Original Article

Clinical and Functional Outcome of Total Knee Replacement in Osteoarthritic Knee

Javed Iqbal[1], Alamgir Khan[2], Rafe-ullah[1], Abid Ullah Khattak[3], Shabir Khattak[1], Faaiz Ali Shah[1]

ABSTRACT

OBJECTIVE*:* To assess the functional and clinical outcome of Total Knee Replacement performed for Osteoarthritis of the knee joint by using Knee Score.

METHODOLOGY: This Descriptive Prospective case series study was carried out in the Department of Orthopedics and Traumatology, Lady Reading Hospital, Peshawar KPK, from January 2021 to December 2022. Forty patients with a mean age of 61.02±8.88 years and a male-female ratio of 1:2 were included. After optimizing for anaesthesia and surgery, all patients underwent total knee replacement. Preoperative and Postoperative clinical and functional outcomes were assessed. Data was analyzed using SPSS version 21.

RESULTS: Of 40 patients, male patients 12(30%), and female patients were 28(70%), with a mean age of 61.02±8.88 year. Clinical score system recorded pre-operatively, 1(2.5%) patient had an excellent result, 5(12.5%) fair, 35(87.5%) poor and no one had a good result. Likewise, in the functional score system of the Knee Society, no patients had excellent scores; 2(5%) patients had good, 2(5%) were fair, and 36 (90%) had poor results. Postoperative evaluation by Clinical knee score, 30(75%) excellent, 9(22.5%) good, and 1(2.5%) patient had an infection and had a fair knee clinical score. Postoperative evaluation by Functional knee score, 34(85%) had excellent, 5(12.5%) good, and 1(2.5%) patient had fair knee score. Postoperatively, the clinical and functional knee scores improved significantly more than preoperative scores (P<0.05).

CONCLUSION: This study concluded that total Knee replacement in patients with advanced Osteoarthritis of the knee joint is a safe and effective treatment modality, leading to satisfactory clinical and functional outcomes.

KEYWORDS: Osteoarthritis, Total knee replacement, advanced arthritis. Knee clinical score, Knee functional score.

INTRODUCTION

Osteoarthritis (OA) of the knee joint is one of the significant causes of disability among adults over 65 years[1]. During activities of daily living, patients with osteoarthritis experience considerable pain and emotional impacts, leading to a loss of efficiency and compromising quality of life[2,3]. There are various treatment modalities to treat the Osteoarthritis of the knee joint[3]. These include medication, physiotherapy, lifestyle modification, and total Knee replacement[5,6]. In advanced-stage Osteoarthritis of the Knee, the most effective modality is Knee joint replacement[2,4]. Since the 19th century, a lot of improvement occurred in the overall quality of knee implants, yielding excellent outcomes, so Total knee replacement has gained particular attention since then[4-6].

[1]*Department of Orthopedics, Traumatology and Sports Medicine, MTI-Lady Reading Hospital, Peshawar, KPK-Pakistan*
[2]*Department of Orthopedics, Pabbi Hospital, Nowshera, KPK-Pakistan*
[3]*DHQ Hospital Kohat, KPK-Pakistan*
Correspondence: *drorthopda@gmail.com*
doi: 10.22442/jlumhs.2023.01086

In Australia, the most common primary Total Knee Replacement disease is Osteoarthritis. Fifty thousand six hundred twenty-three total knee replacement surgeries in 2015 have been done, and this number of primary total knee joint replacements remains to increase[7] and 52,836 total Knee joint replacements done in 2016[8]. The total Knee joint replacement process was 2.8% higher than in 2015 and 139.8% higher than in 2003. Initially, total Knee joint replacement for all Knee pathologies increased from 76.7% in 2003 to 87.0% in 2016[7].

The Knee functional score was associated with the knee clinical score at every interval[9], and both scores showed significant improvement at every follow-up (P<0.05). This study aimed to evaluate functional & clinical outcomes of knee arthroplasty by Knee Society Score in our sitting. This would help us to assess the efficacy of surgical procedures done in our setting, and this will provide us data, which will be a base for further future research and would be a step to improve the treatment of Osteoarthritis of knee joints according to national and international standards.

METHODOLOGY

This Descriptive prospective case series study was conducted at the Orthopedics department of Lady Reading Hospital/MTI, Peshawar, KPK Pakistan, from January 2021 to December 2022. The sample size was 40, estimated using a 95% confidence interval, 5% margin of error and taking the expected frequency of knee replacement surgery, i-e, 87% for knee Osteoarthritis with Consecutive sampling (non-probability) technique.

Patients included in the study with Knee pain, deformity, stiffness, reduced knee joint movement, and unilateral or bilateral were included. Patients excluded from the study were those with active knee infection or infection everywhere in the body, implant in the knee joint, young patients under the age of 40 years, vascular problems, and periprosthetic fracture. A total of 40 patients were included in the study. Ethical approval was taken from the institutional research board of the hospital, and written informed consent was obtained from each patient. Demographic details of patients (name, age) were obtained. A detailed history was taken, complete examinations and all the relevant investigations were carried out. All the other relevant details, like discrepancies in limb length, deformities in the hip and Knee, varus and valgus knee deformity, or a fixed flexion contracture, were noted. After optimizing the patient for anaesthesia and surgery, all patients then underwent surgical intervention under anaesthesia. Postoperatively, a Knee immobilizer was applied, and all the relevant medications, including DVT prophylaxis and IV antibiotics, were started. Once the drain was removed, Weight-bearing and passive movement were started on 2nd day after surgery in all patients.

Patients were discharged and called for follow-up visits at two weeks, four weeks, eight weeks, three months, and six months. Patients were evaluated for recovery and complications and recorded functional and clinical knee society scores. Data was recorded in proforma. SPSS version 21.0 was used to enter and analyze the data. Quantitative data, like age and weight, were presented as means and standard deviation. Qualitative data like age groups, gender-wise distribution, and pre and postoperative total knee replacement scores were presented as frequency and percentages.

RESULTS

40 Patients with a mean age of 61.02±8.88 years. Out of 40 patients, 4(10%) patients were in < 50 years of age group, 11(27.5%) were between the age of 51-60 years. 15(37.5%) were in 61-70 years of age and 10 (25%) patients were in > 70 years of age. Male to female ratio was 1:2, and females predominance over males, accounting for 70% of the patients. **Table I.** As per the clinical score system in preoperative evaluation of the 40 patients analyzed in this study, 1(2.5%) patient had excellent results, 5(12.5%) had fair, 35(87.5%) had poor, and no one had a good result as shown in **Table III**. Likewise, in the functional score system of the knee society, no patients had excellent scores, 2(5.0%) patients had good and fair and 36(90%) patients had poor results **Table II.** In the Postoperative evaluation and comparison of function knee score and clinical knee score, out of 40 patients, 30(75%) patients had excellent clinical knee scores, 34 (85%) excellent knee functional scores, 9(22.5%) knee clinical score good, and 5 (12.5%) patients had good functional score. One patient had an infection and fair knee clinical & functional scores, and no patients had poor scores **Table III.** Thirty patients (100%) had excellent knee functional scores. Out of 9 patients, 4(44.5%) patients had perfect clinical and operational scores, and 5(55.6%) had good functional scores, one patient (100%) had fair clinical and functional knee scores, as given in **Table IV**. The functional knee score was significantly associated with the clinical knee score at each interval.

Table I: Demographic Characteristics of Patients

Age (years)	n (40)	
<50 years		4(10%)
51-60 years		11(27.5%)
Years		15(37.5%)
>70 years		10(25%
Gender	**Male**	**Female**
	12(30%)	28(70%)

Table II: Preoperative Knee Clinical & Functional Score of the Participants

Scoring	Preoperative Knee Scoring	
	Clinical Knee Score	Functional Knee Score
Excellent (80-100)	1(2.5%)	0
Good (70-79)	0	2(5.0%)
Fair (60-69)	5 (12.5%)	2 (5.0%)
Poor (<60)	35 (87.5%)	36 (90%)

Table III: Postoperative Knee Clinical & Functional Score of the Participants

Scoring	Postoperative Knee Scoring	
	Clinical Knee Score	Functional Knee Score
Excellent (80-100)	30 (75%)	34 (85%)
Good (70-79)	9 (90%)	5 (12.5%)
Fair (60-69)	1 (2.5%)	1(2.5%)
Poor (<60)	0	0

Table IV: Association between Post-Operative Knee Clinical and Functional Scores

Knee Clinical Score	Knee Functional Score				P value
Scoring	Excellent	Good	Fair	Total	
Excellent (80-100)	30(100%)	0	0	30(100%)	
Good (70-79)	4(44.4%)	5(55.6%)	0	9(100%)	**0.0004**
Fair (60-69)	0	0	1(100%)	1(100%)	
Poor (<60)	34(85%)	5(12.5%)	1(2.5%)	40(100%)	

DISCUSSION

Knee implant technology and surgical total knee replacement procedures produce promising results in pain relief. After knee arthroplasty, significant pain relief was seen in the oldest people with pain and mobility problems due to degenerative arthritis[9].

In this study, the average age of the patients was 61.02±8.88 years with a range (50-75 years) compared to the study by Berlin BJ et al[10], the average age of the patient at surgery was 67.3 years (49-86 years). In Todkar M et al. analysis, the patient average age is 65 years (range: 50-80 years)[11]. The patient mean age was 57 years (25-87 years) in another study by Ghani et al.[12]. Knee and hip Osteoarthritis present in South Asia at an early age, Knee and hip osteoarthritis are commonly seen in our setting, partly because of the lifestyle like washroom sitting, eating habits, which need squatting. In our study, the typical age group was 61 to 70 years (37.5%), followed by 51 to 60 years (35.7%), with the predominance of women; this is in line with the study conducted by Wood et al. study[13].

The result of knee replacement was measured using the knee society scores. The evaluation system of the Knee Society is the clinical outcome of the special growth of the grading system. In the present study, the knee scoring system performed functional & clinical examination of the patients. Significant progress was observed in knee clinical & functional score throughout follow-up at one, three & six months compared to preoperative values.

Significant progress in knee society score was observed in Farahini et al.[14]. Our results also correlate well with Yaratapalli et al.[15] research score after TKS. Patients showed postoperative infection in one study 5%, resulting in a poor Knee clinical score and knee functional score.

In this study, one patient showed postoperative infection leads to poor knee clinical & functional scores; as in the Kahdam et al. study, Postoperative infection resulted in poor knee clinical scores, and Knee functional scores showed 5% [9]. A similar study by Kadam 2016 showed that functional scores of 80% were excellent, 12.5% were good, and 5% had a fair outcome. In our research, a functional score of 85% had an excellent result, and 12.5% had a good score.

Another study done in 2018 showed that a functional score of 72.5% had an excellent result, and 27.5% had a good result. In our research, functional score 85% had an excellent score, and 12.5% had a good score[16].

CONCLUSION

This study concluded that Knee replacement surgery done by an experienced surgeon is a safe and effective treatment modality. There has been a significant improvement in mobility, functional ability, pain relief, and overall quality of life after six months of total knee replacement.

Ethical Permission: Lady Reading Hospital (MTI), Peshawar, ERC letter No. 884/LRH/MTI.

Conflict of interest: The authors declare no conflict of interest.

Financial Disclosure / Grant Approval: This research did not receive specific funding from any financially supporting body.

Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publically.

AUTHOR'S CONTRIBUTION

Iqbal J: Conception, design of the work, analysis of data, critically revising the draft for any intellectual content and final approval of the draft

Khan A: Conception, designing, data analysis and interpretation

Rafe-ullah: Conception, Framing, data analysis and interpretation, manuscript revising

Ullah Khattak A: Concept for the research, drafting, analysis, interpretation

Khattak S: Conceptualizing the research, data collection, analysis, interpretation and draft formulation

Shah FA: Ideology of the research, designing, analysis, interpretation, framing the manuscript

REFERENCES

1. Neogi T. The epidemiology and impact of pain in Osteoarthritis. Osteoarthritis and cartilage. 2013; 21(9): 1145-53.
2. Sayeed Z, El-Othmani MM, Anoushiravani AA, Chambers MC, Saleh KJ. Planning, building, and maintaining a successful musculoskeletal service line. Orthopedic Clinics. 2016; 47(4): 681-8.
3. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. JBJS. 2007; 89(4): 780-5.
4. Krummenauer F, Wolf C, Günther K, Kirschner S. Clinical benefit and cost-effectiveness of total knee arthroplasty in the older patient. Eur J Med Res. 2009; 14(2): 76.
5. Losina E, Walensky RP, Kessler CL, Emrani PS, Reichmann WM, Wright EA et al. Cost-effectiveness of total knee arthroplasty in the United States: patient risk and hospital volume.

Arch Intern Med. 2009; 169(12): 1113-21.
6. Bruyère O, Ethgen O, Neuprez A, Zegels B, Gillet P, Huskin J-P et al. Health-related quality of life after total knee or hip replacement for Osteoarthritis: a 7-year prospective study. Arch Orthop Trauma Surg. 2012; 132(11): 1583-7.
7. Young T, Dowsey MM, Pandy M, Choong PF. A systematic review of clinical, functional outcomes after medial stabilized versus non-medial stabilized total knee joint replacement. Front Surg. 2018; 5: 25.
8. Fitch D, Sedacki K, Yang Y. Mid-to long-term outcomes of a medial-pivot system for primary total knee replacement: A systematic review and meta-analysis. Bone Joint Res. 2014; 3(10): 297-304.
9. Kadam R, Yadav S, Chhallani A, Sharma C. Prospective study of clinical and functional outcome of total knee replacement in osteoarthritic Knee. Int J Res Orthop. 2016; 2(4): 240-4.
10. Berli BJ, Ping G, Dick W, Morscher EW. Nonmodular flexible press-fit cup in primary total hip arthroplasty: 15-year follow-up. Clin Orthop Rel Res. 2007; 461: 114-21.
11. Todkar M. Obesity does not necessarily affect the accuracy of acetabular cup implantation in total hip replacement. Acta Orthopædica Belgica. 2008; 74(2): 206.
12. Hailer NP, Lazarinis S, Mäkelä KT, Eskelinen A, Fenstad AM, Hallan G, et al. Hydroxyapatite coating does not improve uncemented stem survival after total hip arthroplasty! An analysis of 116,069 THAs in the Nordic Arthroplasty Register Association (NARA) database. Acta orthopaedica. 2015; 86(1): 18-25.
13. Wood AM, Keenan AC, Arthur CH, Aitken SA, Walmsley P, Brenkel IJ. The functional outcome of total knee replacements in young patients: A 10 -year matched case-control study. Open J Orthop. 2013.
14. Farahini H, Moghtadaei M, Bagheri A, Akbarian E. Factors influencing range of motion after total knee arthroplasty. Iran Red Crescent Med J. 2012; 14(7): 417.