Section: Orthopaedics

Original Research Article

A COMPARATIVE STUDY BETWEEN CEMENTED VS UNCEMENTED BIPOLAR HEMIARTHROPLASTY FOR INTRACAPSULAR FRACTURE NECK OF FEMUR IN THE ELDERLY

K. M. Gopinath[1], Aditya Tyagaraj Tumkur[2], Pramod Kumar M[3], Saanvi K Gopinath[4]

[1]*Professor and Unit Head, Department of Orthopaedics, Rajarajeswari Medical College and Hospital, Bangalore, India.*
[2]*Junior Resident 3rd Year, Department of Orthopaedics, Rajarajeswari Medical College and Hospital, Bangalore, India.*
[3]*Professor, Department of Orthopaedics, Rajarajeswari Medical College and Hospital, Bangalore, India.*
[4]*Undergraduate, Department of Orthopaedics, Rajarajeswari Medical College and Hospital, Bangalore, India.*

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Corresponding Author:
Dr. Aditya Tyagaraj Tumkur,
Junior Resident 3rd Year, Department of Orthopaedics, Rajarajeswari Medical College and Hospital, Bangalore, India.
Email: aadityabulletninja@gmail.com

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ABSTRACT

Background: Displaced intracapsular femoral neck fractures in the elderly are associated with significant morbidity and mortality. Bipolar hemiarthroplasty has emerged as the preferred surgical treatment, offering faster rehabilitation and reduced complication rates. Both cemented and uncemented techniques are used, but their comparative efficacy remains under study. The objective is to compare functional outcomes, rehabilitation speed, and complication rates between cemented and uncemented bipolar hemiarthroplasty in elderly patients.
Materials and Methods: This prospective comparative study was conducted at a tertiary care center in Bangalore between June 2021 and June 2023. A total of 40 patients aged >60 years with displaced intracapsular femoral neck fractures were included. They were randomly assigned to Group A (cemented, n=20) and Group B (uncemented, n=20). Functional outcome was assessed using the Harris Hip Score (HHS) at 6 weeks, 3 months, and 6 months. Time to weight bearing, ambulation, and complications were also recorded. Data were analyzed using SPSS v26 with significance set at $p < 0.05$.
Results: The mean Harris Hip Score at 6 months was significantly higher in the cemented group (90.1 ± 3.5) than in the uncemented group (82.6 ± 4.1, $p<0.001$). Cemented cases had earlier ambulation (mean 9.1 vs 11.4 weeks) and fewer complications, including lower incidence of thigh pain and periprosthetic fractures.
Conclusion: Cemented bipolar hemiarthroplasty in elderly osteoporotic patients offers superior early functional outcomes and fewer complications compared to uncemented fixation. It remains the preferred surgical technique in this patient group.
Keywords: Femoral neck fracture, cemented, uncemented, bipolar hemiarthroplasty, elderly, Harris Hip Score.

INTRODUCTION

Intracapsular femoral neck fractures constitute a major orthopaedic emergency in elderly individuals, especially due to falls on osteoporotic bone. The goal of management is early mobilization to avoid complications such as deep vein thrombosis, pressure sores, pneumonia, and disuse osteoporosis.
Fixation procedures like cannulated screws and DHS are less favored in elderly patients due to high risks of nonunion and avascular necrosis. Arthroplasty, particularly bipolar hemiarthroplasty, provides better stability, allows immediate weight bearing, and minimizes the need for revision.
However, the choice between cemented and uncemented prostheses is still debated. Cemented stems provide initial stability, especially in osteoporotic bone, while uncemented designs reduce operative time and avoid cement-related

complications. This study compares these two techniques in a prospective setup.

Objectives

1. To compare functional outcomes of cemented vs uncemented bipolar hemiarthroplasty using the Harris Hip Score.
2. To assess postoperative complications in each group.
3. To evaluate time to weight bearing and return to independent ambulation.

MATERIALS AND METHODS

Study Design: Prospective comparative study
Setting: Department of Orthopaedics, RajaRajeswari Medical College and Hospital
Duration: June 2021 – June 2023
Sample Size: 40 patients (20 in each group)
Inclusion criteria:

- Age > 60 years
- Garden Type III or IV intracapsular femoral neck fractures
- Independent ambulation prior to injury
- Medically fit for surgery

Exclusion criteria:

- Pathological fractures
- Polytrauma
- Previous ipsilateral hip surgery or disease
- Patients unfit for spinal anaesthesia

Surgical procedure:

- Posterior/lateral approach used.
- Cemented stems inserted using standard cementing technique
- Uncemented stems were press-fit with broaching
- Same bipolar modular system used for both groups

Figure 1

Postoperative protocol:

- Antibiotics for 5 days
- DVT prophylaxis with low molecular weight heparin
- Partial weight bearing: Day 2 in cemented, Day 7 in uncemented group
- Full weight bearing at 4–6 weeks (cemented), 8–10 weeks (uncemented)
- Physiotherapy for gait and muscle strengthening

Follow up protocol:

- Follow-up at 6 weeks, 3 months, and 6 months
- Harris Hip Score (HHS) used for functional evaluation
- Complications such as infections, dislocation, fracture, and thigh pain documented.

RESULTS

Table 1: Demographics

Characteristic	Cemented (n=20)	Uncemented (n=20)
Mean Age (years)	71.8 Â± 5.4	72.2 Â± 6.1
Gender (M:F)	7:13	8:12
Right-sided fractures	11 (55%)	12 (60%)
Mechanism of injury	Fall from standing (100% both groups)	

Table 2: functional outcome-harris hip score

Time Point	Cemented (Mean Â± SD)	Uncemented (Mean Â± SD)	p-value
Pre-op	38.4 Â± 4.7	39.0 Â± 5.1	0.67
6 weeks	66.8 Â± 5.3	61.2 Â± 4.8	0.014*
3 months	78.2 Â± 4.5	70.5 Â± 5.2	<0.001*
6 months	90.1 Â± 3.5	82.6 Â± 4.1	<0.001*

*Statistically significant (p<0.05)

Table 3: Time to mobilization and ambulation

Parameter	Cemented	Uncemented
Partial weight bearing (days)	2.2 Â± 0.6	6.5 Â± 1.3
Full weight bearing (weeks)	4.5 Â± 1.2	8.2 Â± 2.1
Independent ambulation (weeks)	9.1 Â± 2.3	11.4 Â± 3.0

Table 4: complication profile

Complication	Cemented (n)	Uncemented (n)
Superficial infection	1	2
Dislocation	0	0
Thigh pain	0	1
Periprosthetic fracture	0	1
Deep infection	0	0
Mortality (within 6 mo)	0	0

DISCUSSION

This study demonstrates superior early functional recovery and fewer complications in patients undergoing cemented bipolar hemiarthroplasty compared to uncemented fixation. Early mobilization and better pain relief contributed to higher HHS in the cemented group.

Thigh pain and periprosthetic fractures, common with uncemented stems, were observed in 2 of 20 patients. This confirms concerns raised in earlier studies:

- Langslet et al. (2014) reported a 4x higher fracture rate in uncemented group.
- Siddiqui et al. noted uncemented hips had more postoperative pain and delayed mobilization.

Although uncemented prostheses reduce risk of cement embolism, they require strong metaphyseal bone for immediate fixation — often lacking in elderly osteoporotic patients. However no statistical significant differences were observed between the two.

CONCLUSION

Cemented bipolar hemiarthroplasty:

- Provides superior early functional outcome
- Reduces pain and risk of complications
- Facilitates earlier mobilization and independent ambulation

In osteoporotic elderly patients with displaced intracapsular fractures, cemented prostheses are preferred, especially when rapid rehabilitation is essential. However no statistical significant differences were observed between the two.

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