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Associate Professor, Department of Orthopaedics, Mamata Academy of Medical Sciences, Bachupally, Hyderabad, Telangana, India A comparative study of short-term outcomes in total hip arthroplasty using anterior approach versus posterior approach

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Abstract

Introduction: Total Hip Arthroplasty (THA), a widely practiced surgical intervention for managing debilitating hip joint diseases, has demonstrated great success in providing pain relief and restoring joint function. This study was aimed to compare the short-term outcomes of THA using the anterior approach versus the posterior approach.

Methods: A total of 128 patients who underwent THA were retrospectively evaluated. Sixty-four patients had surgery using the anterior approach and 64 using the posterior approach. Demographic characteristics were comparable between the two groups. The primary outcomes were the Harris Hip Score (HHS) and Visual Analog Scale (VAS) for pain at six months postoperatively. Secondary outcomes included complication rates, length of hospital stay, and readmission within six months of surgery.

Results: At 6 months postoperatively, the Anterior Approach group had a slightly higher HHS (mean 85.6, SD 7.5) compared to the Posterior Approach group (mean 84.1, SD 8.3), suggesting better hip function. The Anterior Approach group also reported a lower mean VAS score (2.5, SD 1.4) than the Posterior Approach group (3.0, SD 1.6), indicating less pain. Fewer patients in the Anterior Approach group experienced dislocation (3.1% vs 7.8%) and infection (1.6% vs 3.1%), but a higher incidence of nerve injury was observed (4.7% vs 0%). The Anterior Approach group (3.5 days, SD 1.3) and a lower readmission rate within six months postoperatively (6.3% vs 9.4%).

Conclusion: The results suggest that patients who underwent THA via the Anterior Approach had slightly better functional outcomes, experienced less pain, and had a lower risk of certain complications than those who underwent the Posterior Approach. However, there was a slightly higher risk of nerve injury in the Anterior Approach group.

Keywords: Total hip arthroplasty (THA), anterior approach, posterior approach, harris hip score (HHS), visual Analog scale (VAS)

Introduction

Total hip arthroplasty (THA) is a common surgical procedure performed worldwide for the management of various hip conditions, such as osteoarthritis, hip fractures, and avascular necrosis ^[1]. The procedure aims to alleviate pain and improve function in patients with hip disorders, thereby enhancing their overall quality of life ^[2]. Two prevalent surgical approaches to perform THA are the anterior and posterior approaches ^[3].

The anterior approach to THA is performed from the front of the hip. It is associated with potential advantages such as less muscle damage and quicker recovery because it follows an intermuscular and internervous plane ^[4]. However, this approach might have a higher learning curve for surgeons due to limited exposure of the surgical site and potential risks associated with nerve damage ^[5].

On the other hand, the posterior approach, conducted from the back of the hip, provides excellent exposure of the acetabulum and femur, which may make the procedure technically easier for surgeons ^[6]. But, this approach might be associated with higher rates of postoperative dislocation and need for revision surgery if performed without a posterior soft tissue repair ^[7].

Corresponding Author: Dr. Kumar A Associate Professor, Department of Orthopaedics, Mamata Academy of Medical Sciences, Bachupally, Hyderabad, Telangana, India Despite a substantial amount of research conducted on both these techniques, there remains a lack of consensus regarding which approach leads to better short-term outcomes in terms of function, pain, and complication rates ^[8].

Numerous studies have aimed to determine the superior approach between the two in terms of short-term outcomes, including complication rates, postoperative pain levels, functional recovery, and quality of life. However, these studies have generated conflicting results, thereby failing to achieve a clear consensus in the medical community ^[9]. Furthermore, factors such as surgical experience, patient characteristics, and postoperative rehabilitation may also influence the outcomes ^[10].

Therefore, this study aims to compare the short-term outcomes of THA using the anterior approach versus the posterior approach.

Material and Methods

This study is a retrospective cohort study conducted at Mamata Academy of Medical Sciences, Hyderabad. Data was collected from 128 subjects medical records that underwent Total Hip Arthroplasty (THA) using either the anterior or posterior surgical approach.

Inclusion criteria

- Patients aged 18 years and above.
- Patients who have undergone a primary THA for the first time.
- Patients with a minimum of six months of follow-up.

Exclusion criteria

- Patients with a history of hip surgery.
- Patients who underwent a revision THA.
- Patients with incomplete medical records.

Data Collection

Data was collected on the patients' demographics (age,

gender, BMI), comorbidities, diagnosis leading to THA. The primary outcome measure was the short-term functional outcome, measured using the Harris Hip Score (HHS) at six months postoperatively. Secondary outcome measures include postoperative pain scores (VAS), complication rates (including dislocation, infection, periprosthetic fracture, nerve injury), length of hospital stay, and any readmissions or revisions within six months postoperatively.

Statistical Analysis

Demographics and baseline characteristics will be compared using independent t-tests (or Mann-Whitney U tests for nonnormally distributed data) for continuous variables and chisquare tests (or Fisher's exact tests if needed) for categorical variables. The primary and secondary outcomes will be compared using independent t-tests (or Mann-Whitney U tests) and chi-square tests (or Fisher's exact tests), as appropriate. All tests will be two-sided, with p<0.05considered statistically significant.

Results

Characteristic	Anterior Approach (n=64)	Posterior Approach (n=64)
Age (years), mean (SD)	65.4 (10.2)	66.1 (11.3)
Gender, n (%)		
Male	35 (54.7)	38 (59.4)
Female	29 (45.3)	26 (40.6)
BMI, mean (SD)	28.3 (4.5)	27.8 (5.2)
Comorbidities, n (%)	42 (65.6)	45 (70.3)
Primary Diagnosis, n (%)		
Osteoarthritis	51 (79.7)	49 (76.6)
Hip Fracture	7 (10.9)	9 (14.1)
Avascular Necrosis	6 (9.4)	6 (9.4)

Table 1: Demographics and Baseline Characteristics

Table 2:	Postoperative	Outcomes
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Outcome	Anterior Approach (n=64)	Posterior Approach (n=64)
Harris Hip Score at 6 months, mean (SD)	85.6 (7.5)	84.1 (8.3)
Pain score (VAS) at 6 months, mean (SD)	2.5 (1.4)	3.0 (1.6)
Complications, n (%)		
Dislocation	2 (3.1)	5 (7.8)
Infection	1 (1.6)	2 (3.1)
Periprosthetic fracture	0 (0)	1 (1.6)
Nerve injury	3 (4.7)	0 (0)
Length of hospital stay (days), mean (SD)	3.2 (1.1)	3.5 (1.3)
Readmission within 6 months, n (%)	4 (6.3)	6 (9.4)

There is no significant difference in the demographic characteristics of the two groups. The Harris Hip Score (HHS), a commonly used measure to assess functional outcome in patients who have undergone hip surgery, was higher for the Anterior Approach group (mean score of 85.6 with a standard deviation of 7.5) than the Posterior Approach group (mean score of 84.1 with a standard deviation of 8.3). This suggests that, on average, patients who underwent the Anterior Approach had slightly better hip function at 6 months postoperatively.

Pain was assessed using the Visual Analog Scale (VAS), with a lower score indicating less pain. The Anterior Approach group reported a lower mean pain score (2.5 with a standard deviation of 1.4) than the Posterior Approach group (mean score of 3.0 with a standard deviation of 1.6) at 6 months postoperatively, indicating less pain in the Anterior Approach group.

In terms of complications, a smaller percentage of patients in the Anterior Approach group experienced dislocation (3.1% versus 7.8%) and infection (1.6% versus 3.1%) compared to the Posterior Approach group. However, nerve injury was more common in the Anterior Approach group (4.7% versus 0% in the Posterior Approach group). There was one case of periprosthetic fracture in the Posterior Approach group, while none was reported in the Anterior Approach group.

The average length of hospital stay was slightly shorter for the Anterior Approach group (mean of 3.2 days with a standard deviation of 1.1) compared to the Posterior Approach group (mean of 3.5 days with a standard deviation of 1.3), indicating a slightly faster discharge rate for patients who underwent the

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Anterior Approach.

The percentage of patients readmitted within 6 months of surgery was slightly lower in the Anterior Approach group (6.3%) compared to the Posterior Approach group (9.4%).

Overall, these results suggest that patients who underwent THA via the Anterior Approach had slightly better functional outcomes, experienced less pain, and had a lower risk of certain complications than those who underwent the Posterior Approach

Discussion

Our study aimed to compare the short-term outcomes of Total Hip Arthroplasty (THA) using the Anterior Approach versus the Posterior Approach. The results obtained suggest slightly better functional outcomes and a lower pain score for the Anterior Approach at six months postoperatively, although these differences were small and may not be clinically significant.

The Harris Hip Score (HHS), a widely used measure of hip function following THA ^[11], was marginally higher in the Anterior Approach group. This aligns with previous studies that have reported enhanced early functional recovery with the Anterior Approach ^[12]. This might be attributed to the intermuscular and internervous plane followed in the Anterior Approach, potentially causing less muscle damage ^[13].

The pain scores at six months postoperatively were also slightly lower in the Anterior Approach group. This could be due to the less invasive nature of the Anterior Approach, leading to less postoperative pain and potentially faster recovery ^[14]. However, there is no consensus on this aspect, and some studies have reported comparable pain scores between the two approaches ^[15].

The complication rates showed some variation between the two groups. The Anterior Approach group had fewer incidences of dislocation and infection but showed a higher rate of nerve injury. This is consistent with previous research where the Anterior Approach has been associated with a lower dislocation risk ^[16] but an increased risk of lateral femoral cutaneous nerve damage ^[17]. It is crucial to note that despite these differences, the overall complication rates were relatively low in both groups, reflecting the general safety of THA surgery.

The length of hospital stay was marginally shorter for patients in the Anterior Approach group, which is in line with previous studies demonstrating a quicker initial recovery with the Anterior Approach ^[18]. The difference in readmission rates was negligible, reinforcing previous research indicating no significant difference between the two approaches in terms of major complications requiring hospital readmission ^[19].

Despite the useful insights gained, our study has limitations. Being a retrospective study, it is subject to potential biases such as selection bias and information bias. The generalizability of the results may also be restricted due to variations in surgical technique, surgeon experience, and patient characteristics.

In conclusion, our study indicates that both Anterior and Posterior Approaches to THA provide satisfactory short-term outcomes. Although some differences were observed, these may not be clinically significant, and the choice of surgical approach should depend on individual patient characteristics, surgeon's skill, and preference. More extensive, prospective randomized studies may be warranted to further explore the subtle differences between the two approaches.

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