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FUNCTIONAL OUTCOME OF LATERAL APPROACH FOR TOTAL HIP REPLACEMENT: A COHORT STUDY.

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ABSTRACT

Background
The majority of the cases undergoing total hip replacements have favorable outcomes in a significant number of cases the outcomes are not as per the requirement. The outcome of the surgery depends on the approach taken to perform Total hip replacement (THR). This study aims to determine the effect of the lateral approach in performing total hip replacement on the outcome of the surgery.

Method
This study considered the retrospective data as well as the prospective data of the patients undergoing total hip replacement surgery. The patients underwent THR by lateral modified approach. Harris hip score was used for functional evaluation of the hip bone and the Trendelenburg test was performed for abductor muscle strength.

Results
Among the 100 patients included in the study, the mean age was 55.55 years (SD ± 7.2), with 45% being male and 55% female. THR was performed on the left side in 63% of patients and on the right side in 37%. The most common indication for surgery was a fracture of the neck of the femur (66%). Postoperatively, 39% of patients had excellent outcomes, 55% had good outcomes, and 6% had fair outcomes based on the Harris hip score. No patients were reported to have poor outcomes. Complications included heterotrophic ossification in 5% of patients and superficial infections in 4% of patients.

Conclusion
The modified lateral approach provides a better visualization of the hip, the dissection of the muscles is not involved and the retention of the posterior capsule prevents it from dislocation and provides extra stability.

Recommendation
A lateral modified approach should be considered for performing total hip replacement surgery irrespective of the indication as the complications reported in this study are comparatively lesser than the other approaches used.

Keywords: *Total hip replacement, Modified lateral approach, Harris hip score*
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INTRODUCTION

Various pathologies associated with hip bone such as fractures, osteoarthritis, autoimmune bone disorders, and trauma cause progression towards decreased physical function and the quality of life of the patient suffering deteriorates. Total hip replacement provides relief and improves the functionality of the bone. Statistically, there is an increase in the number of total hip replacements performed each year due to an increase in the geriatric population [1,2]. Although the majority of the cases undergoing total hip replacements have favorable outcomes in a significant number of cases the outcomes are not as per the requirement.

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The unfavorable outcomes include limping, decreased physical function, pain, readmission for surgery, and dislocation of the allied muscles and tissues. It has been reported that the outcome depends on the approach of the surgery. Internationally, the lateral approach is preferred over the posterior approach but in India, surgeries are carried out by the posterior approach [3,4,5]. Nevertheless, both approaches have their pros and cons considering the patient outcomes. In the posterior approach, the patients have reported more dislocation and requirement of another surgery whereas the more lateral approach causes undesirable side effects.

The posterior approach during the surgery causes damage to the sciatic nerve which might occur due to compression with the retractors, this makes it difficult to place the cup in the proper position which increases the risk of dislocation and requirement for another surgery [6]. However, while taking the lateral approach the lateral tissues are damaged which causes the issues of muscular pain and rigid movements which decreases the functional abilities of the hip bone.
Surgeons have to meticulously consider the approach for the surgery as it can severely affect the prognosis of the existing disease. Studies are required to determine the patient outcome and selection of the appropriate route for performing the surgery. This study aims to determine the effect of the lateral approach in performing total hip replacement on the outcome of the surgery.

METHODOLOGY

Study design

A cohort study.

Study setting

This study was carried out for a period of 5 years (May 2020 to June 2024) at Indira Gandhi Institute of Medical Science (IGIMS), Patna, Bihar, India. This study considered the retrospective data as well as the prospective data of the patients undergoing total hip replacement surgery.

Participants

A total of 100 patients were included in the study.

Inclusion criteria

The patients who underwent total hip replacement by modified lateral approach and had records of modified Harris hip score as well as the other radiological findings were considered for the study. Also, patients who agreed to follow-up and were undergoing total hip replacement were considered for this study.

Exclusion criteria

The patient who had multiple joint replacement surgeries before and those who had other immunological and neurological disorders were not considered for this study.

Data Collection and Procedure

In total 100 patients participated in this study; a team of surgeons performed this surgery over 5 years. The retrospective cases were thoroughly examined for radiological findings. Primarily modified Harris Hip score was used to evaluate the outcomes of the surgery. Patients followed up for 5 years. Individuals participating in this study had a variety of indications due to which they required total hip replacement. All of them underwent total hip replacement by a modified lateral approach. The procedure for surgery remained the same for each individual irrespective of the pathology, including preoperative and post-operative protocols.
Mobilization of the patients began on the 12th day of the surgery, crutches were removed after three months. The patients were trained to perform different exercises which helped them in recovery and total weight-bearing function started in each individual as per their recovery and willingness. For the first 6 months, patients followed up after every 15 days and after 6 months they followed up every 6 months. During each follow-up the patients were evaluated for modified Harris Hip score and abductor muscle strength was determined during each visit, The Trendelenburg test was performed.

Ethical consideration

The ethical committee of the institute approved the protocols of the study considering the aim and the significance of the outcome of the study

Statistical analysis

The data obtained from the study was arranged in a tabular format and the data was then subjected to statistical analysis. Data were analyzed using SPSS version 23.0.

RESULTS

In the study, 100 patients participated in this study out of which 45 were males and 55 were females. The average calculated age in the study was 55.55 years. However, 61 patients belonged to the age group above 60 years whereas the remaining 49 patients belonged to the age group

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between 40 to 60 years. The total hip replacement was performed on the left side for 63 patients and on the right side for 37 patients. Table no. 1 gives the details of the age and gender of the patients who volunteered for this study.

Table no.1: Age and gender of the patients

Characteristics	N (%)
Age (Mean±SD) years	55.55±7.2
Gender Male Female	 45 55
Laterality Left Right	 63 37

The patients participating in this study for total hip replacement had a variety of indications. The commonest among the 100 was the fracture of the neck of the femur. 66 patients had fractures in the neck of the femur. Then the non-union fracture was the second most common indication suffered by the patients. Secondary arthritis was found to be the reason for total hip replacement in 9 cases and avascular necrosis was found to be the indication in 7 cases. When the Trendelenburg test was performed 11 patients had positive tests out of which 7 were suffering from secondary osteoarthritis as the primary indication. This indicated that people with secondary osteoarthritis tend to have weakened abductor muscles. Table no. 2 entails the details of indications

Table no.2: Indication of the patients

Pathology	N (%)
Fracture of the neck of the femur	66 (66%)
Non-union fracture of femur neck	18 (18%)
Secondary osteoarthritis	9 (9%)
Necrosis	7 (7%)

Harris's hip score was used to evaluate the surgery. It was found that the majority of the patients had good Harris Hip scores after the surgery. None of them had poor outcomes according to the Harris Hip score. Nevertheless, 6 patients had fair scores postoperatively. Table no.3 shows the Harris Hip score of the patients.

Table no.3: Harris Hip score of the patients postoperatively

Modified HHS (Postoperative)	N (%)
poor	0 (0%)
fair	06 (6%)
good	55 (55%)
excellent	39 (39%)

The most common postoperative complications found in the patients were heterotrophic ossification, 5 patients had heterotrophic ossification out of which 3 of them had no restriction in the movement of the hip bone but 2 of them had a restriction in moving the hip bone. 2 patients among the 100 had loosened cement bone but there were symptoms related to it. This was a radiological finding. Superficial infections found in 4 patients were managed by routine antibiotics there were no deep infections reported. The replacement subsided in 2 patients which required another surgery. The sciatic nerve was damaged in 2 patients which led to the loss of movement but the injury recovered well. In this case, foot drop was reported in the patients. Periprosthetic fracture was reported in two cases, they had trauma fracture as their primary indication for total hip replacement.

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Table no. 4: Details of complications reported postoperatively

Complications	N (%)
Heterotrophic Ossification	5 (5%)
Loosening of the replacement	2 (2%)
Superficial Infection	4 (4%)
Periprosthetic fracture	2 (2%)
Subsidence of the replacement	2 (2%)
Injury of the nerve	2 (2%)
Difference in the limb length	0
Deeply situated infection	0
Emboli in the surgical area	0
Injury to the vessels	0
Complete dislocation	0

DISCUSSION

The results of this study indicate that the modified lateral approach for total hip replacement (THR) generally leads to favorable outcomes, with the majority of patients achieving either excellent or good functional results. Specifically, 39% of the patients experienced excellent outcomes, while 55% had good outcomes based on the Harris hip score, a standard measure used to assess hip function after surgery. Only a small proportion (6%) had fair outcomes, and importantly, no patients were reported to have poor outcomes. This suggests that the modified lateral approach is effective in restoring hip function for most patients undergoing THR.

Demographically, the study included a balanced representation of males (45%) and females (55%), with a mean age of 55.55 years. The majority of surgeries (63%) were performed on the left hip, with the remaining 37% on the right. The most common indication for surgery was a fracture of the neck of the femur, affecting 66% of the patients. This highlights the prevalence of femoral neck fractures as a leading cause of hip replacement in the studied population.

In terms of complications, the study found a relatively low incidence of adverse outcomes. The most common postoperative complication was heterotrophic ossification, observed in 5% of patients. This condition, where bone tissue forms outside the skeleton, was generally manageable, with most affected patients not experiencing significant functional impairment. Additionally, 4% of patients developed superficial infections, all of which were successfully treated with routine antibiotics, and no deep infections were reported. The absence of severe complications such as dislocation, deep infections, or significant nerve injury further underscores the safety and effectiveness of the modified lateral approach.
Overall, these results suggest that the modified lateral approach for THR not only provides a high rate of positive functional outcomes but also minimizes the risk of severe complications. The approach appears to be particularly beneficial for elderly patients and those with femoral neck fractures, supporting its use as a preferred surgical method in these cases.

In this study modified lateral approach was studied as an approach to perform total hip replacement. There are various approaches available for performing total hip replacement surgery. Each of them had their pros and cons [7]. Since total hip replacement surgery is most commonly carried out among the geriatric population. Restoring the functionality of the hip bone is important. The approach taken for performing total hip replacement surgery is crucial as it influences the functionality of the hip bone postoperatively [8].

In this study, the majority of the population was above 60 years of age which is similar to the demographic distribution in another study [10]. To evaluate the functionality of the hip, the Harris hip score was used. It was found that 39%, 55%, 6%, and 0% of patients had excellent, good, fair, and poor outcomes. This finding was consistent with the other study conducted on a modified lateral approach [11]. There were no poor outcomes reported in this study. Various studies have stated that the modified lateral approach improves the function of the hip muscles as there is no dissection taking place when this approach is used for performing total hip replacement [10,11,12].

In a study conducted prosthetics dislocations were reported after performing total hip replacement by posterior approach [13]. Similarly, another study reported denervation and nerve injury [13]. However, in this study, no dislocation and denervation were reported. Postoperatively the commonest complication reported was heterotrophic ossification followed by superficial infection. Superficial infections were well managed by using antibiotics. Limping was reported in certain cases.

Trendelenburg test performed in this study, 11 individuals tested positive among the 100. The proportion of the patients testing positive for the Trendelenburg test is significantly higher when the posterior approach is used. Literature states that while taking a modified lateral approach the posterior capsule is as it is and the hip bone is visible clearly [14,15]. All these factors contribute to increased stability of the prosthetics which prevents dislocation.

The strength of the other side of the muscles is comparable to that on which a lateral modified approach is used to perform total hip replacement. As this approach prevents dissection of the muscles and provides a better view of the hip bone it was found to be superior to the other approaches used for performing total hip replacement.

GENERALIZABILITY

The study's external validity is supported by its inclusion of a diverse patient demographic and a variety of indications for total hip replacement, which enhances the generalizability of the results to a broader population. The consistent positive outcomes and low complication rates observed with the modified lateral approach suggest that these findings can apply to similar patient groups undergoing THR in other tertiary care settings.

CONCLUSION

The modified lateral approach provides a better visualization of the hip, the dissection of the muscles is not involved and the retention of the posterior capsule prevents it from dislocation and provides extra stability. Limping is reported but dislocation of the prosthetics is not found in any of the cases.

LIMITATION

To conclude the superiority of the modified lateral approach over other approaches requires long-term studies along with electrophysiological studies.

RECOMMENDATION

Lateral modified approach should be considered for performing total hip replacement surgery irrespective of the indication as the complications reported in this study are comparatively lesser than the other approaches used.

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LIST OF ABBREVIATION

THR: Total Hip Replacement
IGIMS: Indira Gandhi Institute of Medical Sciences
HHS: Harris Hip Score
SD: Standard Deviation

SOURCE OF FUNDING

No funding was received.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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