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ORIGINAL ARTICLE

Association of Anterior Knee Pain (AKP) in Different Age Groups after Total Knee Replacement (TKR)

GHAREEB ULLAH[1], JAMSHED KHAN[2], USMANULLAH[3], MOHAMMAD ISHAQ[4], MUHAMMAD HANIF[5], SAJAWAL KHAN[6]
[1]*Orthopaedic Surgeon Mian Rashid Shaheed Memorial Hospital Pabbi Nowshera*
[2]*Assistant Professor Anatomy Department LMC Loralai Medical College Loralai Balochistan*
[3]*Associate Professor Anatomy GKMC Gajju Khan Medical College Swabi*
[4]*Orthopaedic Surgeon. NMC Nowshera Medical College Nowshera*
[5]*Assist Professor of Paediatrics LMC Loralai Medical College Balochistan*
[6]*Orthopaedic Surgeon.Medical Officer RHC Hospital Pirpiai Nowshera*
Correspondence to: Jamshed Khan, Email: drjamshedkhan@gmail.com, Cell: +92-332-9918925

ABSTRACT

Objective: The purpose of this research is to assess and to determine the frequency of Anterior Knee Pain after Total Knee Arthroplasty.

Study Design: Cross sectional study.

Place and Duration: This Cross sectional study was conducted at Department of Orthopedic s, Khyber Teaching Hospital, KTH Peshawar in the period of eight months from june 2020 to january 2022.

Introduction: Anterior Knee Pain (AKP) is one of the most commonest causes of persistent problems after knee replacement. Total Knee Arthroplasty (TKA) is a surgical procedure in which artificial joint or prosthesis replace the damage knee. A significant proportion of the patients experience AKP after TKA surgery.

Methods: After recording complete history, physical examination and routine baseline investigations were performed . Post-operatively, patients were kept under observations for 5 days in ward and were discharged if indicated. Patients were followed at regular intervals and finally at the end of third month to measure the intensity of pain on VAS.

Results: Out of 205 patients, 69.3% were males and 30.7% were females. Means ± SD calculated for age was 48.62±7.98 years, for BMI was 24.63±3.07 and for Pain on VAS was 1.31±1.39. Most patients (51.7%) were recorded in 51-60 years age group. Rheumatoid Arthritis (RA) in 18% while Osteoarthritis (OA) (OA) was found in 82% patients. 21.5% patients were diabetic while 31.7% patients were hypertensive. AKP at third month was found in 8.8% patients.

Conclusion: It is evident that anterior knee pain (AKP) after the total knee arthroplasty (TKA), or total knee replacement (TKR) is prevalent and clinically relevant.There is an absolute need for further investigations to find out ways to reduce or eliminate the AKP after TKA in order to improve the quality of life after this surgery.

Keywords: Anterior knee pain, Arthroplasty, Total knee replacement.

INTRODUCTION

Anterior knee pain (AKP) is one of the most commonest causes of persistent problems after total knee replacement. According to the literature, the rates of satisfaction after total knee arthroplasty (TKA) vary between 75 and 89%.[1]

Total Knee Arthroplasty is a commonest surgical procedure in which artificial joint or prosthesis replace damage knee. It's mostly used for treating patients with Osteoarthritis (OA), still significant proportion of the patients experience Anterior Knee Pain (AKP) after surgery[2]. The pain is described as a retro patellar or peripatellar pain-limiting patients in their everyday activities. Patients experience difficulty in standing from sitting position, walking up and down stairs, and riding a bicycle in case of AKP[3].

In one study, 20.2% of patients subjected to TKA reported with AKP on follow up[4]. In another study, 8% of Osteoarthritis (OA) and 7% of rheumatoid arthritis patients reported with AKP after subjecting to TKA[5].

The present study was designed to determine frequency of AKP after TKA. Doing a thorough literature search, we found that very rare data exists regarding the frequency of Anterior Knee Pain after Total Knee Arthroplasty and available data suggests variation in its magnitude from one setting to another[6]. This study will be an attempt to determine the frequency of Anterior Knee Pain in our local population subjected to Total Knee Arthroplasty[7].

The results of this study will be a guideline for devising future research strategies and identifying mechanisms of preventing AKP after TKA.

MATERIAL AND METHODS

This is a cross sectional study performed the KTH hospital in the department of orthopaedic surgery. The duration of this study was seven months after the approval of synopsis starting from june 2020 to january 2021.

Total sample size was 205 patients, keeping 7% prevalence of AKP after TKA, 95% confidence level and 3.5% absolute precision using WHO formula for sample size calculator.

Consecutive (non-probability) sampling technique was used to conduct thisstudy.

Inclusion Criteria

1. All patients scheduled for TKA irrespective of indication.
2. Age group above 30 to 60 years.

Exclusion Criteria

1. Patients with BMI of more than 30kg/m^2.
2. Immunocompromised patients.
3. Patients with debilitating diseases like chronic liver, renal or cardiac impairment.

The study was carried out after getting approval from hospital's ethical and research committee. OPD/ER patients meeting the inclusion criteria were included in the study. The purpose, risks and benefits of the study were explained to all included patients in detail. They were assured that the study was purely conducted for research and data publication and written informed consents were obtained from all included patients.

Complete history of all patients were recorded very keenly. Completet physical examination and routine pre-operative baseline investigations were performed for all patients. According to hospital's protocols, patients were put on OT list and surgeries were performed in all patients by single expert Orthopedic surgeon who was fellow of CPSP and designated for performing total knee arthroplasty.

Post operatively, all patients were kept under observations for 5 days in ward and were discharged if indicated. The patients were followed at regular intervals and finally at the end of third postoperative month to measure the intensity of pain on visual analogue scale (VAS) and label as presence or absence of Anterior Knee Pain.

All the above mentioned information including name, age, gender, address and telephone numbers were recorded on a pre designed proforma. Exclusion criteria were followed strictly to control confounders and bias in the study results.

All the data was entered and analyzed in SPSS 20. Mean ± SD were calculated for numerical variables like age, BMI and pain on VAS. Frequencies and percentages were calculated for categorical variables like gender, indications for TKA (Rheumatoid Arthritis and Osteoarthritis (OA)), diabetes mellitus, hypertension and Anterior Knee Pain at third month follow up. Anterior Knee Pain was stratified among age, gender, indications for TKA (Rheumatoid Arthritis and Osteoarthritis (OA)), diabetes mellitus and hypertension to see the effect modifiers using chi square test with P value < 0.05 as significant. All the results have been presented as tables.

RESULTS

A total of 205 patients were recruited as per sample size calculated through WHO software to conduct this study at the Department of Orthopedic Surgery, Khyber Teaching Hospital, Peshawar. Means and Standard Deviation calculated for age was 48.62 ± 7.98 years, for BMI was 24.63 ± 3.07 and for Pain on VAS (at third month follow up) was 1.31 ± 1.39.

Table 1: Mean and Standard Deviation of Numeric Variables(n = 205)

Variables	Mean	StandardDeviation
Age	48.62	±7.98
BMI	24.63	±3.07
Pain on VAS	1.31	±1.39

Total population was distributed in three age groups, wherein 51.7% patients were recorded in 51-60 years age group, 30.7% patients were recorded in 41-50 years age group and 17.6% patients were recorded in 30-40 years age group.

Table 2: Age Distribution (n = 205)

Age Group	Frequency	Percent
30-40	36	17.6%
41-50	63	30.7%
51-60	106	51.7%

After recording the indications for Total Knee Arthroplasty (TKA) in all 205 patients, Rheumatoid Arthritis (RA) was found in 18% patients while Osteoarthritis (OA) (OA) was found in 82% patients.

Table 3: Frequency and Percentages of Indications for Total Knee Arthroplasty (TKA) (n = 205)

Indication for TKA	Frequency	Percent
Rheumatoid Arthritis	37	18%
Osteoarthritis (OA)	168	82%

Similarly, in total study population, 21.5% patients were diabetic and 78.5% patients were non-diabetic while 31.7% patients were hypertensive and 68.3% patients were non-hypertensive.

Table 4: Frequency and Percentage of Hypertension (n = 205)

Hypertension	Frequency	Percent
Yes	65	31.7%
No	140	68.3%

Anterior Knee Pain (AKP) at third month follow up was stratified with respect to age, wherein it was found that 1.5% patients in 30-40 years age group, 3.4% patients in 41-50 years age group and 3.9% patients in 51-60 years age group were feeling Pain (AKP). On the other hand, 16.1% patients in 30-40 years age group, 27.3% patients in 41-50 years age group and 47.8% patients in 51-60 years age group were not feeling the Pain (AKP) as per our operational definition.

Anterior Knee Pain (AKP) at third month follow up was stratified with respect to indications for TKA (Rheumatoid Arthritis or Osteoarthritis (OA)), wherein it was found that 2.4% of the patients who were having Rheumatoid Arthritis and 6.3% of the patients who were having Osteoarthritis (OA) were still feeling the pain. On the other hand, 15.6% of the patients who were having Rheumatoid Arthritis and 75.6% of the patients who were having Osteoarthritis (OA) were not feeling the pain.

Table 5: Stratification of Anterior Knee Pain (AKP) with Respect to Age (n = 205)

	Age Group					
AKP	30-40	%age	41-50	%age	51-60	%age
Yes	3	1.5%	7	3.4%	8	3.9%
No	33	16.1%	56	27.3%	98	47.8%

Anterior Knee Pain (AKP) at third month follow up was stratified with respect to Body Mass Index (BMI), where it was found that 1.5% patients in 19-22.9 BMI group, 4.4% patients in 23-26.9 BMI group and 2.9% patients in 27-29.9 BMI group were feeling Pain (AKP). On the other hand, 34.1% patients in 19-22.9 BMI group, 29.8% patients in 23-29.9 BMI group and 27.3% patients in 27-29.9 BMI group were not feeling the Pain (AKP) as per our operational definition.

Table 6: Stratification of Anterior Knee Pain (AKP) with Respect to Body Mass Index (BMI) (n = 205)

	BMI					
AKP	19-22.9	%age	23-26.9	%age	27-29.9	%age
Yes	3	1.5%	9	4.4%	6	2.9%
No	70	34.1%	61	29.8%	56	27.3%

P Value = 0.173

Anterior Knee Pain (AKP) at third month follow up was stratified with respect to Diabetes Mellitus and Hypertension. Wherein it was found that 1.5% of the diabetic patients and 7.3% of the non-diabetic patients were still feeling the pain while 20% of the diabetic patients and 71.2% of the non-diabetic patients were not feeling the pain.

Table 7: Stratification of Anterior Knee Pain (AKP) with Respect to Diabetes Mellitus (n = 205)

	Diabetes Mellitus			
TKP	Yes	%age	No	%age
Yes	3	1.5%	15	7.3%
No	41	20%	146	71.2%

P Value = 0.604

Similarly, 3.4% of the hypertensive patients and 5.4% of the non-hypertensive patients were still feeling the pain while 28.3% of the hypertensive patients and 62.9% of the non-hypertensive patients were not feeling the pain.

Table 8: Stratification of Anterior Knee Pain (AKP) with Respect to Hypertension (n = 205)

	Hypertension			
TKP	Yes	%age	No	%age
Yes	7	3.4%	11	5.4%
No	58	28.3%	129	62.9%

P Value = 0.4

DISCUSSION

It has been estimated that clinically significant Osteoarthritis (OA) of the knee currently affects 5% to 10% of people. With a predicted increase in life expectancy and an increasingly active population, the number of patients who are seeking treatment for significant pain and disability secondary to knee arthritis are undoubtedly increasing[8].The surgical intervention with Total Knee Arthroplasty (TKA) was the need of the time which was offered to those who had exhausted non-operative attempts to improve quality of life. Occasionally, urgent referrals to Orthopedic surgeons were indicated in patients who were presented with complaints of debilitating knee pain and radiographic evidence of severe bone loss and deformity on initial standardradiographs[9].

The most important finding of the current study is that

various variables have been observed with regard to the prevalence of AKP, with some clearly demonstrating a correlation with AKP. Patients' characteristics including age, gender, BMI, diabetes mellitus, hypertension and the presence of preoperative AKP were not found to be predictive of AKP[10]. Knee-specific characteristics including diagnosis, radiographic grade of Osteoarthritis (OA) and Rheumatoid Arthritis, knee scores, range of motion, and deformity were not related to the occurrence of postoperative anterior knee pain.In some other studies[11], a prior history of revision surgery was reported to be associated with AKP and impaired functional outcome[12]. Each surgical intervention was reported adding up to a cumulative tissue injury and scar formation, which was hypothesized to be associated with concurrent increased activation as well as the intensity of the nociceptors being responsible for the experienced pronounced pain[13]. To accomplish a more profound approach to address the often-observed weakness of the quadriceps muscle, Werner et al[14], for instance, suggested a multiphasic approach, including an early correction of imbalance between the vastus medialis and vastus lateralis for physically active individuals with AKP[15].

Multiple studies observed a correlation between different types and thicknesses of inlays and AKP[16]. It is conceivable that thinner inlays are predisposed for instability due to a slackening of the ligaments, which, in turn, may be related to AKP. In line with previous studies, some studies were reviewed[17] ,where is no association of AKP after TKA was found with the prosthetic design[18]. Furthermore, it is not conclusively possible to clarify if the observed limited strength of the quadriceps muscle in participants with AKP is responsible for the postsurgical AKP or if the postsurgical AKP results in less loading of the leg, which impairs quadriceps muscle strength[19]. To investigate further, future studies may consider focusing on quadriceps muscle strength of the uninvolved limb considering the fact that patients tend to shift weight away from the operated limb. So that a causal relationship between postsurgical AKP and the ability to stand up from a chair can be finally drawn, and a careful interpretation of the obtained results may be made.

CONCLUSION

In all age groups the postoperative pain is the most commonest complication after any surgery. It is evident that anterior knee pain (AKP) after the total knee arthroplasty (TKA), or total knee replacement (TKR) is prevalent and clinically relevant. It is concluded that there is an absolute need for further investigations to find out ways to reduce or eliminate the AKP after TKA in order to improvethe quality of life in all age of patients after this surgery.

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