

## CEMENTED BIPOLAR HEMIARTHROPLASTY – AN ANALYSIS OF FUNCTIONAL OUTCOME

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### Abstract

**Background:** The life time risk of sustaining a hip fracture in females is 9% at the age of 50, but this rises to 18% by the age of 90. As life expectancy increases, the hip fracture incidence will continue to rise. The management of displaced femoral neck fractures has been controversial for past few decades. Bipolar hemiarthroplasty is the most commonly done procedure in femoral neck fractures. **Objective:** Our aim was to assess the functional & radiological outcome of cemented bipolar hemiarthroplasty for fracture neck of femur in elderly. **Materials and Methods:** It is a prospective study of 24 months duration done from March 2019 to March 2021 at SMMCH & RI, Chennai. Using statistical analysis sample size was calculated as 30 patients with neck femur fractures treated with cemented bipolar hemiarthroplasty. Data was collected from hospital records of the patients being admitted and operated and was analysed using SPSS software system. **Results:** Ninety percent had mild pain. None of the patients had any limp. 66.66% could walk without any support. 43.33% could walk a distance of 6 blocks. 30% could climb stairs without any support and 50% with support. 83.33% had good range of motion. Average Harris Hip Score was 85.76. There were no significant radiological abnormalities. **Conclusion:** Cemented Bipolar hemiarthroplasty is an ideal procedure for neck of femur fracture as it provides good relief of pain, early mobilization, and excellent range of motion and good level of activities with minimal complications.

## INTRODUCTION

Dennison et al,<sup>[1]</sup> in his study has established that the life time risk of sustaining a hip fracture in females is 9% at the age of 50, but this rises to 18% by the age of 90. As life expectancy increases, the hip fracture incidence will continue to rise.

Koval KJ and Zuckerman JD,<sup>[2]</sup> noted in his study that the neck of femur fracture incidence occurs in two different patient populations. 3% to 5% are young patients due to high velocity injuries. 90% of these injuries are due to a trivial fall, especially in elderly patients. The age specific incidence of hip fracture doubles every 5 - 6 years after the age of 30 in women. The factors contributing to poor healing in femoral neck fractures are compromised blood supply to the femoral head, the intracapsular location and severe trabecular atrophy which predisposes to osteonecrosis and its sequelae.

The management of displaced femoral neck fractures has been controversial for past few decades.<sup>[3,4]</sup>

Bipolar hemiarthroplasty is the most commonly done procedure in femoral neck fractures. Cemented hemiarthroplasty is done in elderly age group with reduced bone stock. Its advantages are reduced stress at the bone-implant interface, greater stability and lesser risk of protrusio acetabulae.

### Aims and Objectives

To assess the functional outcome of cemented bipolar hemiarthroplasty for fracture neck of femur in elderly.

## MATERIALS AND METHODS

It's a prospective study of 24 months duration done from March 2019 to March 2021 at SMMCH & RI, Chennai. Using statistical analysis sample size was calculated as 30 patients with neck of femur fractures treated with cemented bipolar hemiarthroplasty

### Inclusion Criteria

All patients with fracture neck of femur, above the age of 60 years were included in the study as shown in Table 1

## Exclusion Criteria

Patients below the age of 60 years, preexisting hip abnormality requiring total hip arthroplasty and pathological fractures are excluded from the study.

Data was collected from hospital records of the patients being admitted and operated and was analysed using SPSS software system

All patients in the study had a thorough clinical examination done. Routine blood investigations in Hb%, BT, CT, urine routine (albumin, sugar, and microscopy) were done. X-Ray of hip joint (AP view) or pelvis were taken with internal rotation of the affected limb to classify fracture type, to assess the size of the head, and calcar bone stock.

Pre-anaesthetic check-up was done and patients were taken up for surgery after obtaining informed

written consent. IV antibiotics were started on the night prior to surgery and continued thereafter. During the postop period, the patients were placed in an abduction pillow for 5 - 7 days. In patients who had a doubtful stability of reduction, immobilization was done using Thomas splint. Check X-Rays were obtained in all the cases. Patients were advised not to sit on the floor or squat to avoid excessive load on the prosthesis after discharge from hospital.

Patients examined at 6 weeks, 3 months, 6 months, one year and two years for functional outcomes, which was used for Harris hip score system<sup>5</sup> and X-Rays were taken to look for any evidence of complications.

## RESULTS

In the present study, thirty cases of fracture neck femur treated with cemented bipolar hemiarthroplasty between May 2019 to March 2021 were enrolled. The follow up period ranged from six weeks to 24 months' duration. The following observations were made in the study.

**Table 1: Age, Sex & Side Distribution**

Age		Sex		Side	
60-65yrs	80 -85yrs	Male	Female	Right	Left
25 (83.33%)	5 (16.67%)	13 (43.34%)	17 (56.66%)	13 (43.34%)	17 (56.66%)

Mean age group was 72 years.

**Table 2: Functional Outcome Evaluation**

Pain		Limp		Movements		
No Pain	Mild Pain	No	Yes	Good	Fair	Poor
10 (33.33%)	20 (67.77%)	21 (70.00%)	9 (30.00%)	25 (83.33%)	4 (13.33%)	1 (3.33%)

**Table 3: Final Harris Hip Score.<sup>[5]</sup>**

Result	No. of Patients	Percentage	
Excellent	90 – 100	9	30.00%
Good	80 – 89	16	53.33%
Fair	70 – 79	4	13.33%
Poor	< 70	1	3.33%
Total		30	100%

Mean Harris Hip Score is 85.76

Radiological assessment of bipolar prosthesis is done with various parameters like acetabular fit, femoral stem, varus/ valgus alignment, femoral stem/ canal fit, acetabular erosion/ protrusion, lucent lines around the femoral component, femoral subsidence, heterotropic ossification. In the present study, there is one patient (3.33%) with varus alignment of the stem.

## DISCUSSION

Cemented Bipolar hemiarthroplasty done in 30 patients with fracture neck of femur above 60yrs of age. The purpose of this study is to determine the outcome of these fractures treated with cemented Bipolar hemiarthroplasty The age incidence in our study was comparable with other studies The data obtained in this study were compared with other series and the results were evaluated.

In our study, the age for fracture neck femur was 60 years and above with mean age group of 72 years. Whereas The average age incidences reported by

other series were Tapasvi SR,<sup>[7]</sup> was 63 years, Nodzo SR <sup>8</sup> was 68 years. Frank J Raia et al,<sup>[6]</sup> was 65 years, Sean & Gordan,<sup>[7]</sup> was 83 years, Frede Frihagen et al,<sup>[10]</sup> was 78.5 years. Our gender distribution, 17 patients (56.66%) females and 13 patients (43.34%) males were comparable were Tapasvi SR,<sup>[7]</sup> Nodzo SR,<sup>[8]</sup> Frank J Raia et al.<sup>[6]</sup> About 93.33% of our patients required prosthesis of size that varied between 41- 47mm.

All patients in our study underwent Bipolar hemiarthroplasty by Moore's Southern Approach.<sup>[5]</sup> It has been proved that, there is no statistically

significant difference in any complication; including dislocation or revision surgery, with use of either an anterior or posterior approach.<sup>[9]</sup> One patient in our study, had a displaced periprosthetic fracture which was noted in the post-operative X-Ray and was subsequently treated with DCP, screws and SS wires.

The complication rate in ours was 13.17% while in other studies was Tapasvi SR,<sup>[7]</sup> was 17%, Nodzo SR<sup>[8]</sup> was 12%. Frank J Raia et al,<sup>[6]</sup> was 27%, Sean & Gordan,<sup>[7]</sup> was 25%. All were followed up for a period of 6 weeks - 24 months.

In present study, 89.99% of patients had no pain. Only 3 patients had mild pain in our study while with Frank J Raia et al,<sup>[6]</sup> no pain percentage was 77.8 %, Sean & Gordan <sup>7</sup> was 84%, In present study, 66.66% of the patients could walk without any support and 20% could walk for long distances with single cane. Most of our patients were able to perform daily activities. All patients could climb stairs with or without the help of banister and could sit comfortably on chair for long hours. There were no fixed deformities. Only 3 patients (10%) had minimal lengthening of 1 cm in contrast to the requirement of < 3.2 cm limb length discrepancy in Harris Hip Score.

In our study, the final Harris Hip Score ranged from 53 to 95 with a mean of 85.76. Final Harris Hip Score of our study has been compared to Frank J Raia et al,<sup>[6]</sup> no pain percentage was 78, Sean & Gordan<sup>[7]</sup> was 67.30.

Radiological assessment of bipolar prosthesis is done with various parameters like acetabular fit, femoral stem, varus/ valgus alignment, femoral stem/ canal fit, acetabular erosion/ protrusion, lucent lines around the femoral component, femoral subsidence, heterotropic ossification. In the present study, there is one patient (3.33%) with varus alignment of the stem. However, there was not much difference in the functional outcome of this patient

Peter M Lewis,<sup>[11]</sup> et al study shows that uncemented arthroplasty can be used safely and effectively in the elderly population with low complication and revision rates. Arthroplasty in patients leads to improved pain relief as well as mobility but the conversion of the same outcomes to functional activity is not proportionally improved.<sup>[12]</sup>

Evans JT et al suggested that hip arthroplasty has been treated as an individual episode, as opposed to analysis of individual patients. Consistent with recent literature,<sup>[13]</sup> each arthroplasty has an independent risk of failure and with PROMs improvement recognized equivalent whether the arthroplasty is the first or subsequent undertaking

Abdul Q Khan et al,<sup>[14]</sup> that cost of treatment with unipolar hip prosthesis is lower compared to bipolar hip prosthesis, which becomes significant when it comes to management of femoral neck fractures in elderly in resource limited areas. Yang,<sup>[15]</sup> in a systematic review and meta-analysis of unipolar vs

bipolar hemiarthroplasty in displaced femoral neck fractures in elderly found acetabular erosion in 5.5% and 1.2% in unipolar and bipolar hemiarthroplasty patients respectively. In our study we did not have acetabular malalignment but had varus stem malalignment in radiological findings which did not have much on the functional outcome of the patient.

## CONCLUSION

Osteoporosis is found to be the main factor which increases incidence of femoral neck fracture in elderly. These patients have been shown to have lower BMD than age matched controls. Increased risk of falling in elderly is another factor contributing to these fractures. Cemented bipolar hemiarthroplasty can be safely performed in elderly population with predictable results. It provides early mobilization, good pain relief and good level of activities with minimal complications.

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