International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 5, May 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.5.2025.94

ORIGINAL RESEARCH

HEMI replacement arthroplasty and total hip replacement arthroplasty for neck of femur fractures: Comparison of Harris Hip Score (HHS)

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Received: 01March, 2025 Accepted: 02April, 2025

ABSTRACT
Femoral neck fractures are intracapsular hip fracture which are common in elderly patients.The common modality of treatment of neck of femur fracture in elderly patients are hemi replacement (HRA) and total hip arthroplasty (THR). A comparative study in 42 patients aged more than 65 years with neck of femur fracture taken up for surgery and treated with HRA and THR and post operatively mobilisation was encouraged on first day after surgery and full weight bearing ambulation with waking aids. Follow up evaluation was done at 2,4,8,12 weeks using Harris hip score Visual analogue scale. 42 patients divided into two groups of 21 each. With mean age of 72.19 in group A and 65.86 in group B.Where group B show statistically significant P value in term of VAS score and HHS. Group B showed better functional recovery (higher Harris Hip Scores), quicker pain relief, and faster discontinuation of walking aids. Both groups had similar early postoperative mobilization. Overall, Total Hip Arthroplasty led to improved recovery and outcomes compared to Hemiarthroplasty. In our study we concluded that THR is a better option as compared to HRA in the management of elderly patients with neck of femur fracture on account of short term functional outcome, less complication rate and higher Harris hip score.

Key words: Hemireplacementarthroplasty, total hip arthroplasty, functional outcome

INTRODUCTION

Hemiarthroplasty, often considered for elderly patients with a femoral neck fracture, involves the replacement of the femoral head and neck while preserving the acetabulum. This procedure is less invasive and generally has a quicker recovery time, which makes it an appealing option for patients who are not expected to benefit from the restoration of full hip function [1, 2]. However, hemiarthroplasty may not provide long-term relief for younger patients or those with pre-existing hip joint degeneration. In contrast, total hip replacement (THA) involves replacing both the femoral head and the acetabulum, which is aimed at restoring a more normal hip joint function. It is often chosen for younger patients with higher functional demands or those with underlying hip joint pathology such as osteoarthritis [3].

While hemiarthroplasty and THA are both common surgical treatments for NOF fractures, the clinical outcomes following these procedures remain a subject of debate. The early outcomes, specifically postoperative pain, functional recovery, and mobility, are essential factors in evaluating the success of these surgeries. It is crucial to assess whether the more extensive procedure of THA provides significant improvements over hemiarthroplasty, particularly in the early postoperative period [4].

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Postoperative pain management is one of the most critical aspects of recovery following surgery for NOF fractures. Pain relief is essential for improving patient satisfaction and promoting early mobilization. While both procedures aim to alleviate pain, the extent and duration of pain relief may differ. Hemiarthroplasty may provide more immediate pain relief because it is a less invasive procedure, while THA, although more comprehensive, might involve longer surgical times, resulting in greater initial postoperative discomfort. Therefore, understanding the pain trajectory following these surgeries is a key component of evaluating early outcomes [5].

Functional recovery is a significant outcome measure when comparing hemiarthroplasty and THA. Functional outcomes after surgery are typically measured by the ability to perform essential activities of daily living, such as walking, dressing, and climbing stairs. The functional outcomes after hemiarthroplasty and THA may differ depending on the extent of the surgery and the patient's overall health. Hemiarthroplasty is generally considered suitable for older patients with lower functional expectations, while THA is believed to offer superior outcomes for younger patients with higher functional demands due to its ability to restore both components of the hip joint [6].

One of the key aspects of recovery following hip surgery is the ability to mobilize early. Early mobilization after surgery helps prevent complications like deep vein thrombosis (DVT), pulmonary embolism, and muscle atrophy, all of which can significantly affect a patient's long-term recovery. Both procedures typically follow a structured rehabilitation protocol, but the time to mobilization can differ. The less invasive nature of hemiarthroplasty may allow for earlier mobilization, while the more complex procedure of THA may require a longer recovery period, leading to delayed mobilization [7].

The cessation of walking aids is an important measure of functional recovery following hip surgery. The time required to discontinue walking aids can provide an indication of the overall recovery process. Hemiarthroplasty patients may be able to stop using walking aids earlier due to the simpler procedure and quicker recovery time. On the other hand, THA patients may take longer to cease the use of walking aids, as the rehabilitation process is generally more intensive due to the complexity of the surgery [8].

METHODOLOGY

The study was designed as a prospective observational study, aimed at evaluating the functional outcomes of patients undergoing hemiarthroplasty and total hip replacement (THR) for femoral neck fractures. The primary focus of the study was to assess postoperative pain relief, functional recovery, and the time taken for the cessation of walking aids and mobilization. By following a structured, prospective approach, data could be systematically collected over a predefined follow-up period, allowing for comparison between the two groups (group A and group B). Patients were enrolled into the study after meeting the inclusion criteria and providing informed consent. The design aimed to provide a clear picture of how each procedure impacted postoperative recovery and daily function, using objective measures like the Harris Hip Score (HHS) and Visual Analog Scale (VAS) for pain.

STUDY SETTING

The hospital provided access to a diverse population of patients requiring hip replacement surgeries, allowing for a comprehensive and varied sample. In addition to the medical college itself, its allied hospital facilities were also used for patient recruitment, preoperative assessments, and follow-up evaluations. This setting offered the necessary infrastructure, medical expertise, and facilities to ensure the accurate collection of data, performance of surgical procedures, and post-surgical rehabilitation.

INCLUSION CRITERIA

1. Patients with femoral neck fractures of the hip joint.
2. Age ≥ 65 years.
3. Patients who were willing to provide informed consent to participate in the study.
4. Patients who had no contraindications for either hemiarthroplasty or total hip replacement surgery based on preoperative evaluation.

EXCLUSION CRITERIA

5. Patients with active infections (systemic or local) or history of infections in the hip joint.
6. Patients with other fractures around the hip or in the ipsilateral or contralateral lower limb.
7. Patients undergoing active treatment for malignant diseases, suspected malignant diseases, rheumatoid arthritis, or neurological deficits (e.g., Parkinson's disease).
8. Patients with significant skin diseases in the area of the proposed incision or poor skin condition affecting surgical outcomes.

RESULTS

Table 1: Gender Distribution in Group B (Total Hip Arthroplasty Group)

Group B		
Gender	**Frequency**	**Percentage**
Male	11	52.38%
Female	10	47.62%

DOI: 10.69605/ijlbpr_14.5.2025.94

Total	21	100.00%

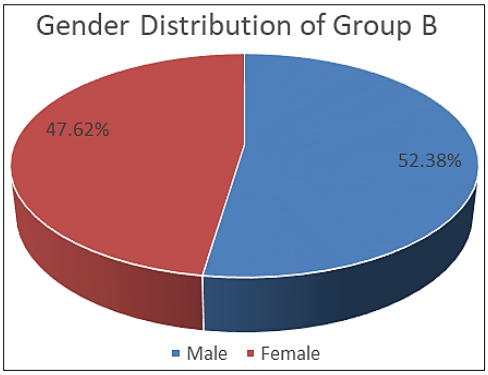

Figure 1: Gender Distribution in Group B (Total Hip Arthroplasty Group)

The mean age of patients in Group A, who underwent hemiarthroplasty, was 72.19 years with a standard deviation of 5.33 years, indicating that this group primarily consisted of older individuals. In contrast, Group B, which underwent total hip arthroplasty, had a lower mean age of 65.86 years with a standard deviation of 8.34 years.

Table 2: Comparison of Mean Age between Group A (Hemiarthroplasty) and Group B (Total Hip Arthroplasty)

	Group A	Group B
Mean	72.19	65.86
S.D.	5.33	4.34

The mean Harris Hip Scores (HHS) at various follow-up intervals-2, 4, 8, and 12 weeks-demonstrate a consistently better functional outcome in Group B (Total Hip Arthroplasty) compared to Group A (Hemiarthroplasty). At 2 weeks, the mean HHS in Group B was 43.71 ± 3.94, which was significantly higher than 40.86 ± 2.15 in Group A ($p = 0.0029$). This trend continued across all time points, with Group B maintaining significantly higher scores: at 4 weeks (66.43 vs. 55.43; $p = 2.49E-09$), 8 weeks (85.24 vs. 72.38; $p = 8.5E-14$), and 12 weeks (89.52 vs. 85.24; $p = 1.39E-07$). These findings indicate that patients undergoing total hip arthroplasty experienced superior early functional recovery compared to those receiving hemiarthroplasty.

Table 3: Comparison of Harris Hip Score (HHS) Between Group A (Hemiarthroplasty) and Group B (Total Hip Arthroplasty) Over Time

	Time Period	Group	Mean	S.D.	P-value
HHS	2 W	A	40.86	2.15	0.0029
		B	43.71	3.94	
	4 W	A	55.43	3.94	2.49E-09
		B	66.43	5.54	
	8 W	A	72.38	3.47	8.5E-14
		B	85.24	4.17	
	12 W	A	85.24	2.86	1.39E-07
		B	89.52	1.40	

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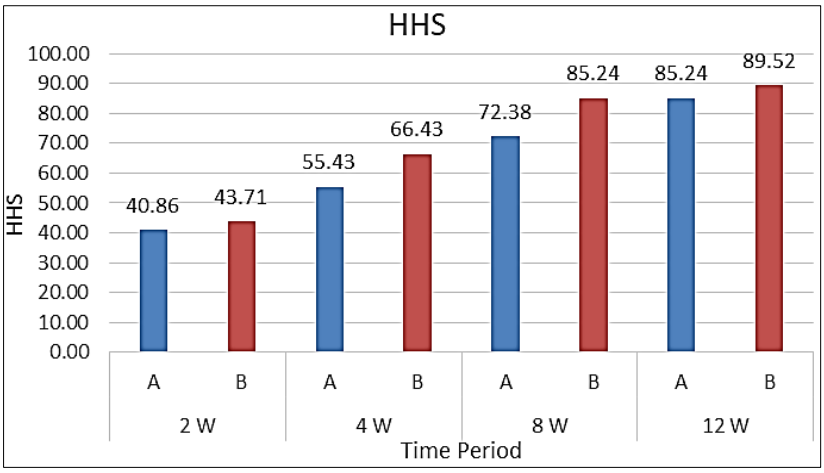

Figure 2: Comparison of Harris Hip Score (HHS) Between Group A (Hemiarthroplasty) and Group B (Total Hip Arthroplasty) Over Time

Pain scores assessed using the Visual Analog Scale (VAS) at 2, 4, 8, and 12 weeks postoperatively revealed similar trends between Group A and Group B during the early postoperative period, with some divergence at 8 weeks. At 2 weeks, the mean pain scores were comparable between the two groups-7.76 ± 0.70 in Group A and 7.67 ± 0.58 in Group B (p = 0.7150)-showing no statistically significant difference. Similarly, at 4 weeks, both groups recorded identical mean scores of 5.62 ± 0.50 (p = 1). However, by 8 weeks, Group B exhibited a statistically significant reduction in pain with a mean score of 1.95 ± 0.86 compared to 2.48 ± 0.68 in Group A (p = 0.0444). By 12 weeks, pain levels had markedly reduced in both groups, with identical mean scores of 0.29 ± 0.46 (p = 1), indicating effective pain control in the late postoperative period for both surgical modalities.

DISCUSSION

In our study, the gender distribution among patients revealed notable differences between the two groups. Group A, undergoing hemiarthroplasty, comprised 21 patients with a female predominance (57.14% female vs. 42.86% male), which is consistent with the epidemiological understanding that elderly women are more susceptible to osteoporotic fractures due to decreased bone mineral density and increased fall risk. In contrast, Group B, treated with total hip arthroplasty (THA), demonstrated a nearly equal distribution (47.62% female and 52.38% male). Although many previous studies have not focused exclusively on gender distribution as a primary outcome, the higher female incidence in osteoporotic fracture cases has been acknowledged in the literature. For instance, Khani*et al.* [10] and Adeyemo*et al.* [9] reported that older females are disproportionately represented among patients with femoral neck fractures, likely due to similar underlying risk factors such as postmenopausal bone loss. While Puqi*et al.* [11] and Sonaje*et al.* [12] did not primarily analyze gender differences, their cohorts also indicated a trend towards higher fracture prevalence in women undergoing hemiarthroplasty. Our findings, therefore, support the view that patient selection for hemiarthroplasty often involves older females with compromised bone quality, whereas the THA group's balanced gender distribution may reflect a broader selection based on functional demands rather than solely on fracture etiology. This differentiation underscores the importance of individualized treatment planning. Overall, our data on gender distribution align with prior research findings and emphasize that gender, along with bone quality considerations, plays a critical role in determining the most appropriate surgical intervention for femoral neck fractures.

The functional outcome as measured by the Harris Hip Score (HHS) consistently favored total hip arthroplasty (THA) over hemiarthroplasty (HA) in our study. At 2 weeks postoperatively, the THA group achieved a mean HHS of 43.71 (SD 3.94) compared to 40.86 (SD 2.15) in the HA group (p = 0.0029). This early functional advantage of THA continued with mean HHS values at 4 weeks of 66.43 (SD 5.54) versus 55.43 (SD 3.94) in HA (p = 2.49E-09), at 8 weeks of 85.24 (SD 4.17) versus 72.38 (SD 3.47) (p = 8.5E-14), and at 12 weeks of 89.52 (SD 1.40) compared to 85.24 (SD 2.86) (p = 1.39E-07). These results suggest that THA patients experience superior and more rapid functional recovery in the early postoperative period. This observation aligns with findings from previous investigations; for example, Khani*et al.* [11] reported that THA patients had a mean HHS of 83.5 at 6 months, significantly outperforming HA patients who scored 78.6, with further improvements noted at one year (87.3 vs. 80.4, p = 0.028). Additionally, Puqi*et al.* [10] noted that while initial HHS scores were similar in both groups, THA patients achieved significantly higher scores in the long term (88.2 vs. 78.4 at three years, $p<0.05$), suggesting a sustained functional benefit. Similarly, S *et al.* [12] demonstrated better functional outcomes in THA patients at both 6 and 12 months. These

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comparisons underscore that the enhanced biomechanical restoration and joint stability provided by THA likely contribute to improved mobility, reduced pain during movement, and overall better functional outcomes. Hence, in patients with higher functional demands and longer life expectancy, THA may be the preferred option, given its demonstrated efficacy in promoting early and sustained functional improvement following femoral neck fractures.

CONCLUSION

The Harris Hip Score (HHS) demonstrated significant differences: at 2 weeks, Group A had a mean HHS of 40.86 (SD 2.15) compared to 43.71 (SD 3.94) in Group B; at 4 weeks, the scores were 55.43 (SD 3.94) versus 66.43 (SD 5.54); at 8 weeks, the scores were 72.38 (SD 3.47) versus 85.24 (SD 4.17); and at 12 weeks, Group A scored 85.24 (SD 2.86) versus 89.52 (SD 1.40) in Group B.

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