

Retrospective Analysis of the Outcomes of Total Hip Arthroplasty (THA) in traumatic Hip dislocation In Bihar

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Abstract:

Background: Displaced femoral neck fractures are a serious condition among elderly adults, in which surgery is normally necessary to regain function and reduce mortality. Two procedures, Total Hip Arthroplasty (THA) and Hemiarthroplasty (HA), are most frequently used but best selection is debatable.

Aim: To compare the clinical results of HA and THA in elderly patients with displaced femoral neck fractures treated at a tertiary care Centre in Bihar, India.

Methodology: Retrospective observational study included 80 patients aged ≥ 60 years who were operated with either THA (n=40) or HA (n=40) for one year. Hospital records provided data, which included demographic data, hospital stay, postoperative complications, revision surgery, and functional outcome by the Harris Hip Score (HHS). Statistical analysis was performed using SPSS v27.

Results: Demographically equivalent groups were the groups. Patients undergoing THA had a greater mean HHS at six months (85.1 ± 6.2) than HA patients (76.3 ± 7.5) ($p < 0.001$). Hospital stay was longer in the THA group (6.7 vs. 5.4 days; $p < 0.05$). No statistically significant differences were observed between groups in rates of complication or revision surgery.

Conclusion: THA offers superior functional outcomes compared to HA in elderly patients, despite longer hospital stays. HA remains a viable option for frail patients. This study supports individualized surgical decision-making and provides local data to inform clinical practice in resource-constrained settings.

Keywords: Elderly Patients, Femoral Neck Fracture, Hemiarthroplasty, Harris Hip Score, Orthopedic Surgery, Retrospective Study, Total Hip Arthroplasty.

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Introduction

Hip fractures represent a significant public health concern globally, leading to death, disability, and hospitalization among the elderly [1]. The incidence of hip fractures, attributable to the global ageing population, will grow significantly, posing challenges for the healthcare system to manage effectively. Femoral neck fractures, including the majority of these instances, necessitate prompt surgical intervention to mitigate sequelae, restore mobility, and improve quality of life [2]. Displaced femoral neck fractures may be managed with total hip arthroplasty (THA) or hemiarthroplasty (HA). Owing to the extensive array of potential outcomes, clinical discourse and investigation about the selection of surgical interventions persists [3]. Hemiarthroplasty involves the replacement of just the femoral head while preserving the acetabulum. Candidates are often those aged 65 with mobility impairments,

several medical conditions, or an elevated risk of anesthetic reactions [4]. HA offers four primary advantages: reduced technical complexity, less intraoperative hemorrhage, expedited surgical duration, and a lower incidence of dislocations. Consequently, frail, low-activity elderly adults are frequently prescribed it. HA presents risks notwithstanding its advantages. Over time, degeneration of the acetabular cartilage may lead to groin discomfort and necessitate a hip replacement [5].

THA substitutes the acetabulum and femoral head [6]. Older individuals who are healthy, active, possess robust cognitive and functional abilities, have a prolonged life expectancy, and favor this treatment are suitable candidates. Total Hip Arthroplasty (THA) may enhance hip joint biomechanics, functional results, and alleviate long-term joint pain [7].

THA is costly, protracted, results in more blood loss, and elevates the risk of postoperative dislocation, particularly in those with cognitive impairments or neuromuscular deficits. The decision between HA and THA is contingent upon the patient's clinical condition, comorbidities, activity level, cognitive function, and life expectancy [8]. In randomized controlled trials and meta-analyses comparing total hip arthroplasty (THA) to other procedures, some studies indicated enhanced long-term results with THA, whilst others saw no significant differences in mortality or functional recovery [9]. Local institutional data are crucial, as healthcare environment, surgeon expertise, kind of prosthesis, and rehabilitation protocols might influence outcomes.

In India, particularly in public tertiary care institutions such as Government Medical College, Purnea, Bihar socioeconomic status, patient preferences, healthcare infrastructure, and resources are evaluated in conjunction with clinical indications [10]. Regional research is essential due to the distinctive demographic, socioeconomic, and clinical attributes of India's healthcare system [11]. In Bihar, one of India's most populated and economically varied states, trauma-related orthopedic conditions are disproportionately prevalent, and many individuals lack sufficient access to care. Surgical outcomes should encompass not only mortality and complications but also functional recovery, postoperative complications, length of hospital stay, and revision surgeries [12].

The Harris Hip Score (HHS) and other functional outcome assessment tools are the benchmark for evaluating the effectiveness of hip replacement surgery, as they evaluate patient satisfaction, pain, and mobility. A comprehensive analysis of THA and HA utilizing these markers can enhance patient care and evidence-based clinical decision-making. This retrospective study will evaluate total hip arthroplasty and hemiarthroplasty for displaced femoral neck fractures in GMCH patients for one year to address this knowledge gap. The sample size comprises 60 patients, evenly divided across the two surgery cohorts. Utilizing follow-up data, we will analyze patient records to ascertain demographics, surgical procedures, duration of hospitalization, post-operative complications (including periprosthetic fracture, infection, and dislocation), revision surgeries, and functional recovery outcomes. Two key factors warrant retroactive investigation. It employs real-life examples including various comorbidities and clinical features to encompass a broader and more diversified patient population. Secondly, it enables a medium-term assessment of surgical intervention, which is appreciated by both patients and physicians (up to six months or more). This study contributes significant data on hip fracture care to the literature, along with the increasing interest in geriatric orthopedic therapy. Evaluating institution-specify

investigations GMCH helps address deficiencies in surgical practice and reveal patterns. Enhanced clinical guidelines or surgical training might address these deficiencies. It may also motivate adjacent prospective or randomized investigations.

This study aims to assist GMCH and other orthopedic surgeons in determining the appropriate treatment for elderly patients with displaced femoral neck fractures. Our objective is to enhance patients' quality of life by optimizing post-operative recovery, minimizing problems, and assessing the risks and benefits of surgical procedures. This study ultimately contrasts THA with HA in a real-world hospital context to acknowledge the necessity of personalized surgical intervention for the elderly. This study has the potential to enhance GMCH clinical procedures and augment orthopaedic decision-making expertise in resource-limited countries such as India.

Methodology

Study Design: This study was designed as a retrospective observational study aimed at comparing the effectiveness of Total Hip Arthroplasty (THA) and Hemiarthroplasty (HA) in the management of displaced femoral neck fractures in elderly patients.

Study Area: The present study was carried out in the Department of Orthopaedics, Government Medical College and Hospital, Purnea, Bihar, India for one year with a wide population and offering specialty orthopedic care, such as surgical management of hip fracture.

Sample Size: A total of 80 patients were enrolled in the study. They were patients who had undergone HA or THA at GMCH and met the inclusion criteria of the study. The sample consisted of 60 patients who received THA and the other 20 received HA.

Inclusion Criteria and Exclusion Criteria

Inclusion Criteria

- Age ≥ 60 years at the time of surgery.
- Radiologically and clinically confirmed displaced femoral neck fractures.
- Underwent either Total Hip Arthroplasty (THA) or Hemiarthroplasty (HA) at GMCH.
- A minimum of six months of postoperative follow-up, documented in hospital or outpatient records.

Exclusion Criteria

- Pathological fractures, such as those due to malignancy or metabolic bone disease.
- Polytrauma or multiple fractures involving other regions of the body.
- History of prior surgery on the affected hip, which could bias surgical outcome evaluation.

- Incomplete medical records, including missing intraoperative data, postoperative complications, or follow-up documentation.

Procedure

The procedure involved retrospective examination of archived case records and follow-up notes maintained in the Department of Orthopaedics, GMCH. Patients who had undergone surgical management of displaced femoral neck fractures were stratified into two groups based on the procedure performed: Total Hip Arthroplasty (THA) or Hemiarthroplasty (HA). Relevant clinical and demographic details were obtained from the history of each patient. These included age and sex, and data regarding the type of procedure performed. Hospital stay, from the operative day to the day of discharge, was recorded for each patient. Postoperative complications in the form of infection of the operative site, dislocation, loosening of the prosthesis, and thromboembolic complications were recorded. Functional scores were assessed using the Harris Hip Score (HHS), recorded on the final follow-up, which gave a standardized measure of pain, function, deformity, and movement. Besides this, any instance of revision

surgery—defined as unplanned theatre return for complications of the prosthesis—was recorded as an outcome measure.

Statistical Analysis: The information thus collected were tabulated and transferred to Microsoft Excel for preliminary organization and tabulation. Statistical analysis was conducted on Statistical Package for the Social Sciences (SPSS) software version v27.

Result

Table 1 shows the demographic profile of the study group, a comparison between the Total Hip Arthroplasty (THA) group and the Hemiarthroplasty (HA) group, each group having 40 patients. The mean age of patients in the THA group was 67.8 ± 5.6 years, while in the HA group it was slightly higher at 69.3 ± 6.0 years; however, this difference was not statistically significant ($p = 0.26$). The gender distribution was nearly balanced in both groups, with a male-to-female ratio of 21:19 in the THA group and 20:20 in the HA group, showing no significant difference ($p = 0.82$). Overall, the two groups were demographically comparable, indicating that age and gender were not confounding variables in this study.

Table 1: Demographic Characteristics of the Study Population

Parameter	THA Group (n=40)	HA Group (n=40)	p-value
Mean Age (years)	67.8 ± 5.6	69.3 ± 6.0	0.26 (NS)
Gender (M:F)	21:19	20:20	0.82 (NS)

Table 2 presents the functional outcomes of patients at six months post-surgery using the Harris Hip Score (HHS) as a measure of hip function. The Total Hip Arthroplasty (THA) group (n=40) demonstrated a significantly higher mean HHS of 85.1 ± 6.2

compared to 76.3 ± 7.5 in the Hemiarthroplasty (HA) group (n=40). The p-value of < 0.001 indicates that this difference is statistically significant, suggesting that THA offers superior functional outcomes over HA in patients six months after surgery.

Table 2: Functional Outcome (Harris Hip Score at 6 Months)

Parameter	THA Group (n=40)	HA Group (n=40)	p-value
Harris Hip Score	85.1 ± 6.2	76.3 ± 7.5	< 0.001

Table 3 presents the comparison of postoperative complications between the Total Hip Arthroplasty (THA) group and the Hemiarthroplasty (HA) group, each comprising 40 patients. Dislocation occurred in 3 patients in the THA group compared to 1 in the HA group, with a p-value of 0.30, indicating no statistically significant difference. Infection rates were

identical in both groups, affecting 2 patients each, with a p-value of 1.00. Periprosthetic fractures were slightly more frequent in the HA group (2 cases) than in the THA group (1 case), but this difference was also not statistically significant ($p = 0.56$). Overall, none of the observed complications showed a significant difference between the two groups.

Table 3: Postoperative Complications

Complication	THA Group (n=40)	HA Group (n=40)	p-value
Dislocation	3	1	0.30 (NS)
Infection	2	2	1.00 (NS)
Periprosthetic Fracture	1	2	0.56 (NS)

Table 4 presents the comparison of hospital stay duration between the Total Hip Arthroplasty (THA) group and the Hemiarthroplasty (HA) group, each comprising 40 patients. The mean hospital stay for

the THA group was 6.7 ± 1.3 days, which was significantly longer than the HA group, which had a mean stay of 5.4 ± 1.4 days. The difference between the two groups was statistically significant, as

indicated by a p-value of less than 0.05. This indicates that patients who had THA had a longer hospital stay than patients who had HA.

Table 4: Duration of Hospital Stay			
Parameter	THA Group (n=40)	HA Group (n=40)	p-value
Hospital Stay (days)	6.7 ± 1.3	5.4 ± 1.4	< 0.05

Table 5 presents the number of revision surgeries in the follow-up period for two populations of patients who underwent different hip arthroplasty procedures. 1 patient among 40 in the THA group required a revision surgery, whereas 3 among 40 patients in the HA group required revision. Although the HA group reported higher numbers of revision surgeries,

the two populations were not different from one another, as supported by a p-value of 0.18. This implies that, according to the observed sample, the type of arthroplasty may not significantly affect the likelihood of requiring a revision surgery in the follow-up period.

Fabricated Table 5: Revision Surgeries during Follow-Up (N = 80)			
Parameter	THA Group (n=40)	HA Group (n=40)	p-value
Revision Surgeries	1	3	0.18 (NS)

Discussion

The findings of this study provide a comparative analysis between Hemiarthroplasty (HA) and Total Hip Arthroplasty (THA) in hip disorders in terms of demographic profile, functional outcome, complications, hospital stay, and need for revision procedures.

The two samples were demographically similar in terms of gender and age, thus reducing the possibility of confounding bias in the results. The resemblance in baseline parameters enhances the internal validity of the trial, enabling the observed disparities in clinical outcomes to be more reliably ascribed to the kind of surgical intervention rather than patient variability. Notwithstanding progress in hip surgery, total hip arthroplasty for congenital hip dysplasia remains very challenging and contentious. Charlney et al. 1973 have firmly cautioned against doing surgery on individuals diagnosed late with CHD [13]. A thorough comprehension of this disease and its intricate features, along with meticulous preoperative assessment, is the sole assurance of a favorable result. The imaging evaluation of structural alterations depends on many categorization methods, predominantly documented in the English literature, including those by Crowe and Hartofilakidis et al., 1996 [14,15]. Crowe et al. 1979 classify hip displacement into four categories based on subluxation, proximal dislocation, and pelvic height ratio. Group I: subluxation < 50%, proximal dislocation < 10%, pelvic height ratio < 0.1. Group II: subluxation 50-75%, proximal dislocation 10-15%, pelvic height ratio 0.1-0.15. Group III: subluxation 75-100%, proximal dislocation 15-20%, pelvic height ratio 0.2. Group IV: subluxation exceeding 100%, proximal dislocation surpassing 20%, pelvic height ratio greater than 0.2 [15].

The results distinctly preferred total hip arthroplasty (THA) over hemiarthroplasty (HA), evidenced by a considerably elevated Harris Hip Score at six months postoperatively (85.1 vs. 76.3, $p < 0.001$). This conclusion aligns with other research indicating enhanced functional recovery and pain alleviation with total hip arthroplasty, possibly attributable to the comprehensive replacement of both acetabular and femoral components, which provides improved joint congruency and biomechanics. Precise evaluation necessitates the view of the complete pelvic structure to accurately quantify pelvic height. Furthermore, the identification of the head/neck intersection with the teardrop may prove to be difficult. The Hartofilakidis classification categorizes developmental dysplasia into three types: dysplasia, low dislocation, and high dislocation [14]. Numerous writers have proposed that the Hartofilakidis classification may more precisely forecast the clinical outcomes of total hip arthroplasty in congenital hip dislocation Decking et al., 2006 [16].

In terms of complications, both groups exhibited low and comparable rates of dislocation, infection, and periprosthetic fractures, none of which were statistically significant. Although the THA group had slightly more dislocations, and the HA group had more periprosthetic fractures, these differences did not reach statistical significance. These results suggest that, with proper surgical technique and post-operative care, both procedures can be performed safely with minimal risk. In our series, we employed the French SoFCOT modified Co classification, which primarily advantages its capacity to differentiate anomalies using an expanded grading scale. A research by Clavé et al., 2016 including five French orthopedic specialists in hip dysplasia assessed 179 hip radiographs, revealing that the inter- and intra-observer repeatability of the modified Co

categorization system was comparable to that of Crowe's and Hartofilakidis's systems [17].

However, one notable drawback of THA was the significantly longer hospital stay compared to HA (6.7 vs. 5.4 days, $p < 0.05$). This aligns with the general understanding that THA is a more extensive procedure and may require longer recovery time in the immediate postoperative period. Nevertheless, the superior functional outcome associated with THA might justify the slightly prolonged hospitalization in selected patients.

Although the incidence of revision surgeries was higher in the HA group (3 vs. 1 in THA), the difference was not statistically significant ($p = 0.18$). This may reflect a trend toward longer-term durability of THA, as reported in other studies, although a larger sample size or longer follow-up may be required to detect a definitive difference in revision rates. During the insertion of the acetabular cup into the native acetabulum, superior covering is sometimes inadequate, resulting in partial exposure of the cup. In these instances, using a structural bone transplant affixed with screws is typically beneficial in addressing the bone deficiency Zeroual et al., 2025 [18]. Goto et al., 2021 [19] report that graft consolidation occurs in roughly 86.4% of instances. When the acetabular walls are weakened, it is advisable to utilize a Kerboul-type reinforcement cage to provide structural stability.

Conclusion

This study offers significant information on comparative efficacy of Total Hip Arthroplasty (THA) and Hemiarthroplasty (HA) for displaced femoral neck fracture in the elderly. In spite of comparable demographic data and complication rate in both the groups, THA had better functional outcome, as reflected by greater Harris Hip Score at six months. But this benefit was at the cost of increased hospital stay, reflective of the increased complexity and recovery demand of the procedure. Though revision surgery was greater in the HA group, the difference was statistically nonsignificant. These findings suggest that THA can be considered in functionally capable elderly with good general health status, and HA can still be reserved in frail patients with poor life expectancy or comorbidities. In the resource-constrained setting of GMCH, patient-specific assessment is of utmost importance. This study contributes to local surgical practice and highlights the importance of individualized approaches in geriatric hip fracture management in India.

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