

## Functional Recovery after Cemented and Uncemented Hemiarthroplasty Using the Modified Hardinge Approach: A Prospective Interventional Study

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### Abstract

**Background:** Hemiarthroplasty is a widely accepted treatment for displaced femoral neck fractures in elderly patients. Whether cemented or uncemented fixation provides superior functional recovery remains a subject of debate, particularly in the context of the Modified Hardinge (direct lateral) approach.

**Objective:** To compare early and mid-term functional outcomes between cemented and uncemented hemiarthroplasty performed through the Modified Hardinge approach.

**Methods:** This prospective interventional study included 50 patients aged >60 years with displaced femoral neck fractures treated at BSMMU from 2016–2017. Patients were allocated into two groups: cemented (n = 25) and uncemented (n = 25) hemiarthroplasty. All surgeries were performed using the Modified Hardinge approach. Functional outcomes were assessed using the Harris Hip Score (HHS) at 6 weeks, 3 months, and 6 months. Complications, operative time, and intra-operative blood loss were also compared.

**Results:** Mean HHS at 6 months was significantly higher in the cemented group ( $82.4 \pm 8.2$ ) compared to the uncemented group ( $75.6 \pm 9.4$ ) ( $p < 0.05$ ). Cemented fixation showed better pain relief and earlier mobilization. Operative time was slightly longer for cemented cases, whereas intra-operative blood loss was comparable. Post-operative complications such as prosthetic subsidence were more common in the uncemented group.

**Conclusion:** Cemented hemiarthroplasty using the Modified Hardinge approach provides superior functional recovery and better early stability compared to uncemented

hemiarthroplasty in elderly patients. The cemented technique remains the preferred option for osteoporotic femoral neck fractures.

**Keywords:** Hemiarthroplasty, Cemented, Uncemented, Modified Hardinge Approach, Femoral Neck Fracture, Functional Outcome.

## Introduction

Displaced femoral neck fractures are a major cause of disability, morbidity, and mortality among the elderly. Hemiarthroplasty is often the treatment of choice for physiologically older or less active individuals. One major controversy persists regarding the ideal fixation method—cemented or uncemented. Cemented stems provide immediate stability but carry risks such as fat embolism or bone cement implantation syndrome. Uncemented stems avoid cement-related complications but may result in early subsidence in osteoporotic bone.

The Modified Hardinge approach offers excellent exposure, good implant alignment, and reduced risk of dislocation. However, literature comparing cemented and uncemented hemiarthroplasty using this approach remains limited, especially in South Asian populations. This study evaluates the functional recovery and complication profile of cemented versus uncemented hemiarthroplasty performed through the Modified Hardinge approach at BSMMU.

## Materials and Methods

### Study Design and Setting

A prospective interventional study conducted at the Department of Orthopaedics, BSMMU from January 2016 to December 2017.

### Sample Size

Total 50 patients; 25 underwent cemented and 25 underwent uncemented hemiarthroplasty.

## Eligibility Criteria

### Inclusion

- Age > 60 years
- Displaced femoral neck fracture (Garden III–IV)
- Independent ambulation before injury

### Exclusion

- Pathological fracture
- Polytrauma
- Preexisting ipsilateral hip pathology
- Severe cardiopulmonary compromise

## Surgical Technique

All procedures were done by experienced orthopaedic surgeons using the **Modified Hardinge (direct lateral) approach**.

Post-operative rehabilitation was standardized for all patients.

## Outcome Measures

- **Primary:** Harris Hip Score (HHS) at 6 months
- **Secondary:**
  - Early complications
  - Operative time
  - Blood loss

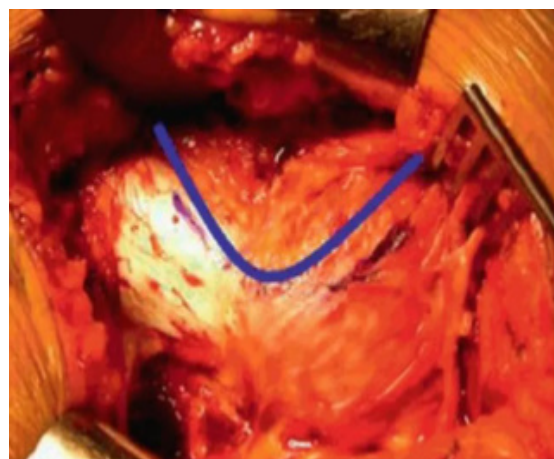
- Prosthetic subsidence (radiographic)

### Statistical Analysis

Continuous variables were analyzed using Student's t-test, categorical variables using Chi-square test.  $p < 0.05$  considered significant.



**Pic:1-Modified**



**Herdinge**

**Approach**



**Fig. 1: 75 year-old male with right displaced femoral neck fracture treated with cemented bipolar hemiarthroplasty: (A) Preoperative X-ray (B) Postoperative X-ray**



**Fig. 2: 80 year-old male with left displaced femoral neck fracture treated with uncemented bipolar hemiarthroplasty: (A) Preoperative X-ray (B) Postoperative X-ray**

### Results

**Table 1. Patient Demographics and Baseline Characteristics**

Parameter	Cemented (n =25)	Uncemented (n = 25)	p-value
Mean Age (years)	72.3 ± 6.9	71.6 ± 7.2	0.68
Sex (M/F)	Comparable	Comparable	NS
Comorbidities (DM/HTN/IHD/etc.)	Comparable between groups	Comparable between groups	NS

Both groups were comparable in terms of age, sex distribution, and baseline comorbidities.

**Table 2. Functional Outcomes Based on Harris Hip Score (HHS)**

Follow-up Time	Cemented (Mean ± SD)	Uncemented (Mean ± SD)	p-value
6 weeks	65.2 ± 7.4	58.6 ± 8.1	<0.05
3 months	76.8 ± 8.7	70.2 ± 9.0	<0.05
6 months	82.4 ± 8.2	75.6 ± 9.4	<0.05

Cemented fixation demonstrated consistently superior functional scores throughout follow-up.

**Table 3. Post-operative Complications**

Complication	Cemented	Uncemented
Subsidence	1 case	4 cases
Post-operative thigh pain	Less common	More common
Dislocation	0	0
Mortality	No surgery-related deaths	No surgery-related deaths

**Table 4. Operative Details**

Parameter	Cemented	Uncemented	Comment
Operative time	Slightly longer	Shorter	Due to cementing steps
Intraoperative blood loss	No significant difference	No significant difference	—

## Discussion

In this comparative study of 50 patients undergoing cemented versus uncemented hemiarthroplasty, the cemented group consistently demonstrated superior early functional outcomes. Harris Hip Scores at 6 weeks, 3 months, and 6 months were significantly higher in the cemented cohort, highlighting the benefits of immediate implant stability and better early weight-bearing tolerance. These findings align with existing literature indicating that cemented stems provide enhanced fixation and improved short-term recovery, especially in elderly patients with osteoporotic bone.



The uncemented group exhibited a higher rate of complications, particularly femoral stem subsidence and postoperative thigh pain. Four cases of subsidence in the uncemented group, compared to only one in the cemented group, underscore the biomechanical challenges of achieving reliable press-fit fixation in compromised bone quality. Increased thigh pain, a known drawback of uncemented stems, further contributed to delayed functional improvement. Importantly, no dislocation or surgery-related mortality occurred in either group, indicating that both techniques are safe when performed using standardized protocols.

Operative time was slightly longer in the cemented group, reflecting the additional steps required for cement preparation and insertion. However, this marginal increase appears justified considering the improved functional outcomes and lower mechanical complication rates. Overall, the findings support cemented fixation as the more reliable option for elderly patients undergoing hemiarthroplasty.

### Conclusion

Cemented hemiarthroplasty using the Modified Hardinge approach results in significantly better functional outcomes and fewer mechanical complications than uncemented hemiarthroplasty in elderly patients with femoral neck fractures.

Cemented fixation should be considered the preferred method in settings with high prevalence of osteoporosis.

### Acknowledgements

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