treatment for patients with advanced osteoarthritis. However, in the rheumatoid patient, it presents unique challenges, such as the systemic nature, poor bone quality as a result of prolonged steroid use, valgus, fixed deformities, flexion contractures and the disease process itself. [(1)]

Although total knee arthroplasty is a very effective intervention and increasing in prevalence, failures do occur. Patients after surgery may present in follow up to determine any modifiable causes of failure, both short and long term, and where future efforts should be directed to reduce the incidence of failure. [(2)]

Failure of TKA is always difficult to define. Change in one piece or all prosthetic components clearly represents surgical failure from varied causes. Two large categories are identified: infections, and mechanical failures. In the later category, failure may be attributed to the surgeon (implant malpositioning or technical error may lead to femorotibial instability) or to the implants themselves (polyethylene wear implant rupture, metallosis). However, other complications are difficult to impute to a particular cause: aseptic loosening may be due to poor cementation (by the surgeon), helped by the release of polyethylene particles (from the implant), or by some major activity and excess weight (patient).[(3)]

Total knee arthroplasty (TKA) has become standard operative treatment for various degenerative disorders of the knee that has failed conservative measures, and is associated with improved postoperative function. The indications for TKA are expanding, and with an aging population the number of TKAs performed annually continues to rise and exceed previously reported projections. [(4)]

In our present study we have observed for significant outcomes during midterm follow up of rheumatoid patients operated for total knee arthroplasty.

Aim & Objectivs:

To study the midterm outcome and complications of total knee arthroplasty in patients of rheumatoid arthritis.

Material & Methods:

This retrospective study has been conducted in Sree Sudheendra Medical Mission hospital Ernakulum for one year in 89 patients with primary diagnosis of RA who have undergone either unilateral or bilateral knee arthroplasty. All patients have minimum 6 months to 4yrs follow up. Preoperatively all patients were in stage 4 of degenerative changes (based on Kellgren-Lawrence Score). All bilateral affected knees operated in single stage.

Patients were assessed for pain, deformity, range of motion, activity level and functional capabilities preoperatively. We discontinued methotrexate and other similar agents one weeks before surgery and restarted them 2 weeks after surgery. On follow up, patients were examined clinically for pain, deformity, laxity, extensor lag, residual flexion deformity or any other significant complaint.

Functional assessment was done by using KSS. KSS(85 or more-excellent, 61-84- good, <60-poor out come.) Postoperative varus, valgus was calculated from AP radiograph. End point of survival was removal or revision of any component for any reason. After surgery postoperative care had been taken as per standard protocols.

All patients were evaluated and examined at the 2nd week, 6th week 3 months and 6 months, after that every year by the operating surgeon. Preoperative, intra operative and postoperative data was obtained from review of medical records and radiology archives.

Observation & Results:-

Out of 89 patients 10 were male and 79 female and the mean age at the time of surgery was 56.27years (range 22-81years). All patients have minimum 6 months to 4yrs follow up. All patients received medical treatment for RA by rheumatologist.

In 58 patients (64.44%) arthroplasty was performed for their both knees in single stage. Pain was the main complaint of all RA patients. 52% patients had varus deformity, 22.3% had valgus deformity, and rest didn't have any deformity in coronal plane. 40.5% knees had fixed flexion deformity.

75% patients required blood transfusion when bilateral TKA was done in single stage while 34.3% patients required blood transfusion when unilateral TKA was done.

On 29 knees (18.9%) cruciate ligament was preserved while129 knees (81.1%) were done by posterior stabilizing TKA. TKA in which PCL was preserved did not show any instability in flexion on midterm follow-up. In one patient, we fixed the PCL with CC screw , did not show any A-P instability in 2 years follow up.

Preoperatively it was also observed that osteoporosis and thinned out

Table:1- Comparative evaluation of Pre & Post operative KSS in patients of RA undergone TKR.

Parameter	Preop KSS	Postop KSS	T test	Preop-Postop KSS change	Paired T test	P Value
Total TKA	31.69±11.7	89.01±7.29	61.19			<0.001
Sagittal plane deformity	25.76±11.84	87.37±8.77	47.0	61.61±10.73	4.56	<0.001
No Sagittal plane deformity	36.86±8.96	90.44±5.53	45.38	53.58±10.36		
Coronal plane deformity	30.92±9.43	88.93±6.53	58.57	58.01±10.24	1.25	0.211
No Coronal plane deformity	33.92±16.73	89.24±9.23	24.59	55.32±13.68		
Intraop collateral lig injury	30.71±13.42	91.57±3.82	12.02	60.86±13.40	0.85	0.395
No Intraop collateral lig injury	31.74±11.72	88.88±7.40	60.00	57.14±11.15		
Extensor mechanism injury	16.00±12.44	71.50±13.08	13.63	55.50±9.97	0.40	0.687
No Extensor mechanism injury	32.38±11.28	89.77±5.93	59.58	57.40±11.32		
Intraop bony procedure	23.89±10.03	87.47±9.18	32.11			<0.001
Intra op soft tissue procedure	25.50±10.32	91.90±5.20	28.86			<0.001

Patellar tendon were present in majority of patients. Patellar tendon tear or tibial tuberosity avulsion and Collateral ligaments avulsion were seen in 7 patients each. Extensor mechanism injury incidence was also 4.7 % in our retrospective analysis. This injury was seen more commonly in patient having preop Fixed Flexion Deformity (FFD). Incidence of extensor mechanism injury seen more common in patient those taking methotraxate as DMARDs, data showing significant correlation (p value=0.048).

Post operatively it was observed that 11 knees showed complications. Out of these 11 patients only one developed deep infection and required liner change (no implant removal required in short term results), other infected wounds healed by curettage and secondary suturing. Common peroneal nerve palsy was observed in 2 cases where one patient had 65^0 FFD of knee and the other had 85^0 FFD of knee preoperatively. Both cases recovered within 3 week. Range of motion of $<90^0$ in 6 Knees postoperatively. Single stage bilateral TKA required more frequent blood transfusion but KSS and complication rates are comparable in both equal in both group. KSS and functional outcome is good if intra operatively injury to extensor mechanism or major deformity correction done by extra bony as well as soft tissue procedure.

Discussion:-

This retrospective study has been conducted in Sree Sudheendra Medical Mission hospital, Ernakulum for one year in 89 patients with primary diagnosis of RA who have undergone either unilateral or bilateral knee arthroplasty. Functional assessment was done by using KSS. KSS (85 or more- excellent, 61-84- good, <60-poor out come.) Postoperative varus, valgus was calculated from AP radiograph.

In our study pain was the main complaint of all RA patients which was significantly reduced after TKA in RA patients. 52% patients had varus deformity, 22.3% had valgus deformity, and rest didn't have any deformity in coronal plane. 40.5% knees had fixed flexion deformity.

Studies by Riley et al [5] and Laskin R S [6] demonstrated remarkable reduction in pain scores of patients after Total Knee Arthroplasty (TKA). Similarly in our study TKA was responsible for pain relief in all the cases of arthritis knee due to rheumatoid arthritis, which is the most common indication in majority of these patients which is evidenced by the improvement of KSS score and functional score.

In our study the youngest patient was of age 22 years (range 22years-81 years). Ranawat et al[7] studied TKA in young population of less than 45 years. He reported rheumatoid arthritis as the diagnosis in more than 80% of their cases. Rheumatoid arthritis affects knee at an earlier age than degenerative arthritis hence needs to be addressed early with TKA.

Range of movements improved in patients after TKA in general. In 96% patients having ROM $>90^o$ (average ROM 118°), excellent knee society score and functional outcome had been observed. Most significant improvement was seen in patients who were having FFD preoperatively (P value <0.001).Increased ROM, correction of deformity and decreased pain were responsible for increased activity in all patients post TKA. Similar trend is seen with Riley et al [5] and Abernethy P J.[8]

In our series of primary TKA in Rheumatoid arthritis patients showed an intra operative complication rate of 10.13%. 13 knee shows tendon or ligament injury [8.78%], 2 fracture around knee[1.35%]. Ligament injuries were commonly avulsion injury. The incidence of intra operative complication is rarely reported in the literature. No literature found which shows intra operative complication during TKA in rheumatoid patient but study by Pinaroli et al [3] reported that fracture were more common finding than ligament injury which is contradictory to finding of our study.

In our study the most common postoperative complication following TKA for rheumatoid arthritis was infection. Incidence of deep infection is same as other studies on TKA done for other indications but superficial skin related complications (incidence 7.43%) like delayed healing, superficial infection and necrosis occur more common in our study. Studies by Jabalameli et al[9] described that the TKA complications are more frequent and more severe in RA patients due to poor quality of bone and soft tissue, severe preoperative joint deformity and laxity, poor healing process, increased risk of deep infection and multiple joints involvement that preclude proper rehabilitation. The main complication that can affect the results of TKA is infection that occurs in RA patients three times greater than in OA

In our study, incidence of blood transfusion is more in single stage B/L TKA than U/L TKA but allogenic blood transfusion was not associated with increased infection rates (P=0.848). Unilateral TKA (9.35%) having more incidence of infection than bilateral TKA (6.89%) but this data is not statistically significant (P= 0.926). Allogenic transfusion has been proposed as a risk factor for infection by Pulido et al [10]. There are some weaknesses of our study. First, this is a retrospective cohort study subject to variability in data collection. It is a single centre study so sample size may not be adequate so a further study with long term follow-up needs to be carried out on this topic to show significant difference in outcome

Conclusions:

TKA is a procedure which significantly reduces the pain due to rheumatoid arthritis and increase the ROM in patients who were having FFD or ROM less than 90^o. Intra operative complication like injury to collateral ligaments, extensor tendon injury, fractures are common in patient with Rheumatoid Arthritis because of osteoporosis and thinned out ligaments and tendon. Damage to extensor mechanism during surgery leads decrease ROM postoperatively and give only good KSS in midterm follow up. If we identify the collateral ligament injury and managed well during surgery give excellent outcome in midterm follow up. Most common postoperative complication following total knee replacement for rheumatoid arthritis was infection.

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