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POSTERIOR APPROACH TOTAL HIP REPLACEMENT TO SPARE PIRIFORMIS MUSCLE: A STUDY AT A TERTIARY CARE HOSPITAL

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ABSTRACT

OBJECTIVE: The purpose of this study is to assess the functional result in terms of hip function and postoperative pain of patients who underwent total hip replacement surgery utilizing a technique that spared the piriformis muscle.

BACKGROUND: Several methods to the hip joint have been advocatedfor the total hip arthroplasty (THA) including direct anterior, anterolateral, lateral, posterior, and posterolateral approaches. Because of its benefits, the posterolateral technique is widely used, which include sufficient exposure of femur and acetabular fossa and abductor muscle preservation in THA. Comparatively the lesser invasive methods have been used to lessen the dislocation rates because of maintaining the piriformis muscle. Studies have found that maintaining the piriformis was beneficial.

STUDY DESIGN: cohort study

PLACE AND DURATION: This study was conducted in Mastoi Medicare Centre Nawabshah from December 2022 to December 2023

METHODOGY: The Oxford Hip Scale, which consists of 12 items with a total score of 48 (X1) and a score ranging from 0 to 4, as well as the 12-item Short Form Survey (SF-12) general health score, were utilized to assess the hips' functioning. It is divided into two sections. SPSS version 26 was utilized for data entry and analysis. P-values were deemed statistically significant if they were less than 0.05. The numerical data was presented using mean ± SD, whereas the categorical variables were reported using frequencies and percentages.

RESULTS: The procedure involved 24(44.44%) patients with left hip surgery and 30(55.56%) patients with right hips surgery. Surgerywasperformedonleftsidein26patientsandrightsidein 34 patients. The most common indication for surgery wasOA in 44 (81.48%) followed by other causes in 7(12.96%) patients. There were 24(44.44%) and 30(55.56%) patients able to walk with and without the support respectively, there were 46 (85.19%) patients and 7(14.81%) patients in PM grade 0 and I respectively.

CONCLUSION: When it comes to hip replacement surgery, the posterior approach that spares the Piriformis muscle provides a better functional outcome in terms of hip function and postoperative pain. Piriformis muscle is particularly crucial hence it should be spared wherever feasible to have the greatest results following total hip replacement using posterior approach.

KEYWORDS: Piriformis Muscle, Total Hip Arthroplasty, Oxford hip Ratio

INTRODUCTION

Several methods to the hip joint have been advocated for total hip arthroplasty, including direct anterior, anterolateral, lateral, posterior, and posterolateral approaches. [1, 2]. The posterolateral technique is commonly used and has various benefits, which include sufficient exposure of femur and acetabular fossa and abductor muscle preservation in THA [3, 4]. Corrective surgical techniques for THA, on the other hand, have lately gained popularity among surgeons because to the benefits of mini-incisions and quick postoperative recovery [5, 6]. These adjustments are widely characterized as mini-incision and external rotator sparing methods [5-7].

The posterolateral technique is the most popular and has several benefits, including sufficient exposure of femur and acetabular fossa and abductor muscle preservation in THA [8].

The posterior route is one of the most regularly used THA methods, according to the literature. Compared to the lateral approach, there is a higher rate of dislocation. The reason for this could be that the longer trochanter and the shorter external rotators have separated [9].It has been suggested that less intrusive methods that preserve the piriformis can lower the incidence of dislocation. [10]. Despite the fact that the control group was retrospective and the study was not randomized controlled, the data showed that the muscle-sparing technique enhanced clinical outcomes. Two further studies that did not have suitable control groups concluded that sparing the piriformis was helpful. [11].

Therefore, the goal of this study is to assess the functional success of patients in terms of hip function and postoperative pain who underwent total hip replacement surgery using a piriformis muscle sparing technique.

METHODOLOGY:

Using a non-probability consecutive sampling method we inducted 54 subjects who underwent totalhiparthroplastyin the study. The male and female patients who underwent totalhiparthroplasty aged more than 18 years. However, patients with history of previous hip surgery, post traumatic arthritis were not included in the study.

After seeking the institutional ethical approval from the hospital's ethical review committee, patients meeting the inclusion criteria were made part of the study.

The researcher conducted the posterior approach surgery that spared the piriformis under his supervision. Patients were anaesthetized with a combination of spinal and epidural anesthesia, positioned in lateral position , and the standard posterior posterior approach was performed. The posterior hip capsule and the obturator externus and internus muscles were raised off the bone, but the piriformis muscle was spared. During closure, Ethibond sutures were used to reattach the obturator externus and internus to the bone, and the remaining incision was closed in compliance with accepted standards. All of the patients were transported, and physiotherapists quickly put a predetermined rehabilitation plan into action. Patients were later mobilized for weight bearing within 24 hours of surgery, depending on their tolerance, and discharged when they were fully mobile.

The subsequent follow up scheduled after two weeks, the staples of surgery were removed and dressing was refreshed. Postoperative outcomes were assessed at intervals of 2, 6 weeks, 3months and 1 year after surgery using Visual analogue scale for pain.

To evaluate the hips functions we used the 12-item Short Form Survey (SF-12) general health score and Oxford Hip Scale which comprised of 12 questions scored from 0 to 4 and total score of 48 (X1), While the SF-12 consists of twelve things. It has two parts. The first part is related with the summery of physical component, while the 2nd includes the summery of mental component scores. In the general population, the mean score is 50±10 [12].On the other hand OHS captures detailed data on patients' views of hip problems, with ahigher emphasis on pain and functional limitations [13].

SPSS version 26 was utilized for data entry and analysis. P-values were deemed statistically significant if they were less than 0.05. Frequencies and percentages were used to report the categorical variables, and mean ± SD was utilized for the numerical data.

RESULTS

A total of 54 patients were part of this study, outof those 33(61.11%) were males and 21(38.89%) were females. The procedure involved 24(44.44%) patients with left hip surgery and 30(55.56%) patients with right hips surgery. Surgerywasperformedon left side in 26 patientsand rightsidein 34 patients. The most common indication for surgery wasOA in 44 (81.48%) followed by other causes in 7(12.96%) patients. Overall 38 (70.37%)patients were of physical status I and 16 (29.63%) ASA II, There were 24(44.44%) and 30(55.56%) patients able to walk with and without the support respectively (As shown in Table I)

Table I Sociodemographic characteristics of the patients (n=54)

Variables	n	%
Right/Left Side of HIP		
Left	24	44.44
Right	30	55.56
Indication For Surgery		
OA	44	81.48
RA	7	12.96
Avascular necrosis	3	5.56
Gender		
Male	33	61.11
Female	21	38.89
ASA score		
I	38	70.37
II	16	29.63
Baseline walking ability		
With aid	30	55.56
Unaided	24	44.44

The Mean BMI ofthe patients was 26.3±2.9, Mean baseline pain score on VASwas 7.1±2.34and baseline OHSscorewas 19.8±6.6. (As shown in Table II). The scores of patients on the first follow-up are displayed in Table III. The mean VAS pain score dropped to 1.4±0.23, and the mean OHS pain score was 42±2.77. The mean SF-12 PCS was 41.5±8.78 and the mean SF-12 MCS was 48.4±9.41 out of a total score of 48. Table III shows that there were 46 (85.19%) patients and 7(14.81%) patients in PM grade 0 and I respectively

Table II descriptive statistics of patient's pain score

Variables	Mean	SD
BMI (kg/m^2)	26.3	2.9
Baseline pain	7.1	2.34
Baseline OHS^s	19.8	6.61
AT first follow up		
Pain score	1.4	0.23
OHS	42	2.77
SF-12 PCS	41.5	8.78
SF-12 MCS	48.4	9.41

Table III: Follow up after 1 year for Piriformis muscle grade

PM grade	N	%
0	46	85.19
I	8	14.81
II		0
III		0
IV		0

DISCUSSION

Our study found that patients undergone “posterior approach” for sparing the piriformis muscle while total hip replacement had “good to outstanding” regarding satisfaction of patients and pain score. A few randomized controlled trials that contrasted the posterior surgery with the minimally invasive method have been conducted, which contradicts our findings. Most contrasted a posterior approach with a normal incision with one that used a mini-incision. [14, 15].The procedure involved 24(44.44%) patients with left hip surgery and 30(55.56%) patients with right hips surgery. Surgerywasperformedonleftsidein26patientsandrightsidein 34 patients. The most common indication for surgery wasOA in 44 (81.48%) followed by other causes in 7(12.96%) patients. The patients had a mean BMI of 26.3±2.9, a VAS pain score of 7.1±2.34, and an OHS score of 19.8±6.6. The VAS pain score was reduced to 1.4±0.23 and the OHS score was 42±2.77 out of a total score of 48. This is consistent with a research that found a mean OHS score of 44 and a mean pain score of 1.2 following the surgery. These findings are quite similar to those from our study [16]. In our study, mean SF-12 PCS was 41.5±8.78,meanSF-12 MCSwas 48.4±9.41. There were 46 (85.19%) patients and 7(14.81%) patients in PM grade 0 and I respectively, compared to our study, Umar et al reported thatat the time of one year following the treatment, the mean pain score on VAS was reduced to 1.2±0.5, the mean OHS score was 44±4.9 out of 48, and the mean SF-12 PCS was 40.2±12.2. The mean SF-12 MCS was 56.6±11.3. [14] Additionally, Stevenson et al. undertook a randomized trial to evaluate the 10-year outcomes of the mini-incision and standard posterior methods. It did not show any significant differences in HHS, WOMAC, SF-12, or OHS scores between two groups[17].Procyk published a case series study with a one-year follow-up that used a similar technique to ours, which validated our research findings. The study's participants were under 70 years old and had a mean BMI of less than 30. This technique leads to the best component placement, a quicker functional recovery, less discomfort following surgery, shorter hospital stays, and fewer problems [18].

The goals of THA are to improve function, reduce discomfort, and encourage stability. In these locations, it may be helpful to look at the postoperative anatomy and function of the hip-supporting muscles. There are no long-term functional data or high-level studies that evaluate the long-term muscle morphology after total hip arthroplasty (THA) in the literature.

CONCLUSION

When it comes to hip replacement surgery, the posterior approach that spares the Piriformis muscle provides a better functional outcome in terms of hip function and postoperative pain. Piriformis

muscle is particularly crucial hence it should be spared wherever feasible to have the greatest results following total hip replacement using posterior approach.

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Conflict of interest:
None

Approval
It was taken

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