Original Research Article

OUTCOME OF PRIMARY TOTAL KNEE ARTHROPLASTY AMONG PATIENTS WITH MORBID OBESITY

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Abstract: *This retrospective observational study aimed to assess the outcome of primary total knee arthroplasty among patients with morbid obesity. This retrospective observational study was conducted at the Department of Orthopaedic, Khyber Teaching Hospital Peshawar, from August 2021 to June 2023. We assessed the records of 120 morbidly obese patients who underwent total knee arthroplasty. The outcomes of total knee arthroplasty of morbidly obese patients were evaluated. Paired samples T-test was used to assess the knee society clinical and functional score of the patients. The mean age of 120 morbidly obese patients was 62.21±7.0. Gender-wise, Females were greater in number as compared to male patients (66.7% vs. 33.3%). The mean preoperative clinical KSS was 48.69±2.45 while the postoperative clinical KSS was 83.34±1.04 (P = 0.0001), the mean preoperative functional KSS was 43.69±1.73, and the postoperative functional KSS was 70.03±3.31 (P = 0.0001). We conclude that total knee arthroplasty in morbidly obese patients resulted in significantly better outcomes in terms of clinical and functional knee scores.*

Keywords: Total knee arthroplasty, Morbid obesity, BMI, Outcomes, Knee Society Score

Introduction

Obesity, a body mass index (BMI) of 30 or more, is associated with an increased risk of developing cardiovascular disease, hyperlipidemia, type 2 diabetes mellitus, and hypertension (Kozlov, 2018; Saalbach and Anderegg, 2019). It's a major public health crisis that has worsened for half a century (Gowd et al., 2019). The root causes of obesity are complicated and multifaceted. It's the second leading cause of preventable death after tobacco usage (Gowd et al., 2019; Holly et al., 2019). Obesity treatment is complex, and it may be necessary to do so for the rest of the patient's life. An individual's and a country's health, quality of life, and financial burden can all benefit greatly from a weight drop of up to 10 percent (Akinkuotu et al., 2019; Holly et al., 2019).

Obesity is a major risk factor for the development of osteoarthritis (OA), and epidemiologic studies demonstrate that an increase in body mass index is associated with an increase in the risk of several chronic diseases (Wang and He, 2018). The association between obesity and knee OA is well established in the literature since the primary total knee arthroplasty (TKA) rate is greater in obese patients than in those with a normal BMI (Flugsrud et al., 2006).

Statistics show that the number of patients with a body mass index (BMI) of 40 or more who underwent TKA has steadily increased over the past 6 years (Fehring et al., 2007). Because of its superior postoperative results compared to those of many other orthopedic procedures, TKA has become increasingly popular in recent years [9]. These results include a significant and sustained decrease in knee pain and disability and an enhancement in quality of life, particularly among patients resistant to conservative treatment (Fehring et al., 2007; Klug et al., 2021).

The impact force on the tibial component is thought to be higher in patients with a higher body mass index, which is thought to increase component loosening and decrease prosthesis short-term survival (Sezgin et al., 2020). Some studies have demonstrated greater correction rates and worse functional scores in obese patients after TKA (Sezgin et al., 2020), whereas others have found no significant difference. However, other research has found the same, regardless of participants' body mass index (Collins et al., 2012). TKA is effective in morbid obesity, according to a meta-analysis of 9 research (Boyce et al., 2019). The role of a sedentary lifestyle in reducing the rising rate of prosthetic wear in morbidly obese patients may account for the significant improvement noted in the review (McClung et al., 2000).

A study comparing the outcomes of primary TKA in obese patients to those who are not obese found conflicting results. Previous literature indicated lower functional scores, rising revision rates, and rising complication rates. Both obese and non-obese patients who underwent TKR experienced a similar rate of complications. There was a slight association between BMI and problems before surgery, but survival rates may be good in the long run. This research sought to see how well TKA fared for morbidly obese individuals.

Methodology

This retrospective observational study was conducted at the Department of Orthopaedic, Khyber Teaching Hospital

Peshawar, from August 2021 to June 2023. We searched the records of the morbidly obese patients presenting to our ward from September 2022 to May 2023 for total knee arthroplasty. Morbid obesity was defined as a BMI greater than 40 kg/m2. Patients were in the age range of 50 to 75 years of both genders. We recorded their demographics on a pre-designed proforma. The outcomes were evaluated regarding Knee Society Scoring, clinical outcomes such as pain, stability, and range of motion, and functional outcomes such as walking, climbing, and climbing stairs. Both the clinical and functional outcomes were assessed on a 100-point score each. Postoperative complications such as wound, joint, and vein thrombosis were also assessed.

Data was analyzed using IBM SPSS 20. Age, BMI, and Knee Society Score were assessed using mean and standard deviation, while gender, complications, and comorbid were assessed using frequencies and percentages. A paired samples T-test was applied to assess pre and postoperative Knee Society scores, keeping the P value below 0.05.

Results

This study was conducted on 120 morbidly obese patients who underwent TKA. The mean age of the patients was 62.21 ± 7.0 years. The mean BMI calculated was 48.17 ± 4.18 kg/m^2. Regarding gender distribution, 33.3% male and 66.7% female patients were in our study. Regarding comorbidities, 55.8% of patients had diabetes, while 61.7% had hypertension. Regarding postoperative complications, we observed that 79.20% of patients had no complications, about 13.30% had wound infections, 3.30% had joint infections, and 4.20% had vein thrombosis. Regarding the knee society score, the mean preoperative clinical KSS was 48.69 ± 2.45, while postoperative clinical KSS was 83.34 ± 1.04. The difference was statistically significant (P = 0.0001), while the preoperative functional KSS was 43.69 ± 1.73 and the postoperative functional KSS was 70.03 ± 3.31. The difference was statistically significant (P = 0.0001)

Table 1   Demographics

Demographics		Statistics
Age (Years)		62.21±7.0
BMI (kg/m^2)		48.17±4.18
Gender	Male	40 (33.3%)
	Female	80 (66.7%)
Diabetes		67 (55.8%)
Hypertension		74 (61.7%)
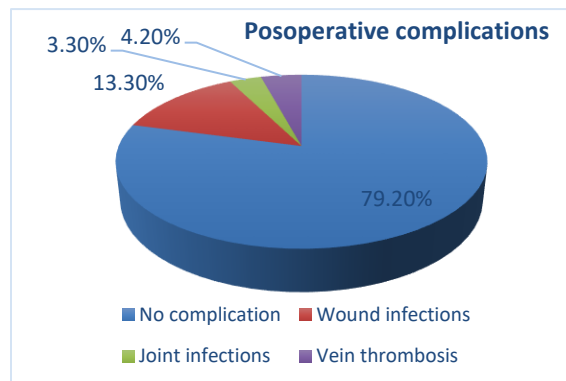
Graph 1   Postoperative complications

Table 2   Outcomes of total knee arthoplasty

Knee Society score	Mean	N	Std. Deviation	P value
Preoperative Clinical KSS	48.69	120	2.456	0.0001
Postoperative Clinical KSS	83.3417	120	1.04918	
Preoperative Functional KSS	43.69	120	1.733	0.0001
Postoperative Functional KSS	70.0333	120	3.31265	

Discussion

Obesity is becoming a growing problem and one of the biggest health risks for people worldwide today. The World Health Organization (WHO) said in a previous study that 500 million people worldwide were overweight. Nearly a third of the people in the US and UK are overweight or obese. In 2015, Egypt was number one out of the 20 countries with the most people because it had the highest rate of adult obesity based on age (Martin et al., 2016).

In addition to being one of the biggest risk factors for osteoarthritis (OA), obesity has been linked to a rise in the risk of many other long-term illnesses by epidemiologic studies. Since the risk of primary TKA is higher for obese people than for people with a normal BMI, the link between obesity and knee OA is clear from the research (von Hintze et al., 2021).

Research shows that the number of fat people who have TKA and have a BMI of 40 or more (called morbid obesity) has been going up. This rise in TKA is because its postoperative results are better than many other orthopedic procedures. This led to a significant and long-lasting decrease in knee pain and disability and improved quality of life, especially in patients who did not respond to conservative treatment (Kuperman et al., 2016).

One common idea is that people with a high BMI have knee overload, which puts more impact stress on the tibial component and speeds up the loosening of the component while lowering the short-term survival of the prosthesis. There are mixed results about how obesity affects problems after TKA. For example, some studies have shown that obese patients have a higher revision rate and a lower functional score. On the other hand, other studies have shown that the effects are the same no matter the BMI (Kim et al., 2012).

In the last few decades, there have been many improvements in how knee OA and its painful symptoms are treated. TKA is now a viable surgical choice for people with severe OA. Because of these changes, the results of TKA need to be examined. Evaluation of functional limits is especially important because more and more obese people are getting TKA. When TKA is done on this group of people, there are many problems to solve. Morbid obesity is linked to all surgery steps, starting with selecting the patient as unfit for elective surgery (Green et al., 2017).

We conducted this retrospective study on 120 morbidly obese patients who underwent TKA. The mean age of the patients in our study was 62.21 ± 7.0 years, and the mean BMI recorded in our study was 48.17 ± 4.18 kg/m^2. Our study observed that most patients were female compared to

male patients. A study (Salama et al., 2022) showed that the mean age of their patients was 66.3±5.2 years, with the majority of the patients being females. This is in accordance with our findings regarding the age and gender of the patients. Another study (Khan et al., 2022) showed that the mean BMI of their patients was 42.84 ± 3.46 kg/m^2.

Our study assessed the outcome of total knee arthroplasty using the Knee Society Score for clinical and functional outcomes. We observed that postoperative TKR, clinical knee, and functional knee scores improved significantly in the patients compared to their preoperative clinical and functional scores. Similar findings have been reported by a study conducted in Pakistan, which showed a significant improvement in pre and postoperative clinical and functional scores (Khan et al., 2022). Another study in Pakistan showed that morbidly obese patients significantly improved clinical knee scores regarding pain, stability, and range of motion. However, their study did not significantly improve walking, climbing, and going upstairs. A study conducted in Egypt demonstrated similar outcomes regarding knee score. They showed a significant pre and postoperative difference in clinical and functional knee score (Salama et al., 2022).

Regarding complications, we observed that 95 (79.2%) patients had no postoperative complications, 13.3% had developed wound infections, 3.3% had developed joint infections, and 4.2% had vein thrombosis. These findings are similar to the study conducted in Pakistan regarding postoperative complications (Noor et al., 2023).

Conclusion

Our study concluded that total knee arthroplasty in morbidly obese patients resulted in significantly better outcomes in terms of clinical and functional knee scores. We suggest positive lifestyle modifications in morbidly obese patients regarding exercise and diet control.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

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