



## Prospective Study of Functional Outcome of Uncemented Bipolar Hemiarthroplasty in Neck of Femur Fracture Patients

Dr. Raamji M<sup>1</sup>, Dr. Ramchandra Reddy Pendli<sup>2</sup>, Dr. Madhukar<sup>3</sup>, Dr. Aizel Sherief P<sup>4</sup>

<sup>1</sup>Post Graduate, Department of Orthopaedics, Sree Balaji Medical College and Hospital, Chromepet.

<sup>2</sup>Post Graduate, Department of Orthopaedics, Sree Balaji Medical College and Hospital, Chromepet.

<sup>3</sup>Professor, Department of Orthopaedics, Sree Balaji Medical College and Hospital, Chromepet.

<sup>4</sup>Assistant Professor, Department of Orthopaedics, Sree Balaji Medical College and Hospital, Chromepet.

**Corresponding Author:** Dr. Ramchandra Reddy Pendli

(Received: 16 September 2024

Revised: 11 October 2024

Accepted: 04 November 2024)

### KEYWORDS

Uncemented,  
Bipolar  
Hemiarthroplasty,  
Neck of Femur  
Fracture, Functional  
Outcome, Elderly,  
Harris Hip Score,  
Prospective Study

### ABSTRACT:

**Background:** Neck of femur fractures (NOF) are common in elderly patients and often require surgical intervention. Bipolar hemiarthroplasty, a treatment option for displaced fractures, can be performed with either cemented or uncemented prostheses. This study evaluates the functional outcomes of uncemented bipolar hemiarthroplasty in patients with NOF fractures.

**Methods:** In this prospective study, 24 elderly patients with displaced NOF fractures underwent uncemented bipolar hemiarthroplasty. Preoperative assessments included radiographs and functional scoring using the Harris Hip Score (HHS). Postoperative follow-up was performed at 2 weeks, 3 months, 6 months, and 1 year to assess pain, mobility, and overall functional recovery.

**Results:** The mean Harris Hip Score significantly improved in postoperative assessments. Pain levels decreased, and mobility increased progressively, with a majority of patients regaining independence in daily activities.

**Conclusion:** Uncemented bipolar hemiarthroplasty provides favorable functional outcomes with minimal complications in patients with NOF fractures. It offers an effective, long-term solution for elderly patients, with outcomes comparable to cemented implants, but with potential advantages in terms of reduced complications associated with cement use.

### INTRODUCTION

Hip fractures are becoming a more frequent occurrence in elderly people. Of proximal femur fractures, the neck of the femur comprises around 50%. In 2050, it is projected that there would be more than 6 million hip fractures worldwide. The patient's age and degree of activity will determine how their femoral neck fractures are treated. Elderly, less active patients are typically treated with either cemented or uncemented hemiarthroplasty, while younger, more active patients should have internal fixation and open reduction. The incidence of hip fractures, which was 1.66 million in 1990, is predicted to increase to around 6.26 million by 2050<sup>1</sup>. Approximately 53% of these hip fractures are intra-capsular femoral neck fractures. About 33% of these are not displaced, while the remaining 67% are displaced<sup>2</sup>. About 90% of proximal femur fractures are

caused by femoral neck and per-trochanteric fractures, which have almost equal incidences<sup>3,4</sup>.

Uncemented bipolar hemiarthroplasty has a great deal of usefulness in these patients. The goal of the current prospective short-term study is to assess the functional and result of this surgical treatment performed in a group of carefully chosen senior femur fracture neck cases with a femoral canal Dorr's ratio of less than 0.75 and generally fair bone quality. The incidence of mortality following hip fractures has decreased recently due to advancements in perioperative treatment and rehabilitation, yet the majority of older patients still have several comorbidities and poor physical condition. As a result, cutting down on operation time and reoperation rate is crucial. Reoperation following HA is necessary for a number of reasons, including dislocation, periprosthetic fracture, and infection<sup>15,16</sup>. Furthermore, a



number of studies on hip arthroscopy (HA) in elderly patients with hip fractures have documented a higher rate of dislocation after surgery using the posterolateral or posterior approach<sup>16,21,22</sup>. In a prior study, the dislocation rate of HA ranged from 1.7% to 9%. who have had HA.

**AIM OF THE STUDY** The objective was to examine the functional result of a patient undergoing uncemented hemiarthroplasty with a bipolar prosthesis for a femur fracture.

**OBJECTIVES OF THE STUDY** To enable prompt weight-bearing mobility and speedy recovery following surgery. To avoid prevent complications from internal fixation in senior osteoporotic fracture patients, such as avascular necrosis, non-union, and prolonged immobilisation; and to investigate related complications.

**MATERIALS**

The present study of 24 cases of fracture neck of femur treated by using uncemented hemiarthroplasty with bipolar endoprosthesis in the Department of Orthopaedics at Sree Balaji Medical College and Hospital (SBMCH).

**Study Area** OPD of Sree Balaji Medical College and Hospital

**Study Setting** Casualty and OPD of Sree Balaji medical college and hospital

**Study Design** Prospective study

**Study Duration** 12-18 months

**Sample Size:** 24

**Study Population** Patients coming to orthopedic opds and Casualty of SBMCH

**Inclusion criteria:**

Age > 50

Both sex

All Neck of femur fractures

**Exclusion criteria:**

All pathological fractures.

Old malunion and non-union.

Previous surgery on neck of femur

Stable fracture neck of femur fracture

Age < 50



Figure 1: Patient Positioning



Figure 2: Incision Site



Figure 3: Intra Operative image



Figure 4: Post Operative Scar



## RESULTS

### PATIENTS AGE

In our study, a total of 24 patients were enrolled. In that 45.8% of patients are from 71 to 80 years of age and 33.3% of patients are from 61 to 70 years of age. The mean age of the patients was 79.1 years, ranged from 61 to 79 years.

### Sex of the patients

There were 14 female participants and 10 male participants in this study. The highest percentage of patients were female (58.3%), while the lowest percentage was male (41.7%)

### Side of the fracture

Among these 24 patients, 45.83% had right-sided injuries and 54.17% had left-sided injuries

### Mode of injury

The most prevalent injury was slip and fall (62.5%), while 9 patients (37.5%) were injured in road traffic accidents.

### Comorbidity

33.3% of the patients had Diabetes. 16.7% of the patients had hypertension, 29.17% of the patients had both

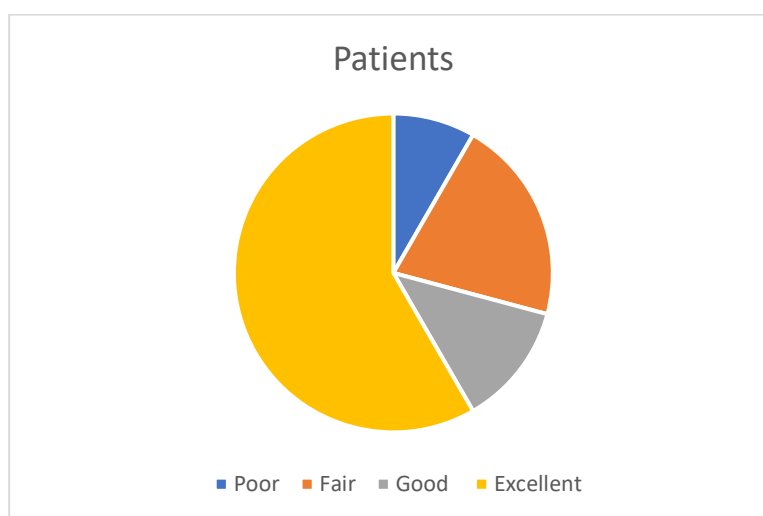
### Harris Hip Score-Based Functional Outcomes

In the context of the Harris Hip Score, the outcome categories are defined as follows:

- **Poor:** Indicates significant limitations in hip function, mobility, and quality of life. Patients in this category experience substantial discomfort and impairment.
- **Fair:** Suggests moderate functional limitations. While patients may perform daily activities, they still face notable challenges related to hip function.
- **Good:** Represents satisfactory functional outcomes. Patients in this category have improved mobility, reduced pain, and a reasonable quality of life.
- **Excellent:** Signifies optimal results. Patients experience minimal or no limitations, with excellent hip function and overall well-being.

**Table 8: Functional Outcome by Harris Hip Score**

Time of Assessment	Outcome	Number of patients
2 weeks	Poor	22
	Fair	2
3 months	Poor	10
	Fair	14
6 months	Poor	3
	Fair	7
	Good	14
12 months	Poor	2
	Fair	5
	Good	3
	Excellent	14



**Figure 8 : Outcome by Harris Hip Score based on 12 month report**

## DISCUSSION

In our experience as well, we found that even in osteoporotic bone, a tight fit of the implant can be easily accomplished. Even though cementless stems are not recommended in very wide femoral canals (Dorr types C and D), press-fit is now possible even in these femora thanks to improved stem designs that are now readily available (e.g., the Corail™ and Solution™ stems, which have larger stem diameters, metaphyseal flares, distal fixation, and combined proximal etc.).

Uncemented implantations had a decreased risk of dislocation and heterotopic ossification in terms of implant-related problems. Conversely, although not statistically significant, the uncemented group had a greater incidence of iatrogenic femur fractures. Three other studies<sup>82,83</sup> also revealed implant-related problems, all of which showed a statistically significant increase in the cementless group..

In patients treated with cementless implants who were 70 years of age or older, only Taylor et al. identified significantly decreased implant-related problems<sup>83</sup>. Such that 4 of 62 patients, or a comparatively small percentage, complained of pain when bearing weight six years following an uncemented bipolar hemiarthroplasty (UCBH), according to Overgaard's study 21. Additionally, during follow-up, none of the patients in this trial reported experiencing discomfort when engaging in typical activities.

In summary, the available data suggests that, in comparison to cemented implantation, UCBH is associated with a shorter operative duration, less blood loss, a lower risk of infection, and a lower incidence of heterotopic ossification. However, there is no discernible difference in terms of other postoperative local or the reoperation rate or systemic complications.

## LIMITATIONS

Hip fractures in elderly individuals are linked to decreased mobility, increased morbidity, death, and loss of autonomy. Elderly people who want early mobilisation and want to avoid the disadvantages of internal fixation often undergo hemiarthroplasty. The unipolar fixed-head prosthesis had several drawbacks that were addressed by the development of the bipolar prosthesis.

It would be anticipated that an extra point of motion would reduce the degree of head migration, dislocation, and loosening.

## CONCLUSION

In our investigation, bipolar hemiarthroplasty (uncemented) proved to be a highly successful repair method for femur neck intracapsular fractures. Furthermore, bipolar uncemented hemiarthroplasty has a number of benefits and results in a satisfactory functional outcome with few problems for displaced intra-capsular femoral neck fractures. There is less blood loss and a shorter surgical time. Nonetheless, it is crucial to remember that when identifying patients for an



uncemented bipolar hemiarthroplasty, the Singh's index and Dorr ratio must be properly adhered. The majority of the outcomes were favorable or exceptional. There were

only a few manageable post-operative problems. It offers the undeniable benefits of pain relief, early mobilization, and a return to nearly normal daily activities

**CASE ILLUSTRATIONS**

**CASE 1**

**PRE-OP**



**POST -OP (2 weeks)**



**POST -OP (6 months)**



**POST -OP (1 year)**



**RESULTS**

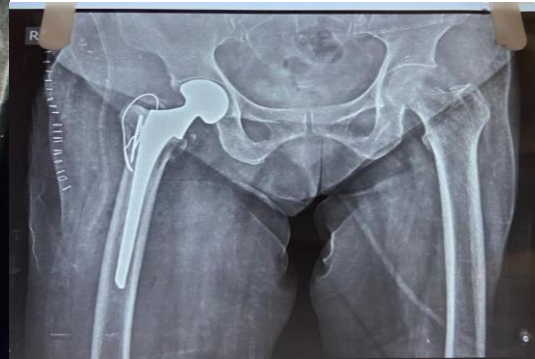




CASE 2

PRE -OP

POST OP XRAY



CASE 3

PRE OP XRAY

POST -OP



## BIBLIOGRAPHY

1. Kannus P, Parkkari J, Sievänen H, Heinonen A, Vuori I, Järvinen M. Epidemiology of hip fractures. *Bone*. 1996; 18(1):57S-63S
2. Somashekar MS, Sathya Vamsi Krishna, Sridhara MS, Murthy JNM. Treatment of Femoral Neck Fractures: Unipolar Versus Bipolar

Hemiarthroplasty; *Malaysian Orthopaedic Journal*. 2013; 7(3).

3. Allfram PA. An epidemiological study of cervical and trochanteric fractures of the femur in an urban population. Analysis of 1,664 cases with special reference to etiologic factors. *Acta Orthop Scand Suppl*. 1964; 65-65:1-109.



4. Gallagher JC, Melton LJ, Riggs BL, Bergstrath E. Epidemiology of the fractures of the proximal femur in Rochester, Minnesota. *Clin Orthop Relat Res.* 1980; 150:163-71.
5. Orlin Filipov. Epidemiology and Social burden of the femoral neck fractures; *J of IMAB.* 2014; 20(4).
6. Raghvendra TS, Jayakrishna Reddy † BS, Jithuram Jayaram. Management of Fracture Neck of Femur with Cemented Bipolar Prosthesis; *Indian Journal of Clinical Practice.* 2014; 24(9):64-76.
7. Shivanand Mayi C, Sachin Shah, Sadashiv Jidgekar R, Arunkumar Kulkarni. Evaluation of functional outcome of cemented bipolar hemiarthroplasty for treatment of osteoporotic proximal femoral fractures in elderly people; *IJOS.* 2016; 2 (3):180-183.
8. Ram Kumar Ponraj, Senthilnathan Arumugam, Prabhakar Ramabadran. Functional Outcome of Bipolar Hemiarthroplasty in Fracture Neck of Femur; *Sch. J App. Med. Sci.* 2014; 2(5D):1785-1790.
9. Sharma V, Awasthi B, Kumar K, Kohli N, Katoch P. Outcome analysis of hemiarthroplasty vs. Total hip replacement in displaced femoral neck fractures in the elderly. *J Clin Diagn Res.* 2016; 10(5):11-3.
10. Dr. Arvind Kumar SM, Dr. Venkatesh Kumar N, Dr. Udayamoorthy S, Dr. Kailash. Radiological assessment of inter-prosthetic joint movement in bipolar hip hemiarthroplasty for fracture neck of femur; *ISSN: 23951958IJOS.* 2017; 3(2):583-589.
11. Moon A, Gray A, Deehan D. Neck of Femur Fractures in Patient's Aged More Than 85 Years-are They a Unique Subset? *Geriatr Orthop Surg Rehabil.* 2011;2(4):123. doi: 10.1177/2151458511414562
12. Okike K, Hasegawa IG. Current Trends in the Evaluation and Management of Nondisplaced Femoral Neck Fractures in the Elderly. *J Am Acad Orthop Surg.* 2021;29(4):e154-e164. doi:10.5435/JAAOSD-20-00349
13. Ma HH, Chou TFA, Tsai SW, Chen CF, Wu PK, Chen WM. Outcomes of internal fixation versus hemiarthroplasty for elderly patients with an undisplaced femoral neck fracture: A systematic review and meta-analysis. *J Orthop Surg Res.* 2019;14(1):1-8. doi:10.1186/S13018-019-1377-5/FIGURES/10
14. Kwak DK, Jang CY, Kim DH, Rhyu SH, Hwang JH, Yoo JH. Topical tranexamic acid in elderly patients with femoral neck fractures treated with hemiarthroplasty: Efficacy and safety?- A case-control study. *BMC Musculoskelet Disord.* 2019;20(1):1-9. doi:10.1186/S12891-019-2615-Z/TABLES/4
15. Fernandez MA, Achten J, Parsons N, et al. Cemented or Uncemented Hemiarthroplasty for Intracapsular Hip Fracture. *New England Journal of Medicine.* 2022;386(6):521-530. doi:10.1056/NEJM0A2108337/SUPPL\_FILE/NEJM0A2108337\_DAT A-SHARING.PDF