

Original Research Article

Hemiarthroplasty versus total hip replacement in displaced femoral neck fractures among the elderly: a prospective comparative study

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Received: 22 June 2026

Accepted: 14 August 2026

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ABSTRACT

Background: Displaced femoral neck fractures in elderly patients are associated with high morbidity, impaired mobility, and reduced quality of life. Although arthroplasty is the preferred treatment, the choice between hemiarthroplasty and total hip replacement remains debated. This study aimed to compare their functional outcomes, perioperative parameters, complications, and overall clinical results.

Methods: This prospective comparative study included 60 elderly patients with displaced intracapsular femoral neck fractures. Patients were divided into two equal groups: group A underwent hemiarthroplasty and group B underwent total hip replacement. Baseline demographic variables, comorbidities, operative time, intraoperative blood loss, transfusion requirement, hospital stay, mobilization time, complications, reoperation, mortality, and Harris hip score (HHS) were assessed during follow-up at 1, 3, 6, and 12 months.

Results: Baseline characteristics and comorbidities were comparable between the two groups. Hemiarthroplasty was associated with significantly shorter operative time than total hip replacement, 72.43 ± 12.85 minutes versus 98.66 ± 15.32 minutes, respectively ($p < 0.001$). Mean intraoperative blood loss was also significantly lower in the hemiarthroplasty group, 286.75 ± 74.52 ml compared with 421.33 ± 96.25 ml in the total hip replacement group ($p < 0.001$). Blood transfusion requirement was significantly lower after hemiarthroplasty than after total hip replacement, 26.7% versus 53.3% ($p = 0.035$). Total hip replacement demonstrated significantly better HHS at 3 months (75.86 ± 7.64 versus 70.53 ± 8.22 ; $p = 0.012$), 6 months (84.62 ± 6.84 versus 77.95 ± 7.56 ; $p = 0.001$), and 12 months (89.15 ± 6.46 versus 81.33 ± 7.27 ; $p = 0.001$). Excellent or good outcome was achieved in 83.3% of total hip replacement patients compared with 63.3% of hemiarthroplasty patients. Acetabular erosion was significantly more common after hemiarthroplasty, 13.3% versus 0.0% ($p = 0.0384$).

Conclusions: Total hip replacement provides better functional recovery in active, medically fit elderly patients, whereas hemiarthroplasty offers perioperative advantages and remains suitable for frail or low-demand patients. Procedure selection should be individualized.

Keywords: Femoral neck fracture, Displaced intracapsular fracture, Elderly patients, Hemiarthroplasty, Total hip replacement, Harris hip score

INTRODUCTION

Hip fractures are among the most serious injuries affecting the elderly population and represent an important public health concern worldwide. With increasing life expectancy and rising prevalence of osteoporosis, the incidence of hip fractures continues to increase, especially among individuals above 60 years of age. The Global Burden of

Disease Study has reported a sustained rise in the number of hip fractures among older adults, highlighting their growing clinical and socioeconomic impact.¹ Among these injuries, intracapsular fractures of the femoral neck are particularly important because they are associated with compromised vascularity of the femoral head, poor healing potential, prolonged immobility, loss of independence, and increased morbidity and mortality.²

Displaced femoral neck fractures, corresponding to Garden type III and IV injuries, are difficult to manage in elderly patients. Internal fixation in this age group carries higher risks of nonunion, avascular necrosis, implant failure, and revision surgery. Therefore, arthroplasty is widely accepted as the preferred treatment for displaced intracapsular femoral neck fractures in elderly patients.³ The American Academy of Orthopaedic Surgeons also recommends arthroplasty over internal fixation for unstable or displaced femoral neck fractures in older adults.⁴ Arthroplasty allows early mobilization, reduces complications related to prolonged bed rest, and helps restore pre-injury ambulatory status. The two commonly used arthroplasty options are hemiarthroplasty and total hip replacement. Hemiarthroplasty replaces only the femoral head while retaining the native acetabulum. It is technically simpler, requires shorter operative time, is associated with less blood loss, and is often preferred in frail elderly patients or those with limited functional demands.⁵ However, it may be associated with acetabular erosion, persistent groin or thigh pain, reduced function, and later conversion to total hip arthroplasty.⁶

Total hip replacement replaces both the femoral head and acetabular surface. It offers better joint biomechanics, improved pain relief, greater range of motion, and potentially superior functional outcome, particularly in elderly patients who were independently mobile before injury.⁷ NICE guidance recommends considering total hip replacement in patients with displaced intracapsular hip fractures who are independently mobile, cognitively intact, and medically fit for surgery.⁸ However, total hip replacement is a more extensive procedure and may involve longer operative duration, greater blood loss, higher transfusion requirement, increased cost, and possible higher dislocation risk.⁹

Thus, the choice between hemiarthroplasty and total hip replacement remains debated. Previous trials and meta-analyses have shown that total hip replacement may provide better functional outcome, but this benefit must be balanced against operative complexity and complications.^{10,11} Recent reviews suggest that total hip replacement may be preferable in selected active elderly patients, while hemiarthroplasty remains valuable in frail or low-demand patients.¹²

Therefore, the present prospective comparative study was undertaken to evaluate hemiarthroplasty and total hip replacement in elderly patients with displaced femoral neck fractures. The study compared functional outcome using Harris hip score, perioperative parameters, complications, reoperation, mortality, and overall clinical outcome during follow-up.

METHODS

A prospective comparative study was conducted in the Department of Orthopaedics at a tertiary care hospital over a period of two years, from 2023 to 2025. The study was

designed to compare hemiarthroplasty and total hip replacement in elderly patients with displaced intracapsular fracture neck of femur. All eligible patients presenting during the study period were screened according to predefined selection criteria. The study was conducted after approval from the Institutional Ethics Committee, and written informed consent was obtained from all patients before enrolment. In patients unable to provide consent due to clinical condition, consent was obtained from legally authorized representatives.

The sample size was calculated using the formula for comparison of two means, considering the Harris hip score as the primary outcome variable. With 95% confidence level, 80% power, assumed standard deviation of 13, and a minimum clinically important difference of 10 points between groups, the required sample size was approximately 27 patients in each group. After allowing for an anticipated 10% dropout or loss to follow-up, the final sample size was rounded to 60 patients, with 30 patients in each treatment group.

The study included patients aged more than 60 years with radiologically confirmed displaced intracapsular fracture neck of femur. All fractures were classified according to the Garden classification, and only Garden type III and IV fractures were included. Patients were eligible if they were ambulatory before injury, medically fit for surgery, and willing to attend regular postoperative follow-up. Both male and female patients were included. Patients with pre-existing osteoarthritis of the affected hip, avascular necrosis of the femoral head, rheumatoid arthritis, pathological fracture, previous surgery around the affected hip, associated acetabular fracture, polytrauma, severe neurological impairment affecting ambulation, or severe medical comorbidities making them unfit for anesthesia or surgery were excluded. Non-ambulatory patients and those unwilling for follow-up were also excluded.

A total of 60 patients satisfying the eligibility criteria were enrolled and divided into two equal groups of 30 patients each. Group A underwent hemiarthroplasty, while group B underwent total hip replacement. Allocation to either group was done using a computer-generated randomization method to reduce selection bias and ensure comparable distribution between the groups.

All patients underwent detailed preoperative assessment. Demographic and clinical details, including age, sex, side of fracture, mode of injury, pre-injury ambulatory status, and associated comorbidities, were recorded. Clinical examination included assessment of limb position, local tenderness, pain on movement, neurovascular status, and associated injuries. Radiological evaluation included anteroposterior radiograph of the pelvis with both hips and lateral view of the affected hip. Routine hematological and biochemical investigations, electrocardiography, chest radiograph, and anesthetic fitness evaluation were completed before surgery.

All surgeries were performed under spinal, epidural, or general anesthesia depending on anesthetic assessment and patient condition. Operations were performed by experienced orthopaedic surgeons using a standard posterolateral approach. In the hemiarthroplasty group, the fractured femoral head was replaced with an appropriate femoral prosthesis. In the total hip replacement group, both femoral head and acetabular surface were replaced using suitable components. Cemented or uncemented fixation was selected according to bone quality, patient age, surgeon preference, and intraoperative stability. Proper soft-tissue repair and wound closure were performed in all cases.

Perioperative data were recorded systematically, including operative duration, estimated intraoperative blood loss, blood transfusion requirement, intraoperative complications, and implant-related technical difficulties. Postoperative parameters such as pain, wound condition, antibiotic duration, time to mobilization, hospital stay, and early complications were documented. Standard postoperative care included analgesics, antibiotics, thromboprophylaxis, wound care, and monitoring for medical or surgical complications.

Physiotherapy was started early with static quadriceps exercises, ankle pump exercises, bed mobility, and assisted ambulation as tolerated. Weight bearing was allowed according to implant stability, surgical procedure, and surgeon's advice.

Patients were followed up at 1 month, 3 months, 6 months, and 12 months after surgery. At each visit, clinical and radiological assessments were performed. Clinical assessment included pain, limp, walking distance, use of walking aids, range of motion, daily activity level, and complications. Radiographs were evaluated for implant position, subsidence, loosening, dislocation, acetabular erosion, periprosthetic fracture, heterotopic ossification, and other implant-related complications.

Functional outcome was assessed using the Harris hip score at each follow-up visit. The primary outcome measure was the Harris hip score at final follow-up. Secondary outcomes included operative time, intraoperative blood loss, transfusion requirement, time to mobilization, hospital stay, early postoperative complications, late implant-related complications, reoperation rate, and mortality. Data were analyzed using appropriate statistical software.

Continuous variables were expressed as mean and standard deviation, and categorical variables as frequency and percentage. Intergroup comparison was performed using independent t-test or Mann-Whitney U test for continuous variables and Chi-square test or Fisher's exact test for categorical variables.

A p value of less than 0.05 was considered statistically significant.

RESULTS

A total of 60 elderly patients with displaced femoral neck fractures were included, with 30 patients each in the hemiarthroplasty and total hip replacement groups. The two groups were comparable in terms of age, sex, side of fracture, mode of injury, Garden fracture type, time from injury to surgery, and pre-injury ambulatory score, indicating that both groups were well matched at baseline (Table 1).

Associated comorbidities were also similarly distributed between the two groups. Hypertension was the most common comorbidity, followed by diabetes mellitus, hypothyroidism, chronic obstructive pulmonary disease, and ischemic heart disease. No statistically significant difference was observed in any comorbidity between the two groups (Table 2).

Perioperative parameters showed significant differences. Hemiarthroplasty was associated with significantly shorter operative time, lower intraoperative blood loss, and reduced blood transfusion requirement compared with total hip replacement. However, postoperative hospital stays and time to assisted mobilization were not significantly different between the two groups (Table 3).

Functional outcome improved progressively in both groups during follow-up. At 1 month, the Harris hip score was slightly higher in the total hip replacement group, but the difference was not significant ($p=0.216$). From 3 months onward, total hip replacement showed significantly better functional scores than hemiarthroplasty, with significant differences at 3 months ($p=0.012$), 6 months ($p=0.001$), and 12 months ($p=0.001$). At final follow-up, the mean Harris hip score was 89.15 ± 6.46 in the total hip replacement group and 81.33 ± 7.27 in the hemiarthroplasty group (Figure 1).

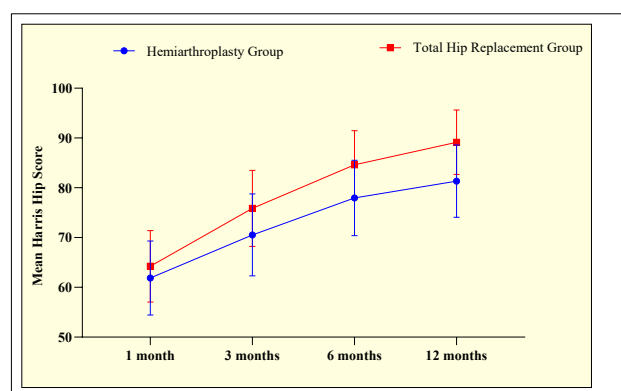


Figure 1: Harris hip score during follow-up.

At 12 months, excellent or good outcomes were achieved in 25 patients (83.3%) in the total hip replacement group compared with 19 patients (63.3%) in the hemiarthroplasty group. Although the proportion was higher after total hip replacement, the difference in overall functional outcome

distribution was not statistically significant ($p=0.2448$) (Figure 2).

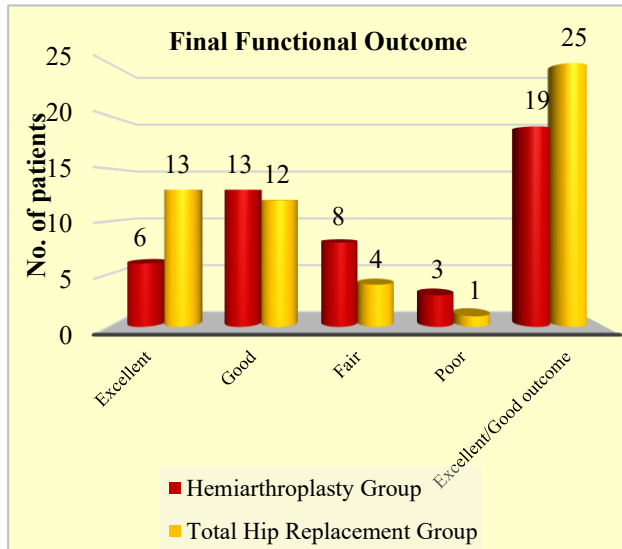


Figure 2: Final functional outcome according to Harris hip score at 12 months.

Early postoperative complications were comparable between the groups. Superficial wound infection, deep wound infection, hip dislocation, deep vein thrombosis, postoperative delirium, and urinary tract infection occurred at low and similar rates. Any early complication was observed in 8 patients (26.7%) in the hemiarthroplasty group and 10 patients (33.3%) in the total hip replacement group, with no significant difference (Table 4).

Late implant-related complications differed mainly in acetabular erosion, which occurred in 4 patients (13.3%) in the hemiarthroplasty group and in none of the total hip replacement patients, showing a statistically significant difference ($p=0.038$). Other complications, including persistent thigh pain, implant loosening, periprosthetic fracture, limb length discrepancy, and reoperation requirement, were not significantly different (Figure 3).

Overall, total hip replacement provided significantly better final functional outcome, while hemiarthroplasty showed advantages of shorter operative time and lower blood loss. Overall postoperative complication rates, reoperation rates, and mortality were comparable between the two groups (Table 5).

Table 1: Baseline demographic and clinical characteristics.

Variable	Hemiarthroplasty group (n=30)	Total hip replacement group (n=30)	P value
Mean age, years	71.86±6.42	70.94±5.93	t=0.5766 p=0.5665
Gender, N (%)			
Male	13 (43.3)	14 (46.7)	X=0.06734 p=0.7952
Female	17 (56.7)	16 (53.3)	
Fracture side, N (%)			
Right	16 (53.3)	15 (50.0)	X=0.06674 p=0.7961
Left	14 (46.7)	15 (50.0)	
Mode of injury, N (%)			
Low-energy fall	25 (83.3)	26 (86.7)	X=0.1307 p=0.7177
Road traffic accident	5 (16.7)	4 (13.3)	
Garden type fracture, N (%)			
III	12 (40.0)	13 (43.3)	X=0.06857 p=0.7934
IV	18 (60.0)	17 (56.7)	
Mean time from injury to surgery, days	3.16±1.27	3.34±1.49	t=0.5036 p=0.6165
Mean pre-injury ambulatory score	4.32±0.66	4.43±0.55	t=0.7013 p=0.4859

Table 2: Distribution of associated comorbidities.

Comorbidity	Hemiarthroplasty group (n=30), N (%)	Total hip replacement group (n=30), N (%)	P value
Hypertension	12 (40.0)	11 (36.7)	X=0.07051 p=0.7906
Diabetes mellitus	8 (26.7)	7 (23.3)	X=0.08889 p=0.7656
Chronic obstructive pulmonary disease	4 (13.3)	3 (10.0)	X=0.1617 p=0.6876

Continued.

Comorbidity	Hemiarthroplasty group (n=30), N (%)	Total hip replacement group (n=30), N (%)	P value
Ischemic heart disease	3 (10.0)	2 (6.7)	X=0.2182 p=0.6404
Hypothyroidism	5 (16.7)	4 (13.3)	X=0.1307 p=0.7177
No major comorbidity	10 (33.3)	11 (36.7)	X=0.07326 p=0.7866

Table 3: Perioperative parameters.

Parameter	Hemiarthroplasty group (n=30)	Total hip replacement group (n=30)	P value
Mean operative time, minutes	72.43±12.85	98.66±15.32	t=7.185 p<0.001*
Mean intraoperative blood loss, ml	286.75±74.52	421.33±96.25	t=6.056 p<0.001*
Blood transfusion required	8 (26.7%)	16 (53.3%)	X=4.444 p=0.035*
Mean postoperative hospital stay, days	7.26±1.63	8.16±1.93	t=1.951 p=0.056
Mean time to assisted mobilization, days	2.64±0.82	3.05±0.96	t=1.779 p=0.080*

*P value statistically significant

Table 4: Early postoperative complications.

Complication	Hemiarthroplasty group (n=30), N (%)	Total hip replacement group (n=30), N (%)	P value
Superficial wound infection	2 (6.7)	3 (10.0)	X=0.2182 p=0.6404
Deep wound infection	0 (0.0)	1 (3.3)	X=1.017 p=0.3132
Hip dislocation	1 (3.3)	2 (6.7)	X=0.3509 p=0.5536
Deep vein thrombosis	1 (3.3)	1 (3.3)	X=0.000 p>0.9999
Postoperative delirium	3 (10.0)	2 (6.7)	X=0.2182 p=0.6404
Urinary tract infection	2 (6.7)	2 (6.7)	X=0.000 p>0.9999
Any early complication	8 (26.7)	10 (33.3)	X=0.3175 p=0.5731

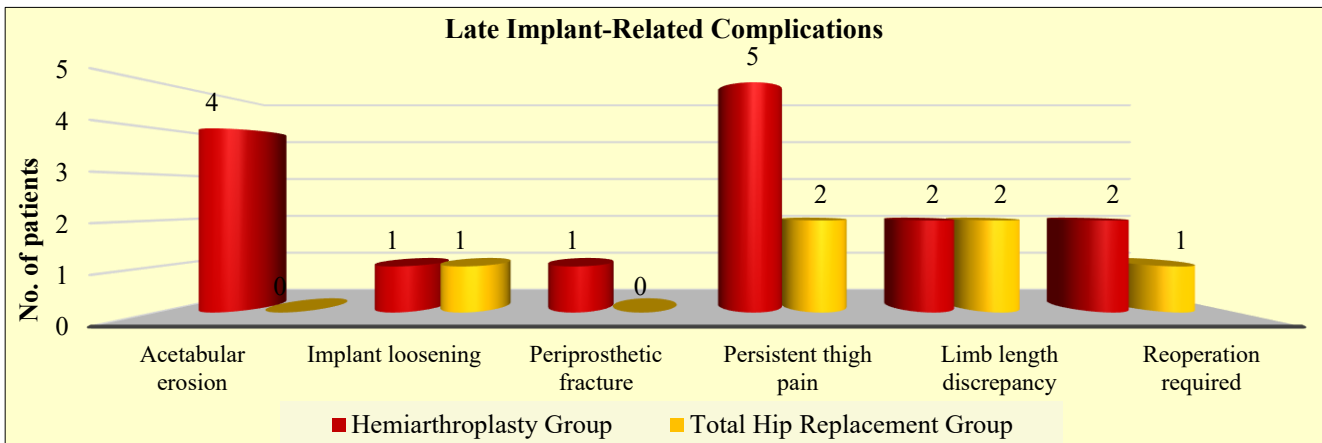


Figure 3: Late implant-related complications during follow-up.

Table 5: Overall outcome comparison between the two groups.

Outcome parameter	Hemiarthroplasty group (n=30), N (%)	Total hip replacement group (n=30), N (%)	P value
Better final Harris hip score	81.36±7.23	89.12±6.46	t=4.384 p<0.001*
Shorter operative time (min)	72.42±12.86	98.65±15.32	t=7.183 p<0.001*
Less intraoperative blood loss (ml)	286.74±74.56	421.37±96.24	t=6.057 p<0.001*
Excellent/good functional outcome	19 (63.3%)	25 (83.3%)	X=3.068 p=0.0798
Any postoperative complication	12 (40.0%)	11 (36.7%)	X=0.07051 p=0.7906
Reoperation rate	2 (6.7%)	1 (3.3%)	X=0.3509 p=0.5536
Mortality during follow-up	1 (3.3%)	1 (3.3%)	X=0.000 p>0.9999

*P value statistically significant

DISCUSSION

Displaced femoral neck fractures in elderly patients remain a major orthopaedic challenge because treatment must provide pain relief, stable reconstruction, early mobilization, functional recovery, and acceptable complication rates. In the present prospective comparative study, both hemiarthroplasty and total hip replacement were effective treatment options. However, the two procedures showed distinct advantages. Total hip replacement was associated with significantly better functional outcome, particularly from three months onward, whereas hemiarthroplasty was associated with shorter operative time, lower intraoperative blood loss, and reduced transfusion requirement. These findings suggest that total hip replacement may be more suitable for active, medically fit elderly patients, while hemiarthroplasty remains useful in patients where minimizing surgical burden is important.

The two groups in the present study were comparable with respect to baseline demographic and clinical characteristics, including age, sex, side of fracture, mode of injury, Garden fracture type, time from injury to surgery, pre-injury ambulatory status, and associated comorbidities. This comparability strengthens the interpretation that differences in postoperative outcome were primarily related to the surgical procedure rather than baseline imbalance. Such matching is important because age, comorbidities, pre-injury mobility, cognitive status, and surgical delay are known to influence recovery after hip fracture. Current recommendations also emphasize careful patient selection, with total hip replacement generally preferred for patients who are independently mobile, medically fit, and likely to maintain functional independence.⁸

Perioperative assessment showed a clear advantage of hemiarthroplasty. The mean operative time was

significantly shorter in the hemiarthroplasty group compared with the total hip replacement group. Mean intraoperative blood loss was also significantly lower, and fewer patients required blood transfusion after hemiarthroplasty. This is expected because hemiarthroplasty involves replacement of only the femoral head, whereas total hip replacement requires acetabular preparation and cup implantation in addition to femoral reconstruction. Li and Luo in their systematic review and meta-analysis, similarly reported that hemiarthroplasty was associated with shorter operative time and lower blood loss compared with total hip arthroplasty.¹³ Falotico et al in an overview of systematic reviews, also observed that surgical time was generally shorter with hemiarthroplasty, although total hip arthroplasty showed advantages in functional outcome, quality of life, and revision rate.¹⁴ Thus, the present findings are consistent with previous literature and support hemiarthroplasty as a less demanding procedure for frail elderly patients, patients with anemia, cardiovascular risk, or limited physiological reserve.

Functional outcome was the major differentiating factor between the two procedures in the present study. Harris hip score improved progressively in both groups, indicating that both procedures were effective in restoring hip function after displaced femoral neck fracture. At one month, the difference between the groups was not statistically significant, suggesting comparable early recovery. However, from three months onward, the total hip replacement group demonstrated significantly higher Harris hip scores. This superiority persisted at six months and twelve months. At final follow-up, the mean Harris hip score was 89.15±6.46 in the total hip replacement group compared with 81.33±7.27 in the hemiarthroplasty group, indicating better medium-term functional recovery after total hip replacement.

The functional advantage of total hip replacement in the present study is supported by several previous studies. The

HEALTH Investigators, in a large multicenter randomized controlled trial, found that total hip arthroplasty provided modestly better functional outcomes than hemiarthroplasty in independently ambulating patients with displaced femoral neck fractures, although it was associated with a higher rate of serious adverse events.¹¹ Ekhtiari et al in a systematic review and meta-analysis, also reported that total hip arthroplasty may provide better function than hemiarthroplasty, particularly in healthier and more active elderly patients.¹⁰ Li and Luo similarly concluded that total hip arthroplasty was associated with improved hip function, while hemiarthroplasty retained perioperative advantages.¹³

Luo et al in active elderly patients over 75 years of age with displaced femoral neck fractures, reported better functional outcomes after total hip arthroplasty than hemiarthroplasty.¹⁵ Sharma et al in their study on outcome analysis of hemiarthroplasty versus total hip replacement in elderly patients with displaced femoral neck fractures, also observed better functional recovery after total hip replacement.¹⁶ Their findings are particularly relevant because they reflect a clinical setting similar to the present study and support the observation that total hip replacement provides superior functional restoration in elderly but active patients. Sabbagh et al also reported that total hip arthroplasty resulted in better functional outcomes compared with hemiarthroplasty.¹⁷ Therefore, the present study is in agreement with both earlier and recent comparative evidence.

The better functional outcome following total hip replacement can be explained by improved restoration of hip biomechanics. Total hip replacement reconstructs both the femoral and acetabular sides of the joint, providing a more anatomical articulation, improved range of motion, better load distribution, and reduced acetabular pain. Hemiarthroplasty, although simpler and effective for early mobilization, retains the native acetabulum. Continued articulation between the prosthetic head and acetabular cartilage may lead to acetabular wear, groin pain, and progressive functional limitation. In the present study, acetabular erosion was observed in 13.3% of patients in the hemiarthroplasty group, whereas no patient in the total hip replacement group developed this complication. This statistically significant difference may partly explain the lower final Harris hip score in the hemiarthroplasty group.

The final categorical functional outcome also favored total hip replacement. Excellent outcome was observed in 43.3% of patients in the total hip replacement group compared with 20.0% in the hemiarthroplasty group. Overall excellent or good outcome was achieved in 83.3% of patients after total hip replacement and 63.3% after hemiarthroplasty. Although this difference did not reach statistical significance, probably due to the modest sample size, the trend clearly favored total hip replacement. These results are in line with Sharma et al, Luo et al, and Sabbagh et al, who reported superior functional outcomes after total hip arthroplasty in selected elderly patients.¹⁵⁻¹⁷

Complications are an important consideration when selecting the optimal procedure. In the present study, early postoperative complications were comparable between the two groups. Superficial wound infection, deep infection, hip dislocation, deep vein thrombosis, postoperative delirium, and urinary tract infection occurred at low and statistically similar rates. Overall early complications occurred in 26.7% of patients in the hemiarthroplasty group and 33.3% in the total hip replacement group, with no significant difference. This suggests that both procedures can be safely performed in selected elderly patients with appropriate surgical technique, perioperative care, and rehabilitation.

Hip dislocation is one of the major concerns after total hip replacement for femoral neck fracture. In the present study, dislocation occurred in 3.3% of patients after hemiarthroplasty and 6.7% after total hip replacement, but the difference was not statistically significant. The HEALTH Investigators and Ekhtiari et al reported that the functional advantage of total hip arthroplasty must be balanced against a possible increase in complications, including dislocation.^{10,11} Edelstein et al in a propensity-score-matched analysis, found that total hip arthroplasty was associated with increased dislocation risk compared with hemiarthroplasty in elderly femoral neck fracture patients.¹⁸ In contrast, the present study did not show a significant difference, possibly due to careful patient selection, standardized operative technique, soft-tissue repair, and postoperative precautions. The small sample size may also have limited detection of significant differences in uncommon complications.

Late implant-related complications showed a procedure-specific pattern. Acetabular erosion was significantly more common after hemiarthroplasty, while implant loosening, periprosthetic fracture, persistent thigh pain, limb length discrepancy, and reoperation requirement were not significantly different between groups. Acetabular erosion is a recognized limitation of hemiarthroplasty, especially in active elderly patients with longer life expectancy. Falotico et al reported that total hip arthroplasty was associated with better function and lower revision tendency, which may be related to avoidance of acetabular wear.¹⁴ The present finding supports the clinical rationale for choosing total hip replacement in elderly patients with good pre-injury mobility and higher functional demands.

Reoperation rate and mortality were comparable between the two groups. Reoperation was required in 6.7% of patients in the hemiarthroplasty group and 3.3% in the total hip replacement group. Mortality during follow-up was 3.3% in both groups. Migliorini et al in their meta-analysis of randomized clinical trials, reported that both hemiarthroplasty and total hip arthroplasty are valid options for displaced femoral neck fractures in elderly patients, with differences mainly related to function, complications, and revision rather than consistent mortality benefit. The present findings agree with this interpretation.¹⁹

The results of the present study support individualized decision-making. Kashanian et al evaluated the application of NICE criteria for selecting total hip arthroplasty in displaced intracapsular hip fractures and emphasized the importance of appropriate patient selection.²⁰ In the present study, total hip replacement provided superior function without a statistically significant increase in overall complications, suggesting that it is suitable for active, cognitively intact, medically fit elderly patients. Conversely, hemiarthroplasty remains appropriate for frail patients, those with lower functional demand, multiple comorbidities, limited life expectancy, or higher anesthetic risk because it offers shorter surgery, less blood loss, and acceptable functional recovery.

The present study has certain strengths. It was prospective in design, included equal numbers of patients in both treatment groups, and assessed perioperative parameters, functional outcome, early complications, late implant-related complications, reoperation, and mortality. Harris hip score was recorded at multiple follow-up intervals, allowing assessment of recovery pattern over time. However, limitations should be acknowledged. The sample size was relatively small, limiting the ability to detect significant differences in categorical outcomes such as dislocation, reoperation, mortality, and excellent/good functional outcome. The follow-up period of 12 months was adequate for early and intermediate assessment but may not detect long-term complications such as progressive acetabular erosion, implant loosening, polyethylene wear, periprosthetic fracture, or late revision. Implant design, cemented versus uncemented fixation, surgical approach, bone mineral density, rehabilitation compliance, and cost-effectiveness were not separately analyzed.

Thus, the present study shows that total hip replacement provides significantly better functional recovery than hemiarthroplasty in elderly patients with displaced femoral neck fractures, particularly after three months of follow-up. Hemiarthroplasty, however, offers important perioperative advantages, including shorter operative time, lower blood loss, and reduced transfusion requirement. Early complications, reoperation rate, and mortality were comparable between the two groups, while acetabular erosion was significantly more frequent after hemiarthroplasty. Therefore, total hip replacement may be preferred in active, independent, medically fit elderly patients, whereas hemiarthroplasty remains an effective, simpler, and safer option for frail or low-demand elderly patients.

CONCLUSION

The present study showed that both hemiarthroplasty and total hip replacement are effective surgical options for displaced femoral neck fractures in elderly patients. Both procedures provided satisfactory clinical and functional improvement during follow-up. Total hip replacement resulted in significantly better functional outcome, with

higher Harris hip scores from the third postoperative month onward and a greater proportion of excellent or good outcomes at 12 months. It may therefore be preferred in active, independent, and medically fit elderly patients with higher functional demands. Hemiarthroplasty showed important perioperative advantages, including shorter operative time, lower intraoperative blood loss, and reduced transfusion requirement. It remains a reliable and safer option for frail elderly patients, those with multiple comorbidities, limited physiological reserve, or lower functional expectations. Overall complication rates, reoperation rates, and mortality were comparable between the two groups, although acetabular erosion was more common after hemiarthroplasty. Thus, the choice of procedure should be individualized, with careful consideration of patient fitness, pre-injury mobility, functional demand, and surgical risk.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Singh NP, Singh S, Jha P. Hemiarthroplasty versus total hip replacement in displaced femoral neck fractures among the elderly: a prospective comparative study. *Int J Res Orthop* 2026;12:1409-17.