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ORIGINAL ARTICLE

Evaluation of the Functional Outcome of Total Hip Replacement by Anterolateral Approach

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ABSTRACT

Background: *Anterolateral Total hip arthroplasty is gaining popularity for hip arthropathy treatment, as it has potential advantages in preserving muscles and enhancing joint stability. There is a lack of information about functional results for this procedure in Bangladeshi patients. The purpose of this study is to explore functional results for Total hip replacement with an anterolateral approach for diverse hip disorders.* ***Methods & Materials:*** *This was an interventional study conducted at the Bangladesh Medical University, Dhaka, Bangladesh from March 2018 to August 2020. 27 patients aged above 20 years with hip arthropathy needing Total hip replacement were purposively sampled for the study. The operations were done by employing the anterolateral approach with the use of cemented implants under spinal anesthetics. The function was evaluated by the Harris Hip Scores (HHS) and Visual Analogue Scale (VAS) for pain at pre-op and six months post-op, respectively. Data were entered and analyzed using SPSS version 26, with a p-value <0.05 considered significant.* ***Results:*** *The average age was 44.85±12.87 years, and 66.7% of the patients were females. The most prevalent indication was osteoarthritis (51.9%), followed by AVN and femoral neck fractures. The average surgery time was 75.37±8.87 minutes, and the average hospital stay was 6.78±1.34 days. The average Harris Hip Score of 82.78±4.87 was attained at the sixth month. The VAS scores improved remarkably from 4.03±3.04 pre-operatively to 1.07±1.73 post-operatively (p<0.001); 66.7% of the patients got complete pain relief. Radiographic stability was achieved in 92.6% of cases.* ***Conclusion:*** *The anterolateral approach in Total hip replacement offers outstanding functional results with substantial pain relief, high implant stability, and acceptable surgery parameters in the Bangladeshi population, ensuring its effectiveness as a surgical procedure in cases of various hip pathologies.*

Keywords: *Total hip arthroplasty, Anterolateral approach, Harris Hip Score*

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INTRODUCTION

Total hip arthroplasty (THA) continues to be one of the most successful orthopedic procedures to date, resulting in substantial pain relief and functional gain for end-stage hip disease sufferers [1]. THA has come a long way since its onset, with different methods being developed to maximize success and reduce complications associated with the procedure [2]. Among these techniques is the anterolateral approach to hip replacement, which has appeared to gain popularity because of its muscle-sparing modality and prospects for improved postoperative rehabilitation [3]. Hip arthropathy, which includes osteoarthritis, avascular necrosis, and femoral neck fractures, is a burden on healthcare systems around the world, especially in geriatric patients [4]. These groups experience significant disability, pain, and loss of function in life, thereby often considering surgical options when non-operative measures fail in treatment [5]. The choice of surgical technique in such cases will play an important role in influencing both the surgical outcome and function postoperatively [6]. The anterolateral approach, originally described by Watson-Jones but modified by various authors, has a number of theoretical benefits when compared to other approaches [7]. This approach allows excellent visualization of the acetabular and proximal femoral regions without compromising the posterior capsule or rotators, potentially lowering dislocation rates postoperatively [8]. Additionally, the anterolateral approach is easier in an obese patient population as well as in revisioning failed internal fixation of femoral neck fractures [9]. Despite such potential advantages, there has been controversy on the particular surgical technique that should be used for THA.

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Such comparative studies have brought forth divergent outcomes, with some indicating that the anterolateral approach is superior based on decreased rates of dislocation and early mobilization [10]. Nonetheless, there has been a consideration of injury to the superior gluteal nerve and abductors, possibly influencing late functional outcomes [11]. Given the situation in Bangladesh, where there is a rising number of cases pertaining to hip pathologies with the advent of demographic shifts and improved life expectancy, there is a lack of information available that focuses specifically on the functional results of THA done via the anterolateral approach. Recognizing how effectively this approach is done in our environment is highly essential for evidence-based surgical practices. This study aims to assess the functional results of Total hip replacement done via the anterolateral approach in relation to pain relief, functional restoration, and complications in a wide range of hip pathologies.

METHODS & MATERIALS

This prospective interventional study was carried out at Bangladesh Medical University Hospital, Dhaka, in the Department of Orthopaedic Surgery from March 2018 to August 2020 on 27 patients who underwent arthropathy of the hip. Patients were enrolled using purposive and non-random sampling. There were fixed criteria of exclusion and inclusion. Patients aged 20 or above with arthropathy of the hip requiring Total hip replacement were considered eligible. There were also specific criteria of surgery that included patients with primary osteoarthritis, avascular necrosis of the femoral head, and femoral neck fractures with no possible internal fixation. Patients with past surgeries to the hip, those with revisions of arthropathy, existing instability, infections, thromboembolic disease, and other patients undergoing concomitant joint replacement within the next three months were excluded. Patients with no mental clarity and no ability to sign informed consent were also not considered. All procedures were carried out under spinal anesthesia by a solitary orthopedic surgeon with the anterolateral surgical approach. In an effort to eliminate variability with respect to implant use, cemented femoral stems and cemented acetabular parts were utilized for all procedures. Preoperative and postoperative evaluations were conducted through various means, which included clinical assessments, radiographic reviews, and patient interviews. The evaluation and assessment of pain were conducted using the Visual Analogue Scale (VAS), in addition to the Harris Hip Score (HHS) for assessing and evaluating functionality [12,13]. Both were conducted preoperatively and at intervals following the procedures, with at least six months of follow-up. Ethical clearance was obtained from the appropriate institutional review board, and informed written consent was secured from all participants prior to inclusion. The data were collected and analyzed through the use of the Statistical Package for the Social Sciences version 26.0. The continuous data include age, operation time, hospital stay, HHS, and VAS. This data can be described using means and standard deviations. A p-value of <0.05 was considered significant for the analysis.

RESULTS

Table I shows that most patients (48.1%) belonged to the 40-59 years age group, with an average age of 44.85 ± 12.87 years. The majority of patients (66.7%) were female patients, while male patients consisted of 33.3%. The occupational status shows that most (40.7%) were service holders, followed by those involved in business (29.6%). [Table I]

Table – I: Demographic profile of the study subjects (*n*=27)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	20-39	10	37.0
	40-59	13	48.1
	≥60	4	14.8
	Mean ± SD	44.85 ± 12.87	
Gender	Male	9	33.3
	Female	18	66.7
Occupation	Service holder	11	40.7
	Business	8	29.6
	Housewife	6	22.2
	Student	2	7.4

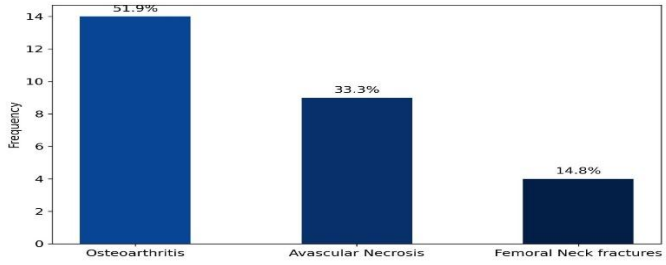

Figure – 1: Distribution of study population according to indication of THA

Figure 1 illustrates that osteoarthritis was the commonest indication for THA (51.9%), followed by avascular necrosis (33.3%) and femoral neck fractures (14.8%). This pattern conforms to the usual disease burden in tertiary care settings, where degenerative conditions predominate but also where a large number of relatively young patients present with avascular necrosis.

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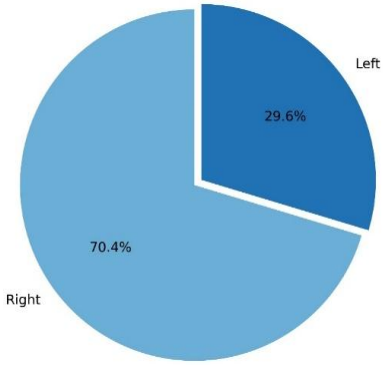

Figure – 2: Distribution of the study subjects according to the side of THA

Figure 2 depicts a marked predominance of right-sided procedures (70.4%) compared to left-sided (29.6%). This asymmetry may reflect the natural dominance of the right side, leading to increased loading and subsequent pathology, or potentially sampling variation in this cohort.

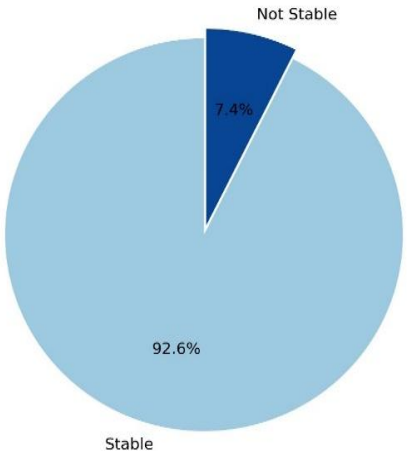

Figure – 3: Distribution of the study population according to radiograph stable implant

Figure 3 revealed excellent implant stability in 92.6% of cases, with only 7.7% showing signs of instability. This high stability rate indicates successful surgical technique and appropriate implant fixation using cemented components.

Table II unveils favorable operative metrics with a mean operation time of 75.37±8.87 minutes, a mean hospital stay of 6.78±1.34 days, and a mean bed rest duration of 3.81±1.36 days. The mean Harris Hip Score of 82.78±4.87 indicates good-to-excellent functional outcomes. The relatively short operative time suggests surgical efficiency with the anterolateral approach, while the hospital stay duration reflects standard postoperative care protocols. [Table II]

Table – II: Assessment of study subjects at different clinical parameters (*n*=27)

Clinical parameters	Mean ± SD
Length of operation time (min)	75.37 ± 8.87
Length of hospital stay (days)	6.78 ± 1.34
Length of bed stay (days)	3.81 ± 1.36
Harris Hip Score	82.78 ± 4.87

Table III demonstrates dramatic improvement postoperatively, with 66.7% of patients reporting no pain compared to 0% preoperatively. The mean VAS score decreased significantly from 4.03±3.04 preoperatively to 1.07±1.73 postoperatively ($p<0.001$). This substantial pain reduction demonstrates the effectiveness of THA in alleviating hip pain, with the majority achieving complete pain relief and only 7.4% experiencing residual moderate pain at six-month follow-up.

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Table – III: Pre- and post-operative pain of the study subjects according to VAS score (*n*=27)

Pain Level	Preoperative (n, %)	Postoperative (n, %)	P value
No Pain (0)	0 (0.0%)	18 (66.7%)	-
Mild Pain (1-3)	15 (55.6%)	7 (25.9%)	-
Moderate pain (4-6)	7 (25.9%)	2 (7.4%)	-
Severe Pain (7-10)	5 (18.5%)	0(0%)	-
Mean ± SD	4.03 ± 3.04	1.07 ± 1.73	<0.001

DISCUSSION

The study demonstrated considerable alleviation in pain and functionality, along with optimal implant stability and acceptable complication rates. The mean value for the Harris Hip Score is 82.78±4.87, which represents optimal results since the HHS score, ranging between 80-90, indicates successful THA surgery reported by Pollock et al. [14]. The demographic characteristics included a relatively younger mean age (44.85 years) than that observed in other parts of the world by Kurtz et al., where the average is usually over 65 years for THA [15]. Also, a lower mean age is attributed to the prevalence rate of avascular necrosis, which stood at 33.3% in our study population, a condition that usually affects younger people, especially found in developing nations, owing to several reasons, mainly the use of steroids, alcohol, etc [16]. The prevalence rate for females (66.7%) is usual, as women show a higher prevalence rate for hip osteoarthritis, hence a higher rate for THA [17]. The anterolateral approach showed some key advantages in this group. The mean surgical time of 75.37 minutes is quite favorable compared with that in other approaches, indicating good surgical efficiency [18]. The approach allowed for good exposure for acetabular reconstruction, hence enabling proper positioning, as seen by a 92.6% rate for radiographic stability. This is particularly essential in preventing complications such as dislocation and looseness, especially where positioning is a key factor [19]. The pain reduction was dramatic, with the mean VAS score reducing from 4.03 to 1.07 ($p < 0.001$). This difference can be considered comparable to Learmonth et al., who showed dramatic relief from pain following THA, irrespective of the method chosen [20]. Notably, 66.7% of the patients had complete relief from pain, which is higher than reported by Wylde et al., signifying that the surgery and patient selection are optimal [21]. The pain that persists in 33.3% patients can be mainly considered to be mild, as only 7.4% are having moderate pain at the six-month follow-up. The rate of instability (7.7%), although low compared to Kwon et al., is remarkable, since dislocation is still among the most prevalent postoperative complications after THA [22]. The anterolateral approach preserves the posterior capsule and external rotators, which play a pivotalrole in the stabilization of the hip joint. Dislocation rates have been observed to range from 0.5% to 10% based on the surgical technique used, with posterior approaches having a more significant risk of dislocation [23]. These results confirm the stabilizing effect of the anterolateral approach on the hip joint. The average hospital stay was quite prolonged compared to Khan et al., where improved recovery practice has reduced hospital stay to 2-4 days [24]. These discrepancies are likely to be due to various institutional and socioeconomic factors and not approach-specific issues. There was early mobilization indicated by a mean bed rest of 3.81 days, which is essential to avoid thromboembolic issues and promote speedy recovery [25]. The rate of instability (7.7%), although low compared to other studies, is remarkable, since dislocation is still among the most prevalent postoperative complications after THA. The anterolateral approach preserves the posterior capsule and external rotators, which play a pivotal role in the stabilization of the hip joint. Dislocation rates have been observed to range from 0.5% to 10% based on the surgical technique used, with posterior approaches having a more significant risk of dislocation. These results confirm the stabilizing effect of the anterolateral approach on the hip joint. The average hospital stay was quite prolonged compared to reports by Gillam et al., where improved recovery practice has reduced hospital stay to 2-4 days [26]. These discrepancies are likely to be due to various institutional and socioeconomic factors and not approach-specific issues. There was early mobilization indicated by a mean bed rest of 3.81 days, which is essential to avoid thromboembolic issues and promote speedy recovery. The predominantly unilateral distribution (70.4% right-sided) may reflect biomechanical loading patterns or sampling variation. This finding calls for further investigation in larger cohorts to determine whether laterality influences outcomes. Our study demonstrates that the anterolateral approach is effective across various hip pathologies and provides reliable outcomes among the Bangladeshi population.

LIMITATIONS OF THE STUDY

The study limitations include a relatively small sample size and a short follow-up duration of six months, which may not capture long-term complications or implant survival rates. Additionally, the absence of a control group comparing different surgical approaches limits definitive conclusions regarding the superiority of the anterolateral technique.

CONCLUSION

Anterior lateral methods to Total hip arthroplasty have excellent functional results in patients with hip arthropathy, as shown by the significant improvement in pain levels and Harris Hip levels observed in this study. The method has demonstrated high rates of implant stability, fast operation times, and great pain reduction, with the majority of patients obtaining Total pain relief. Anterior lateral methods have been beneficial in instances involving a wide range of pathological processes, including degenerative arthritis, avascular necrosis, and femoral neck fractures, demonstrating their adaptability in dealing with hip pathologies. All of the preceding factors demonstrate it as a safe and effective treatment for Total hip replacement in the Bangladeshi community.

RECOMMENDATIONS

Future studies should include larger multicenter trials with longer follow-up periods extending to 5-10 years to assess implant longevity and late complications. Comparative studies evaluating the anterolateral approach against other surgical approaches using randomized controlled trial designs would provide stronger evidence for optimal technique selection in Total hip arthroplasty.

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