*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 6 Ser. 2 (June. 2024), PP 45-48*
*www.iosrjournals.org*

# Cemented Versus Uncemented Bipolar Hemiarthroplasty For Displaced Intracapsular Femoral Neck Fractures

Dr. Apurva Patel[1]
*Post-Graduate Trainee, Department Of Orthopaedics, Pacific Institute Of Medical Sciences, Udaipur, India*

Dr. Asif Husain Ansari[2]
*Junior Resident, Department Of Orthopaedics, Government Medical College, Bhilwara, India*

Dr. Aabid Husain Ansari[3]
*Assistant Professor, Department Of Orthopaedics, Pacific Institute Of Medical Sciences, Udaipur, India*

Dr. Nilargha Chowdhury[4]
*Post-Graduate Trainee, Department Of Orthopaedics, Pacific Institute Of Medical Sciences, Udaipur, India*

***Abstract:***
***Background:*** *There is still controversial about the treatment of displaced femoral neck fractures in old age patients. Therefore, this retrospective study was conducted to compare the clinical and functional outcome between cemented and uncemented bipolar hemiarthroplasty for displaced femoral neck fractures in old age patients.*
***Methods:*** *The retrospective study was conducted on 40 patients of displaced intracapsular femoral neck fracture (Garden type III & IV) treated with bipolar hemiarthroplasty (cemented or uncemented) between August 2020 to May 2023. The minimum follow-up was 12 months. In both groups total blood loss, surgery duration, complications, functional and radiological outcome were noted and compared.*
***Results:*** *The total blood loss and the mean surgery duration were significantly higher in the cemented group. On the last follow-up, the mean Harris Hip Score was 82.7 in the cemented group and 90.2 in the uncemented group.*
***Conclusion:*** *The uncemented bipolar hemiarthroplasty has a less total blood loss and better functional outcome compared to cemented bipolar hemiarthroplasty for displaced intracapsular femoral neck fracture.*
***Keywords:*** *Displaced Intracapsular neck of Femur Fractures, Elderly Patient, Bipolar Hemiarthroplasty, Harris Hip Score.*

---

Date of Submission: 26-05-2024 Date of Acceptance: 06-06-2024

---

## I. Introduction:

Displaced femoral neck fractures is one of the most common fracture in old age groups which affects the quality of life [1] and associated with higher morbidity and mortality rate [2]. Still the treatment of displaced femoral neck fractures in old age patients is controversial [3-6]. The treatment options are reduction & fixation or replacement of femoral head, total hip arthroplasty or hemiarthroplasty, Unipolar hemiarthroplasty or Bipolar hemiarthroplasty, cemented arthroplasty or uncemented arthroplasty.

Therefore, this study was undertaken to compare the clinical and functional outcome between cemented and uncemented bipolar hemiarthroplasty for displaced femoral neck fractures in old age patients.

## II. Materials And Methods:

We did retrospective study on 40 patients of displaced intracapsular femoral neck fracture (Garden type III & IV) treated with bipolar hemiarthroplasty between August 2020 to May 2023. Patients with a pathological femoral neck fracture and Garden type I & II neck femur fracture were excluded. All patients divided into 2 groups, Group A (Cemented group) included 20 patients and underwent cemented bipolar hemiarthroplasty whereas Group B (Uncemented group) included 20 patients and underwent uncemented bipolar hemiarthroplasty. The mean follow-up duration was 29.9 and 30.5 months respectively (Table 1).

After informed written consent and physical fitness, all patients operated by one surgeon in lateral decubitus position via postero-lateral approach. Prophylactic antibiotic were administered 30 minutes prior to skin incision and continue for 48 hours postoperatively. Immediate postoperative hip X-ray was taken to ascertain

the position of the implant and to check the limb length discrepancies. Physiotherapy was started from postop day 1 and early walking on crutches was allowed as tolerated. Surgical drain removal and wound inspection was done on postop day 2. In both groups total blood loss (intraoperative and postoperative), surgery duration, and complications were noted and compared. Most of the patients were discharged on 6th or 7th postop day. Stitches were removed on 14th day. All patients were followed-up post-operatively at 1 month, 3 months, 6 months and 12 months. At each follow-up, functional and radiological evaluation was done. During radiological evaluation, X-ray pelvis with both hips anteroposterior view and affected hip lateral view done to check acetabular erosion, limb length discrepancies, varus/valgus alignment of femoral components and osteolysis or any subsidence of femoral components. The functional outcome was evaluated using Harris Hip Score (HHS). The Harris Hip Score includes pain, joint function, joint deformity, and range of motion. The maximum score is 100 points. The more score, the less the dysfunction. The score 90-100 is excellent, 80-90 is good, 70-80 is fair, and <70 is considered a poor result.

Statistical analysis was performed using the Mann-Whitney test in the SPSS version 19.0 (SPSS Inc./IBM, Chicago, IL). A p-value of <0.05 was deemed statistically significant.


**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**

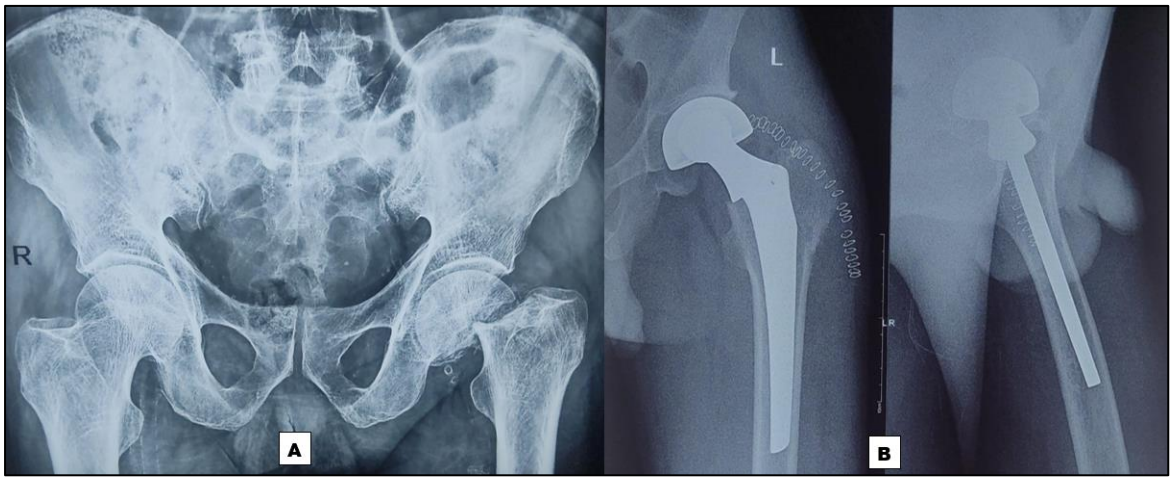


**Fig. 2: 80 year-old male with left displaced femoral neck fracture treated with uncemented bipolar hemiarthroplasty: (A) Preoperative X-ray (B) Postoperative X-ray**

## III. Results:

A total of 40 patients included in the study. The average age was 72.25 years (range: 62-86 years) in cemented group and 65.7 years (range: 56-75 years) in uncemented group. The patient characteristics of both groups were not significantly different (Table 1).

**Table 1: Patient demographics, Perioperative results, Harris Hip Score And Pain Score**

| Parameter | Cemented | Uncemented | P-value |
|---|---|---|---|
| Age (yrs) | 72.25 (62-86) | 65.7 (56-75) | P>0.05 |

| | | | |
|---|---|---|---|
| Follow-up duration (months) | 29.9 (24.8–49.5) | 30.5 (24.7–59.8) | P>0.05 |
| Operation time (min) | 55 (30-65) | 44 (30-55) | 0.046 |
| Total blood loss (ml) | 900 (680-1280) | 650 (570-1100) | 0.008 |
| Intraoperative blood loss | 368.1(258-589) | 280.6(215-421) | 0.025 |
| Postoperative blood loss | 601.0(420-998) | 453.2(359-895) | 0.012 |
| Dislocations | 0 | 0 | |
| Aseptic loosening | 1 | 0 | P>0.05 |
| Acetabular erosion | 1 | 1 | P>0.05 |
| Periprosthetic fracture | 0 | 2 | P<0.05 |
| Reoperation | 2 | 3 | P<0.05 |
| Harris hip score | 82.7 (39-100) | 90.2 (59-100) | 0.016 |
| Pain | 1.6 (1-3) | 2.4 (1-4) | 0.062 |
| Death | 1 | 1 | P>0.05 |

The mean surgery duration was 55 minutes (30 to 65 minutes) for the cemented groups and 44 minutes (30 to 55 minutes) for the uncemented groups (P=0.286). The mean total blood loss was higher in cemented group (900 ml vs 650 ml respectively; P=0.008). At last follow-up, the mean HHS in the cemented group was 82.7 points, and in the uncemented group, 90.2 points (P=0.016).

There were no intraoperative complications or postoperative dislocations or periprosthetic joint infection occurred in either group. In the cemented group, one patient developed aseptic loosening of femoral stem 3 years postoperatively for which femoral stem was revised. In both groups acetabular erosion occurred in two patients 4 years postoperatively and converted to cemented total hip replacement. Periprosthetic fracture occur in 2 patients of uncemented group during follow-up, femoral stem was found to be stable and patients were treated with open reduction internal fixation with cable wire. In both groups two patients died at 12 to 14 months follow-up.

## IV. Discussion:

Femoral neck fracture are common in the old age groups and associated with higher morbidity and mortality rate [2]. Upto 50% of hip fractures are femoral neck fracture [7]. Treatment options for femoral neck fracture are reduction & internal fixation, hemiarthroplasty or total hip replacement. Fracture reduction & internal fixation method is associated with high rates of nonunion and osteonecrosis [3-4, 8-10]. The risk of nonunion and osteonecrosis of the femoral head can be eliminated by hip replacement (Hemi or Total). Total hip replacement (THR) is a good option for treatment of displaced femoral neck fractures but it is associated with high rate of dislocation up to 20% [11-12]. The hemiarthroplasty (Unipolar or Bipolar) is a cost-effective method for displaced femoral neck fractures. The unipolar hemiarthroplasty have higher complications rate compared to bipolar hemiarthroplasty and it causes acetabular erosion and protrusion of femoral head prosthesis that's required a second surgery upto 6% to 18% of patients [13-14]. This study was designed to compare the clinical and functional outcome between cemented and uncemented bipolar hemiarthroplasty for displaced femoral neck fractures in old age patients.

In present study, the average intraoperative blood loss (p=0.025), postoperative blood loss (p=0.012) and the mean surgery duration were significantly higher in the cemented group because of the process of cement insertion and the waiting time for solidification of cement that leads to high blood loss and prolong surgery duration. Lo et al and Krishnan et al also reported a similar finding [15-16].

There were no dislocations in any group during postop period. A meticulous soft tissue handling and good joint capsule and soft tissue repair reduces the risk of dislocation. Chandran et al reported a rate of 7.4% for intraoperative periprosthetic fractures [17]. But in this study no intraoperative periprosthetic fracture in either group; careful placement of the Hohmann retractor and gentle elevation of the proximal femur for femoral reaming and stem insertion was important to avoid intraoperative fractures. Two patient in uncemented group developed periprosthetic fracture at 12 months follow-up due to slip and fall; during intra-op femoral stem was found to be stable and fracture treated with open reduction internal fixation with cable wire. Total of 2 cases of acetabular erosion were encountered (one in each group), which is comparable to rates reported by Devas et al [18] and one patient in cemented group developed stem loosening. The mean Harris hip score was significantly better in the uncemented group. No one developed pulmonary embolism, urinary tract infection, cardiovascular and cerebrovascular complications. There was no difference in the 1-year mortality rate in both groups.

In general, patients treated with cemented hemiarthroplasty had less pain, lower reoperation risk and better function compare to uncemented hemiarthroplasty but the mean Harris hip score was better in patients with uncemented hemiarthroplasty [19].

The limitations of present study; First, it was a retrospective study, Second, the number of the cases in each groups were small, Third, the premorbid activity level of the patients was not considered and Lastly, the mean follow-up time was not enough for evaluation of protrusio acetabuli.

## V. Conclusion:

The cemented hemiarthroplasty is associated with less pain, less postoperative fractures, less reoperation risk and better function compare to uncemented hemiarthroplasty but the mean surgery duration, total blood loss and the mean Harris hip score was better in patients with uncemented hemiarthroplasty.

**Conflict Of Interest:**

The authors declare that they have no competing interests.

## References:


[1] Gjertsen Je, Baste V, Fevang Jm, Furnes O, Engesæter Lb. Quality Of Life Following Hip Fractures: Results From The Norwegian Hip Fracture Register. Bmc Musculoskeletal Disorders. 2016 Dec;17:1-8.

[2] Raut S, Parker Mj. Medium To Long Term Follow Up Of A Consecutive Series Of 604 Exeter Trauma Stem Hemiarthroplasties (Ets) For The Treatment Of Displaced Intracapsular Femoral Neck Fractures. Injury. 2016 Mar 1;47(3):721-4.

[3] Asnis Se, Wanek-Sgaglione L. Intracapsular Fractures Of The Femoral Neck. Results Of Cannulated Screw Fixation. Jbjs. 1994 Dec 1;76(12):1793-803.

[4] Levine A. Orthopedic Knowledge Update: Trauma. Journal Of Pediatric Orthopaedics. 1997;17(3):409.

[5] Swiontkowski Mf. Intracapsular Fractures Of The Hip. Jbjs. 1994 Jan 1;76(1):129-38.

[6] Majernícek M, Dungl P, Kolman J, Malkus T, Vaculík J. Osteosynthesis Of Intracapsular Femoral Neck Fractures By Dynamic Hip Screw (Dhs) Fixation. Acta Chirurgiae Orthopaedicae Et Traumatologiae Cechoslovaca. 2009 Aug 1;76(4):319-25.

[7] Centers For Disease Control And Prevention. Fatalities And Injuries From Falls Among Older Adults---United States, 1993—2003 And 2001—2005. Mmwr: Morbidity And Mortality Weekly Report. 2006;55(45):1221-4.

[8] Livesley Pj, Srivastiva Vm, Needoff M, Prince Hg, Moulton Am. Use Of A Hydroxyapatite-Coated Hemiarthroplasty In The Management Of Subcapital Fractures Of The Femur. Injury. 1993 Apr 1;24(4):236-40.

[9] Overgaard S, Jensen Tt, Bonde G, Mossing Nb. The Uncemented Bipolar Hemiarthroplasty For Displaced Femoral Neck Fractures: 6-Year Follow-Up Of 171 Cases. Acta Orthopaedica Scandinavica. 1991 Jan 1;62(2):115-20.

[10] Rae Pj, Hodgkinson Jp, Meadows Th, Davies Dr, Hargadon Ej. Treatment Of Displaced Subcapital Fractures With The Charnley-Hastings Hemiarthroplasty. The Journal Of Bone & Joint Surgery British Volume. 1989 May 1;71(3):478-82.

[11] Ravikumar Kj, Marsh G. Internal Fixation Versus Hemiarthroplasty Versus Total Hip Arthroplasty For Displaced Subcapital Fractures Of Femur—13 Year Results Of A Prospective Randomised Study. Injury. 2000 Dec 1;31(10):793-7.

[12] Sim Fh. Displaced Femoral Neck Fractures: The Rationale For Primary Total Hip Replacement. The Hip. 1983:51-61.

[13] Harjeet S, Suhail A, Shahril Y, Masbah O, Subanesh S. Outcome Of Traumatic Intracapsular Neck Of Femur Fractures In Patients Aged Above 60 Years Treated By Hemiarthroplasty. Malaysian Orthopaedic Journal. 2009;3(1):24-7.

[14] Lu-Yao Gl, Keller Rb, Littenberg B, Wennberg Je. Outcomes After Displaced Fractures Of The Femoral Neck. A Meta-Analysis Of One Hundred And Six Published Reports. Jbjs. 1994 Jan 1;76(1):15-25.

[15] Lo Wh, Chen Wm, Huang Ck, Chen Th, Chiu Fy, Chen Cm. Bateman Bipolar Hemiarthroplasty For Displaced Intracapsular Femoral Neck Fractures Uncemented Versus Cemented. Clinical Orthopaedics And Related Research (1976-2007). 1994 May 1;302:75-82.

[16] Krishnan H, Yoon Tr, Park Ks. Bipolar Hemiarthroplasty In Elderly Patients Presenting With Displaced Intracapsular Femoral Neck Fractures.. Malaysian Orthopaedic Journal. 2010;4(1):26-31.

[17] Chandran P, Kamath Rp, Johnson Gv. Intraoperative Fractures During Uncemented Furlong Bipolar Hemiarthroplasty. European Journal Of Orthopaedic Surgery & Traumatology. 2007 May 1;17(3).

[18] Devas Mi, Hinves Ba. Prevention Of Acetabular Erosion After Hemiarthroplasty For Fractured Neck Of Femur. The Journal Of Bone & Joint Surgery British Volume. 1983 Nov 1;65(5):548-51.

[19] Kenzora Je, Magaziner J, Hudson J, Hebel Jr, Young Y, Hawkes W, Felsenthal G, Zimmerman Si, Provenzano G. Outcome After Hemiarthroplasty For Femoral Neck Fractures In The Elderly. Clinical Orthopaedics And Related Research (1976-2007). 1998 Mar 1;348:51-8.