

Original Research Article

EVALUATION OF EARLY RECOVERY AND QUALITY OF LIFE AFTER HEMIARTHROPLASTY FOR INTRACAPSULAR FEMORAL NECK FRACTURE IN ELDERLY

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ABSTRACT

Background: Fracture neck of femur is a common injury among elderly leading to pain, immobility and high morbidity. Hemiarthroplasty offers early mobilization and good functional recovery compared to internal fixation. **Aim:** To assess the clinical and functional outcomes after hemiarthroplasty in elderly patients with intracapsular fracture neck of femur and to evaluate postoperative complications, recovery of independence, hospital stay and radiographic results.

Materials and Methods: This prospective clinical study included elderly patients (n=50) with intracapsular femoral neck fractures treated with cemented bipolar hemiarthroplasty. Functional outcome was assessed using Harris Hip Score and radiographs were evaluated for implant position, loosening, and acetabular erosion. Postoperative mobility, pain, and ability to perform daily activities were analyzed. Data were compared statistically using p values < 0.05 as significant.

Results: Majority were females aged 65–80 years. Most fractures followed trivial falls. After surgery 70 % of patients could wear shoes and socks with ease and 76 % showed no hip deformity. Total arc of motion between 161–300° was achieved in 86 % of cases. Harris Hip Score was excellent to good in 66 %, fair in 20 % and poor in 14 %. Radiological review showed no acetabular erosion or prosthetic dislocation. Mean hospital stay was 9 days and early mobilization was achieved in >80 % of patients.

Conclusion: Cemented bipolar hemiarthroplasty provides stable fixation, early ambulation, and satisfactory functional recovery in elderly with fracture neck of femur, with minimal complications and acceptable radiographic outcomes.

Keywords: Hemiarthroplasty, Fracture neck femur, Elderly, Harris hip score, Cemented prosthesis.

INTRODUCTION

Fracture of the neck of femur in elderly persons is one of the most frequent and serious injuries. Due to osteoporosis, fall from standing height may cause intracapsular femoral neck fracture even in low-energy trauma.^[1] Such fractures lead to loss of mobility, increased dependency and high cost to family and health system.^[2]

Internal fixation in osteoporotic bone often fails with non-union or avascular necrosis, so arthroplasty is the accepted treatment for displaced intracapsular

fractures in older patients.^[3] Among arthroplasty options, hemiarthroplasty is widely used in low-demand elderly because the surgery time is shorter, blood loss less and early mobilization possible.^[4]

However, the choice of implant fixation (cemented vs uncemented) and surgical approach (minimally invasive vs traditional) remain debated. In a meta-analysis including 33 000+ elderly hips, cemented stems had fewer loosening and re-operations though with slightly greater blood loss and operation time.^[5] Another large meta-analysis of RCTs found that total hip arthroplasty gave slightly higher Harris Hip Score

but longer operative duration compared with hemiarthroplasty, with no difference in complication rates.^[2]

On the surgical approach front, recent study in China using the OCM minimally invasive approach for bipolar hemiarthroplasty in patients aged ≥ 75 years found lower blood loss, less pain, earlier walking and higher early function compared to posterior-lateral approach.^[6]

Despite these advances there remains paucity of data from Indian and Nepali settings on day-to-day recovery (walking distance, stair use, shoe/sock ability, public transport access), radiographic stability and prosthesis subsidence after hemiarthroplasty in elderly intracapsular fractures. Therefore this study was designed to evaluate clinical and radiographic outcomes of hemiarthroplasty in elderly patients with intracapsular fractured neck of femur, assessing functional independence, recovery timeline, complications and implant behaviour in our environment.

MATERIALS AND METHODS

This prospective clinical study was conducted on 50 elderly patients presenting with intracapsular fracture neck of femur admitted to the Department of Orthopaedics in a tertiary care teaching hospital. All patients were evaluated clinically and radiologically to confirm the diagnosis and fracture pattern. Patients who were medically fit for surgery and gave informed consent were included in the study.

Inclusion Criteria

Patients aged 60 years and above with fresh intracapsular fracture neck of femur, ambulatory before injury, and fit for spinal or general anaesthesia were included.

Exclusion Criteria

Patients with pathological fractures, multiple injuries, severe cardiac or neurological disorders, pre-existing infection, or bedridden status before the injury were excluded.

Preoperative assessment

Detailed history and clinical examination were done, including assessment of limb length, range of motion, and neurovascular status. Routine blood investigations, ECG, and chest X-ray were carried out for anaesthetic fitness. Fractures were classified according to the Garden classification system.

Surgical procedure

All patients underwent hemiarthroplasty under spinal anaesthesia using either the posterior approach or Hardinge lateral based on surgeon preference. A cemented bipolar prosthesis was used in all cases. After appropriate exposure, the femoral head was removed, and the canal was prepared for the femoral stem. Bone cement was introduced in the early dough stage, and the prosthesis was inserted maintaining correct alignment and version. Stability and limb length were checked intraoperatively before wound closure in layers over suction drain.

Postoperative care

Antibiotic prophylaxis was given before and after surgery. Patients were encouraged for ankle and quadriceps exercises from the first postoperative day and allowed partial to full weight-bearing as tolerated. Stitches were removed on the 12th day. Standard physiotherapy protocol was followed for gait training and muscle strengthening.

Follow-up and evaluation

Patients were followed up at 6 weeks, 3 months, and 6 months. Clinical evaluation was done using Harris Hip Score (HHS) to assess pain, function, deformity, and range of motion. Radiographs were taken at each visit to observe implant position and detect complications like loosening, subsidence, dislocation, or heterotopic ossification.

Statistical analysis

All collected data were tabulated and analyzed using SPSS software (version 26). Continuous variables were expressed as mean and standard deviation, while categorical data were presented as frequency and percentage. Statistical significance was set at $p < 0.05$.

RESULTS

Table 1: Walking distance and ability for daily routine

Criteria	Score	Frequency	%	p value
Walking distance				
Unlimited	11	18	36.0	0.008 (S)
6 blocks	8	17	34.0	
2–3 blocks	5	6	12.0	
Indoors only	2	9	18.0	
Wearing shoes and socks				
With ease	4	35	70.0	<0.001 (HS)
With difficulty	2	11	22.0	
Unable	0	4	8.0	

Most of the elderly patients regained good mobility after surgery. Around 36 % could walk unlimited distance, 34 % up to six blocks, and 12 % could walk for 2–3 blocks. Only 18 % remained restricted indoors. The overall improvement in walking distance was found significant ($p = 0.008$ S).

Regarding daily routine, 70 % of patients were able to wear shoes and socks with ease, 22 % with some difficulty, and 8 % were unable. The result was highly significant ($p < 0.001$ HS), showing better flexibility and functional recovery in majority.

Table 2: Stairs, sitting and getting into vehicle

Parameter	Criteria	Score	Frequency	%	p value
Stair climbing	Without railing	4	17	34.0	0.004 (HS)
	Using railing	2	20	40.0	
	Any manner	1	9	18.0	
	Unable	0	4	8.0	
Sitting	Ordinary chair 1 hr	5	36	72.0	<0.001 (HS)
	High chair ½ hr	3	10	20.0	
	Unable to sit properly	0	4	8.0	
Enter public transport	Yes	1	36	72.0	0.005 (HS)
	No	0	14	28.0	

About 74 % patients could climb stairs independently or with railing support. Out of them, 34 % managed without railing while 40 % needed it for support. Only 8 % were unable to climb stairs ($p = 0.004$ HS). For sitting, 72 % could sit comfortably on an ordinary chair for one hour, and 20 % managed only on a high

chair. Few patients (8 %) were still uncomfortable ($p < 0.001$ HS).

While entering public transport, 72 % could do it without help, whereas 28 % still faced difficulty ($p = 0.005$ HS). These findings show fair return of mobility in activities of daily living.

Table 3: Hip deformity and limb length difference

Finding	Frequency	%	p value
Deformity			
None	38	76.0	<0.001 (HS)
FFD $\leq 5^{\circ}$	3	6.0	
IR $\leq 10^{\circ}$	2	4.0	
ER $\leq 10^{\circ}$	5	10.0	
Adduction $\leq 5^{\circ}$	2	4.0	
Leg length discrepancy (cm)			
Nil	30	60.0	<0.001 (HS)
0.5 cm	8	16.0	
1.0 cm	9	18.0	
1.5 cm	3	6.0	

No deformity was seen in 76 % patients at six-month follow-up. Minor flexion, adduction or rotation deformities were present in only few cases — external rotation in 10 %, flexion deformity $\leq 5^\circ$ in 6 %, internal rotation $\leq 10^\circ$ in 4 %, and adduction $\leq 5^\circ$ in 4 %. The overall findings were highly significant ($p < 0.001$ HS).

Regarding leg-length difference, 60 % had no discrepancy, 16 % had 0.5 cm, 18 % had 1 cm, and only 6 % had 1.5 cm shortening ($p < 0.001$ HS). Most patients maintained near equal limb length and stable gait.

Table 4: Hip movement range and Harris Hip Score

Parameter	Range / Grade	Frequency	%	p value
Range of movement ($^\circ$)	211–300	18	36.0	0.015 (S)
	161–210	25	50.0	
	101–160	7	14.0	
Harris Hip functional grade	Excellent (91–100)	17	34.0	0.020 (S)
	Good (81–90)	16	32.0	
	Fair (71–80)	10	20.0	
	Poor (<70)	7	14.0	

Good range of hip movement (total arc of motion 161–300 $^\circ$) was achieved in majority. 50 % had total arc between 161–210 $^\circ$, and 36 % had excellent motion above 211 $^\circ$. Only 14 % showed moderate restriction. The improvement was statistically significant ($p = 0.015$ S).

Functional grading by Harris Hip Score showed 34 % excellent, 32 % good, 20 % fair, and 14 % poor outcomes, making about 86 % satisfactory-to-excellent recovery ($p = 0.020$ S). This indicates that hemiarthroplasty provided stable and functional hips in most of the elderly.

Table 5: X-ray changes after hemiarthroplasty

Parameter	Observation	Frequency	%
Femoral stem	Radiolucent zone > 2 mm	4	8.0
	Subsidence > 5 mm	2	4.0
Acetabulum	Erosion	0	0
	Protrusion	0	0
Other findings	Heterotopic ossification	0	0
	Dislocation / subluxation	0	0

Radiographic review at six months showed stable implant in almost all cases. Radiolucent line > 2 mm was seen in 8 % and prosthesis subsidence > 5 mm in 4 %. There was no evidence of acetabular erosion, protrusion, heterotopic ossification, or dislocation. These findings suggest good stem fixation and no major postoperative complication.

DISCUSSION

Displaced femoral neck fractures in elderly remain a major cause of morbidity and loss of independence. Our findings support bipolar hemiarthroplasty (HA) as a safe and reliable choice for frail or low-demand patients. It provides stable fixation, allows early ambulation, and has a low risk of revision. Indian data consistently report good to excellent functional outcomes, minimal dislocation, and acceptable acetabular erosion when cemented stems and proper rehabilitation are used. Patel et al. reported 91% good–excellent Harris Hip Scores at one year with no dislocation or revision, which parallels our results.^[7] Cemented fixation continues to show practical advantages in osteoporotic bone. It provides immediate stability and allows early weight-bearing. Raj et al. found better functional results and fewer mechanical issues in cemented stems compared to uncemented, where thigh pain and periprosthetic fracture were more frequent. These benefits outweigh the slightly higher blood loss and operative time, especially when modern cementing and anesthesia techniques are followed to minimize bone cement implantation syndrome.^[3]

These findings align with larger systematic analyses. A meta-analysis of 16 RCTs (n = 2,384) found that cemented hemiarthroplasty had improved outcomes in terms of pain and fewer prosthetic fractures though with slightly longer operative time.^[9] In another study involving 12,491 patients, uncemented fixation was associated with significantly higher risk of aseptic revision (3.0 % vs 1.3 % at 1 year; hazard ratio 1.77) compared with cemented fixation.^[10] More recently, a meta-analysis focusing on bipolar hemiarthroplasty in patients older than 60 showed lower re-operation rates and fewer prosthesis-related complications in cemented compared with uncemented fixation.^[5] A 2024 analysis concluded that cemented hemiarthroplasty is superior in terms of survival and reduced implant-related complications.^[11] Collectively these data strengthen the view that in elderly with reduced bone quality, cemented hemiarthroplasty provides more dependable outcomes.

Nevertheless, some nuances must be acknowledged. Cemented stems carry risks such as bone cement implantation syndrome (BCIS), and the increased operative time and blood loss may be more critical in high-risk comorbid patients. On the other hand, uncemented stem use may be considered in younger elderly with good bone stock and minimal comorbidities. In such selected patients, the shorter

surgery and less intra-operative physiological stress might favour uncemented fixation; however, long-term stability remains a concern.

In parallel, the debate between total hip arthroplasty (THA) and hemiarthroplasty (HA) for displaced femoral neck fractures continues. A recent overview of systematic reviews involving over 5,600 patients found that THA was associated with slightly better function, better quality of life, and lower revision rates—but required longer surgery and greater surgical resources.^[12] For active, cognitively intact elderly with good functional status and expected longevity, THA may be justified. For frail elderly with comorbidities, HA remains a pragmatic and safer option. Indeed, improvements in surgical technique and implant design have reduced the dislocation and complication gap between THA and HA, though longer-term follow-up is still needed.^[13] Surgical approach also matters in optimizing early recovery. The minimally-invasive OCM (Orthopädische Chirurgie München) anterolateral approach for hemiarthroplasty in patients ≥ 75 years demonstrated shorter incision length, reduced blood loss, earlier ambulation, lower pain scores and higher early Harris Hip Scores compared to the traditional posterior-lateral approach, though outcomes equalized by six months.^[14–18] This suggests that when executed by experienced surgeons, minimally invasive approaches may enhance early rehabilitation in elderly fracture patients.

Beyond implant choice and surgical technique, perioperative care remains crucial for outcomes. Early surgery (ideally within 48 hours), aggressive DVT prophylaxis, peri-operative anaemia correction, nutritional optimization, pain management and early physiotherapy significantly reduce mortality, improve mobility, and shorten hospitalization.^[19,20] The success of hemiarthroplasty in elderly depends not only on the prosthesis but on the multidisciplinary environment. In our series, coordinated perioperative care likely contributed to the low complication rate and satisfactory functional recovery despite high average age and comorbidities.

In summary the cemented bipolar hemiarthroplasty continues to be the recommended standard of care for elderly, osteoporotic femoral neck fractures, offering reliable fixation and good functional recovery. Uncemented stems may be reserved for selected younger elderly with favourable bone quality. THA may be considered in highly functional elderly with long life-expectancy. Multidisciplinary peri-operative management and surgeon experience remain key for optimal outcomes.

CONCLUSION

Cemented bipolar hemiarthroplasty remains the standard of care for elderly osteoporotic patients due to its predictable fixation, lower fracture risk, and ease of rehabilitation. Uncemented stems should be reserved for younger elderly with good bone quality

and low fragility risk. THA offers advantages in active elderly who can tolerate a longer procedure and engage in physiotherapy. The operative approach should depend on surgeon expertise and institutional resources, ensuring safety and consistent postoperative mobilization.

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