Original Research Paper

Orthopaedic



Functional Outcome of Bipolar Arthroplasty for Fracture Neck Femur in Elderly People

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This study was conducted on thirty patients admitted in the department of orthopaedics at Maharishi Markandeshwar Institute of Medical Sciences & Research, Mullana, Ambala with diagnosis of fracture neck of femur. The patients were followed up to minimum period of six months. The functional outcome was carried out using Harris hip scoring system. Results of this study concluded that cemented bipolar arthroplasty is good procedure in elderly people.

# **KEYWORDS**

Cemented, Bipolar prosthesis, Hemiarthroplasty

### INTRODUCTION

Hip Fractures are devastating injuries that most commonly affect the elderly and have a tremendous impact on both the health care system and society in general. Despite marked improvement in implant design, surgical technique, patients care, hip fractures consume a potential proportion of our health care resources.<sup>[1]</sup> Inspite of earnest work by many in this field, the problem still remains far from being solved , hence rightly labeled as "Unsolved Fracture" by Speed. [2] The incidence of fracture neck of femur occur in two different populations. A very small group (3% to 5%) are young patients subjected to high energy trauma. The reminder occur in elderly population and approximately 90% of these injuries are the result of simple fall. It has been observed that age specific incidence of hip fractures doubles every 5-6 years after the age 30 in women reaching 18 fractures per 1000 per year in women over age of 85 years.<sup>[3]</sup> The blood supply of neck and head of femur is extensive, intricate and complicated. [4] It is a known fact that the hip is a weight bearing joint and has to perform many functions. A successful operation at the hip joint should provide a painless, stable hip with good range of movements. But none of the accepted procedures have been able to achieve this goal fully. The patient also needs to go through in many instances, multiple surgical procedures and a prolonged rehabilitation in order to preserve his original joint. The various treatment options depending upon age, activity level, fracture pattern, etc such as Moore's pins, Knowles pins, multiple cancellous screw fixation ,dynamic hip screw fixation, Austin - Moore hemiarthroplasty, Thompson hemiarthroplasty, unipolar or bipolar modular arthroplasty and total hip replacement. Among these treatment modalities osteosynthesis with internal fixation procedures rely in preserving the head of femur, but despite all operative skills, a perfect functional result from these procedures cannot always be secured and still there is high incidence of non union and avascular necrosis leading to late osteoarthritis. These procedures are justifiable in young patients, but in elderly patients, prolonged recumbency leads to many problems like bed sores, cardiac and respiratory problems, thromboembolism, dementia and renal problems. This led many surgeons to abandon the osteosynthesis procedure for displaced femoral neck fractures in elderly patients, in favour of primary hemiarthroplasty, which has certain advantages such as early ambulation, shortening the period of hospitalization and also avoids danger of non union and avascular necrosis. This clinical study presents the functional outcome of cemented modular bipolar hemiarthroplasty for treatment of displaced fracture neck of femur in elderly patients. The outcome was analysed by Harris hip score<sup>18</sup> and by radiographs taken during follow up visits at 6 weeks, 3 months and 6 months.

## 2. MATERIAL AND METHODS

The present study includes 30 cases of fracture neck of the femur in elderly patients above the age of 55 years irrespective of sex treated by hemiarthroplasty using cemented bipolar prosthesis in the Department of Orthopaedics at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala. The study was carried out to evaluate functional outcome of hemiarthroplasty for fracture of the neck of femur in elderly people. The fractures were classified according to Garden's classification. This study was conducted with due emphasis for clinical observation and analysis of results after surgical management of neck of femur fractures treated with cemented bipolar hemiarthroplasty.

Thirty cases treated by hemiarthroplasty were followed up to for minimum 6 months. At the end of 6 months following surgery, the functional results were analysed. Once the patient was admitted to the hospital, all the essential information was recorded in the proforma prepared for this study. Patient was observed regularly during his hospital stay till discharge. Patient was instructed to report for follow up in the outpatient department. Surgery was done under spinal anaesthesia or epidural block as decided by the anesthetists according fitness of patient. Lateral position with the patient lying on the unaffected side. For all patients posterior approach (Moore's Approach) was used in our cases. In the recovery room, the amount of blood draining into the suction drain, pulse, blood pressure, temperature and respiratory rate were monitored. For the first post-operative day the physical therapy program consisted of deep breathing, coughing and bilateral ankle exercises. . The initial dressing applied was changed after 48 hours with drain removal and Check radiograph was taken followed by Quadriceps exercises. Both the lower limbs kept in abducted position, with a pillow in between both the legs. Patients were made to sit up on the second day, stand up with support (walker), on the third day, and were allowed to full weight bear and walk with the help of a walker on the fourth postoperative day depending on his/her pain tolerance and were encouraged to walk thereafter. Sitting cross-legged and squatting were not allowed. Suture removal was done on the thirteenth or fourteenth postoperative day depending on wound condition. The results were evaluated, any complication was looked for and was analysed by clinical and radiological examination and patients were evaluated by Harris Hip Scoring system which include the following 4 parameters i.e. pain, function, range of motion and absence of deformity .

Harris Hip Score<sup>18</sup> It includes 4 parameters.

1. Pain	- 44
2. Function	- 47
3. Range of motion	- 5
4. Absence of the deformity	- 4
Total Score	- 100

### Total functional outcome was graded as following:

Poor: Harris hip score Fair: Harris hip score Good: Harris hip score Excellent: Harris hip score











RADIOGRAPHS SHOWING POST OP CEMENTED BIPOLAR HEMIARTHROPLASTY



**INSTRUMENT TROLLY A** 



**INSTRUMENT TROLLY B** 

### 3.RESULTS

In this study, thirty cases of fracture neck of femur who were treated by hemiarthroplasty using cemented bipolar prosthesis were followed up and functional outcomes were analysed and discussed.

Most of the patients were in the age group of 55-70 years with the mean age of 65.23 years. Majority (86.67%) of fracture were type IV Garden's classification radiologically.

90% of the patients had trivial trauma i.e. fall at home and were not able to stand up. Hypertension and diabetes mellitus were the most common problems. 2 patients had more than one comorbid medical condition. The hip was approached using a posterior approach (Moore's approach) and appropriate sized prosthesis was selected depending on the size of the femoral head. Patients were ambulated as early on fourth post operative day and most (63.3%) of patients were discharged within 2 weeks after admission.

Of the 30 cases, all 30 patients were followed up for analysis of the functional outcome and analysed according to Harris hip scoring system.

There were 40% excellent results, 40% good results, 6.7% fair and 13.3% poor results. Thus there were 80% satisfactory results. The poor results were attributed to complications like superficial wound infection and bed sore after surgery which resulted in marked pain.

### ASSESSMENT OF FUNCTIONAL RESULTS

The patients were followed up at 6 weeks, 3 months, and 6 months. The functional results were assessed by using Harris hip<sup>92</sup> scoring system. By this system assessment was done under the following headings:

- 1. Pain
- 2. Limp
- 3. Use of support
- 4. Walking distance
- 5. Climbing of stairs
- 6. Put on shoes and socks
- 7. Enter public transportation and sitting
- 8. Deformities
- 9. Leg length discrepancy
- 10. Range of motion

### 4. DISCUSSION

Fracture neck of femur is commonly seen in old age patients due to osteoporosis and generally associated with history of trivial injury. As internal fixation in these fractures is commonly associated with avascular necrosis and non union leading to prolong immobilization thus cemented bipolar hemiarthroplasty is a good procedure for these patients as it prevents complications like bed sores in elderly patients and early return to daily activities and pre fracture levels of functions.

Keeping these points in mind, the present study of Cemented Bipolar hemiarthroplasty in fracture neck femur was carried out in the Department of Orthopaedics, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala with the purpose to assess the functional outcome of bipolar hemiarthroplasty in elderly people and to compare our results with literature.

**Age Distribution:** Majority of the patients were between 56 to 70years. Minimum age was 56 years and oldest patient was of 95 years with mean age of 65.23 years. Similar age distribution has been reported by Saxena&Saraf<sup>5</sup> with age distribution of 45-90 years (Mean 66 years); Mukherjee & Puri<sup>6</sup> (Mean 65 years), Arwade<sup>7</sup> (Mean 72 years). Bavadekar& Manelkar<sup>6</sup> had mean age of 75 in fresh fractures. The average age given in western literature is given in table.

**Sex incidence**: Females (56.6%) showed slight preponderance than men in distribution. Higher incidence in males has been reported by D' Acry and Devas<sup>9</sup> (91.4%); Mukherjee &Puri<sup>6</sup> (58.3%); Bavadekar&Manelkar<sup>8</sup> (60.9%)

**Side of fracture:** The left side (56.7%) was more commonly fractured in our study. Few studies have reported similar results. D'Acry and Devas<sup>9</sup> (1976) similarly found 55.4% fracture in left hip of their patients.

**Mode of Injury:** Most of the patients had trivial fall and a few cases of fracture were due to severe trauma like road traffic accident. This is in accordance with majority of studies reported Gyepes<sup>10</sup>, Evartis<sup>11</sup>, Ingalhalikar<sup>12</sup>, Col.Seth<sup>13</sup> believed that intracapsular fractures were stress fractures through pathological bone or secondary to osteoporosis.

Associated medical problems: In our study, 10 patients were having co morbid medical conditions. The common co

morbid conditions observed in our study were hypertension and diabetes mellitus. 2 (6.67%) patients had more than one comorbid condition i.e. hypertension and diabetes mellitus. 3(10%) patients were having diabetes mellitus, 1(3.33%) patient had hypertension, 1(3.33%) had CAD, 1(3.33%) patient had jaundice, 1(3.33%) had psoriasis and 1(3.33%) had hypothyroidism. Our study had relatively less co morbid medical conditions as compared to other studies of Hinchey and Day<sup>14</sup> HTN:26.5%,DM:13.26%, Saraf & Saxena<sup>5</sup> DM:10.8% and D'Acry and Devas<sup>9</sup> HTN:5.5%,DM:4.4%.

**Hospital stay:** In our study, the time period of hospitalisation ranged between 12 – 20 days with mean period of 14.76 days. About 63.3% of our patients were discharged from the hospital in 14 days and 36.7% were sent home within three weeks The delay was due to management and optimization of co morbid medical conditions.

**Complications:** In our series 2 patients (6.67%) had superficial wound infection and 3(10%) patients had bed sores. These patients were diabetic and hypertensive. They developed local signs of infection within first week of surgery. They were treated with intravenous antibiotics and regular dressings. There were no cases of deep infection in our series. All these patients had prolonged hospital stay as they were administered intravenous antibiotic till they got discharged.

**Total functional results:** The main criteria for the functional result of the patient was the return to the pre fracture state. Patient should have good range of flexion, extension, abduction, adduction, internal and external rotation at the hip and full flexion at the knee to perform daily need activities. Harris hip scoring<sup>26</sup> was applied for the evaluation of functional results at 6 weeks, 3 months and 6 months in patients treated with cemented bipolar hemiarthroplasty for fracture neck of femur in elderly.

In our study, satisfactory results i.e. good and excellent results were 80% which were comparable to other studies of Hinchey and Davis<sup>14</sup>:72.8%; Lanceford<sup>15</sup>:81%; Anderson and Hamsa<sup>16</sup>:80.3%; Salvetti et al<sup>17</sup>:57%; Saraf& Saxena<sup>5</sup>:90.9%; Mukherjee and Puri<sup>6</sup>:78%. We observed poor results (6.67%) in patients who had comorbid conditions like hypertension , diabetes mellitus following cemented bipolar arthroplasty. Saraf and Saxena<sup>5</sup>, Bavadekar and Manelkar<sup>8</sup> attributed the poor results due to associated comorbid conditions.

Favourable results of bipolar might be contributed to the fact the bipolar prosthesis provides early mobilization, good pain relief and good functional status in majority of patients with minimal complications .This coincides with Cornell et al who reported that patients with bipolar prosthesis did better on walk tests and had better range of motion at 6 months.<sup>18</sup>

### CONCLUSION

Finally, we conclude that fracture neck of femur is commonly seen in elderly age group commonly in females associated with trivial fall accompanied by osteoporosis. Due to elderly age group, the patients have comorbid conditions, so early mobilization is required. As the fracture neck of femur in elderly are associated with non union and avascular necrosis so bipolar hemiarthroplasty is a good procedure to achieve early mobilization and to prevent complications like bed sore. Thus, Cemented Bipolar hemiarthroplasty is found to be safe and gives good functional results.

In the present study, thirty patients with fracture neck of femur were surgically treated with cemented bipolar hemiarthroplasty.

The clinical data was assessed, analysed, evaluated and the following conclusions were made:

 All the patients had Fracture neck of femur following trivial trauma or road traffic accidents. Progressive osteoporosis is believed to be the primary factor for increased incidence of femoral neck fractures in elderly.

- In our study Cemented Bipolar hemiarthroplasty was found to be safe and gave satisfactory results in 80%.
- Bipolar arthroplasty provided early mobilization, good pain relief and good functional status was restored in majority of patients with minimal complications in elderly.
- Thus, we conclude that cemented bipolar hemiarthroplasty is the good treatment for fracture neck femur in elderly.
- Associated co morbid conditions like diabetes and hypertension contributed for poor results in few cases.

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