

## Functional Outcome of Hemi-replacement Arthroplasty In Fracture Neck Femur Using Cemented Bipolar Prosthesis

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**Background:** Fracture of the neck femur has always presented challenges to orthopaedic surgeons and remains, in many ways, today the unsolved fracture as far as treatment and results are concerned. **Aims & Objectives:** The present study was conducted with the aim to analyze the results of cemented hemi-replacement endoprosthesis in fracture of neck femur in elderly patients. **Materials And Methods:** This prospective and observational study was conducted to analyze the results in patients with fracture neck femur treated with hemi-replacement arthroplasty using cemented bipolar prosthesis. At 6 months postoperatively results were rated as excellent, good, fair or poor according to modified Harris Hip Score. **Results:** Out of 25 patients, excellent results were obtained in 16 patients (64%) and good results in 7 patients (28%). No cases of poor results were found in the present study. Only 2 patients (8%) had fair results. The majority of the patients had reasonably good range of motion at final follow up. The mean Harris Hip Score was 91.32. **Conclusion:** Cemented Bipolar Hemi-replacement Arthroplasty is an effective mode of treatment to restore the function, allowing early mobilization in elderly patients with femoral neck fracture and consistently providing excellent results with negligible complications.

**Key-words:** Fracture neck femur, Cemented bipolar hemiarthroplasty, Hip surgery.

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### INTRODUCTION

Fracture of the neck femur has always presented challenges to orthopaedic surgeons and remains in many ways.<sup>1</sup> Femoral neck fractures have probably the greatest socio-economic impact of all fractures of the human skeleton. Now these days there are multiple surgical options are available for the management of femoral neck fractures like cannulated screws, dynamic hip screw

systems, blade plates, hemi and total hip arthroplasty, etc.<sup>2</sup> Intracapsular extent of the fracture, poor blood supply to the femoral head through the neck and difficulty in maintaining fracture reduction have been cited as reasons for failure of fixation.<sup>3-5</sup> Their complications cause major permanent disability in the elderly patients and are a major cause of death in the elderly. Hemi-Replacement Arthroplasty is now the established modality of treatment

in fresh fracture of femoral neck in the elderly, largely due to failure of other modalities of treatment such as internal fixation. In addition, there are certain problems of old age, which contribute to the grim outcome of these fractures with other treatment modalities, like internal fixation. The concept of hemi replacement arthroplasty, with the use of unipolar prosthesis, however, has shown intolerance of acetabular cartilage, leading to acetabular erosion, stem loosening, proximal migration, pain and acetabular protrusion.<sup>6</sup> This led to development of the principle of low friction arthroplasty in the form of bipolar hemi-arthroplasty in which low friction inner bearing prevent erosion of acetabular cartilage. Despite these improvements in prosthesis design, many patients used to come into the clinic to complain of pain in thigh, which was attributed to loosening of the stem. To address this problem, the cementing of the stem was started to prevent the stem migration and loosening and to evaluate the functional outcome in cases of hemi-replacement arthroplasty in fracture neck femur the presented study was undertaken.

#### **MATERIALS AND METHODS:**

This was a prospective observational study, conducted at the department of Orthopedics, Medical College and S.S.G. Hospital, Vadodara after taking due permission from the Institutional Ethical Committee. The aim of our study was to analyze the functional outcome of cemented bipolar hemi-replacement arthroplasty in

elderly patients of fracture neck femur. All the elderly patients who came to us with fracture neck femur during the period from March 2015 to August 2015 and treated with cemented bipolar hemi-replacement arthroplasty were taken into the consideration for this study. The patients who were medically unfit or unwilling to participate in the study were excluded.

**Pre Operative Assessment:** The routine blood and radiological investigations were performed in all cases and classification of fractures according to the anatomical classification was done. The patient were posted for the surgery only after declaration of medically and anesthesiologically fit.

All the patients were treated with cemented bipolar hemi-replacement in lateral position using modified Gibson's approach.<sup>7</sup> Postoperatively static and active quadriceps exercises were advised on the same evening within the limits of comfort followed by high sitting on the 2<sup>nd</sup> postoperative day. Depending upon the pain and reliance of the patient to follow our advice, patients were made to walk full weight bearing with the support of a walker on 3<sup>rd</sup> post-operative day and with a walking stick in opposite hand depending on the patient's comfort. The suture removal was done on the 14<sup>th</sup> post-operative day and called for follow-up at 1 month, 3 months and 6 months. At that time of follow-up patients were assessed clinically and radiologically. On final follow up at 6 months the results were analyzed and rated as excellent, good, fair or poor according to modified Harris Hip Score<sup>8</sup> and conclusions

were drawn after comparing with Indian and foreign authors.

## RESULTS

In our study the youngest patient was about 50 years age and the oldest was of 85 years age and the mean age was 66.2 years. The mean age of male patients was 62.09 years and for female patients was 69.42 years. In this study, 11 patients were male and 14 were females making a male to female ratio of 1:1.27. Fourteen cases had right sided involvement and 11 had left side involvement making a right to a left ratio of 1.27:1. In our study, 48% of the patients had a subcapital fracture while 52% had transcervical fracture. The commonest size of the prosthesis used for the management of fracture was 43 mm on average, which was slightly bigger in males (45 mm) and smaller in females (41mm). There were no intra operative complications in our study and the majority of the patients was discharged within 10 days of hospitalization. No postoperative complications were noted in our study except post operative dislocation and superficial infection, which were seen in one patient of each. More than half of the patients (52%) had no pain at final follow up at 6 months postoperative duration, while 48% experienced slight pain. The majority of the patients (72%) had no limp during walking, while 28% were having mild to moderate limping on walking. In the present study, the majority of the patients (84%) did not require any form of support for routine activities. There was no limb length discrepancy in majority of the patients

(84%), while the rest 16% were showing slight limb lengthening. All cases were evaluated according to the modified Harris Hip Score at final follow up at 6 months duration and we found excellent results in 64% patients, good results in 28% patients and fair results in 8% cases while no cases of poor results were seen in our study.

## DISCUSSION

Management of fracture neck femur in elderly still remains a major and difficult undertaking for an orthopedic surgeon. The pendulum of treatment is swinging between reduction and internal fixation with various supplementary methods as osteosynthesis to total hip replacement. It is now the general feeling that reduction and internal fixation should be reserved for the younger patients in whom, if needed revision surgery may be done at a later date. Primary prosthetic replacement in older patients who are active and need early mobilization should be considered. Over the past few years, bipolar hemi-replacement arthroplasty had become the treatment modality of choice for elderly neck femur fracture. The cementing of bipolar prosthesis is used in the old age patient to deal with the problem related to anterior thigh pain and loosening. Cementing provides better functional outcomes in patients and help them to reach pre-injury level of activities with shorter rehabilitation time<sup>9,10,11</sup>

In the present study, out of 25 patients, 19 were operated within 1 week of injury and there was a delay of more than 1

week between injury and surgery in remaining 6 patients, which was due to associated comorbid conditions or late presentation of patients, although this delay did not affect the final outcome and out of these 6 patients, 5 patients had excellent results at final follow up. The patients in our study were suffering from a systemic illness and 4 cases had hypertension, 1 had diabetes mellitus and 1

case had hypertension with diabetes mellitus with 2 cases of hypertension and restrictive lung disease. Almost similar kind of observations were seen by Ingle, Sonar & Koichade.<sup>12</sup> We compared the results of our study with the following study of cemented bipolar hemi-replacement arthroplasty and found similar results in terms of complications and functional outcome.

**Table-1: Showing Various Parameters Studied in cases of Cemented Bipolar Hemi-Arthroplasty**

S.No	Parameter	Results of the Present Study	Results of Study done by Ingle, Sonar & Koichade <sup>12</sup>
1	<b>Number Of Patients</b>	25	30
2	<b>Age</b>	Mean – 66.2 years	Mean – 78.07±6.16years
3	<b>Sex</b>	Male – 11(44%) Female - 14(56%)	Male – 17(56.66%)female – 13(43.34%)
4	<b>Laterality</b>	Right-14(56%) Left-11(44%)	Right – 12(40%) left – 18(60%)
5	<b>Associated Systemic Diseases</b>	Hypertension –16% Diabetes – 4% Hypertension with diabetes – 4% Hypertension with lung disease – 8%	Diabetes - 4(13.33%) Hypertension – 10(33.33%) Diabetes with hypertension – 4(13.33%) Lung disease – 2(6.66%)
6	<b>Complication</b>	Superficial Infection- 1 case Deep Infection - nil Dislocation – 1	Superficial Infection- 2 cases Deep Infection -1 case Dislocation – nil
7	<b>Limb Length Inequality</b>	Lengthning – 4 cases	Shortening – 2 cases
8	<b>Results</b> (modified Harris Hip Score)	Excellent – 64% Good – 28% Fair – 8% Poor - 0%	Excellent – 17(56.66%) Good –8(26.66%) Fair –1(3.33%) Poor - 0 *4 death were noted in the study

The other authors also believe that primary cemented bipolar hemiarthroplasty for unstable inter-trochanteric fractures of femur in elderly provides good functional outcome with early ambulation.<sup>13-15</sup> Our study is not without its own shortcomings. First, our duration of follow-up of 6 months is very less for assessment of the longevity and functional endurance of the prosthesis used and hence coming to definitive conclusions. Second, we have not evaluated the degree of intraprosthesis motion at the inner-bearing

at each follow-up. Such studies are complicated and beyond the facilities available at our institution. Such studies indicated because there are claims that the motion of the inner-bearing reduces over time and most prostheses behave as unipolar prostheses over a period of time.

## CONCLUSION

The cemented bipolar hemi-replacement arthroplasty is an effective mode of treatment to restore the function, allowing

early mobilization in elderly patients with femoral neck fracture and consistently providing excellent results with negligible complications. Bipolar Endoprosthesis has distinct advantages which are as follow:

- Reduction of acetabular cartilage erosion by low friction properties of inner bearing.
- Low incidence of acetabular protrusion.
- Least pain and excellent final results.

Bipolar hemi-replacement arthroplasty provides good functional outcomes, allowing patients to achieve near normal life.

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