

CLINICAL STUDY AND MANAGEMENT OF INTRACAPSULAR FRACTURE NECK OF FEMUR BY HEMIARTHROPLASTY, A COMPARATIVE STUDY BETWEEN AUSTINMOORE & BIPOLAR PROSTHESIS

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ABSTRACT: AIMS AND OBJECTIVES: To study the age and sex incidence, morbidity and mortality and the associated complications of fracture neck of femur treated by hemiarthroplasty. To evaluate the efficiency and functional outcome between Austinmoore and Bipolar hip prosthesis in intracapsular fracture neck of femur. **RESULTS:** In the present study 50 cases of fracture neck of femur treated by hemiarthroplasty using either unipolar (AMP) or bipolar endoprosthesis in the Department of Orthopaedics, Kurnool medical college, Kurnool were included. The average age of patients in our series was ranging from 57 years to 78 years, female patients are 29 (58%) and male patients are 21(42%), left side predominantly involved, trivial fall accounts for majority of fractures. Subcapital fractures (74%) were commonest. In all cases Moore's posterior approach was used. Majority (86%) of the patients had good range of movements. The functional outcome is assessed by using Harris hip score.88% of the hips were classified as having a satisfactory to excellent result and 12% of the patients had a poor result. In our series bipolar prosthesis has slight advantage over Austin moore in case of functional results. **CONCLUSION:** Hemiarthroplasty by using either unipolar or bipolar prosthesis is a good option in elderly patients with displaced fracture neck of femur. The operative procedure is simple, mortality and morbidity associated with it is less. The complications are less disabling, weight bearing is early, early functional results are satisfactory and second operation is less frequently required.

KEYWORDS: Hemiarthroplasty, Austin moore prosthesis, bipolar prosthesis, fracture neck of femur.

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.¹ Fracture neck of femur has been recognized since the time of Hippocrates and is a common orthopaedic problem in elderly. Various methods of treatment have been employed since ages. The prolonged immobilization in elderly will jeopardize the life span of patient and further complicates the problem. This forces one to totally abandon the complete immobilization to achieve a bony union, or to resort early ambulatory procedures by surgery.

The blood supply to the neck and head of the femur is extensive, intricate and complicated.² Healing process mainly depends on the good blood supply. One has to decide

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whether the prolonged immobilization has to be employed to achieve the bony union or quick ambulation by hemi replacement arthroplasty, to achieve fair degree of function. It is a known fact that the hip is a weight bearing joint and has to perform many functions. Earlier hemireplacement arthroplasty by using vitallium or stainless steel was popularly practiced by Austin Moore's produced fairly good results. But it had its limitations in loosening and reactions at acetabulum etc. Many of the shortcomings of this procedure were overcome by a new type of prosthesis, which had the great advantage of second joint, below the acetabulum. It was named as bipolar prosthesis, since it had an outer head of metal which articulates with the acetabulum and a second inner small metallic head which articulates with the high density polyethylene (HDPE), lining the inner surface of the outer head. This prosthesis is very useful and results are encouraging.³ Though a wide variety of endoprosthesis has been used previously, the most commonly used endoprosthesis are the Bipolar & Austinmoore prosthesis. It ensures early mobility and prevents the complications of recumbency.

This clinical study presents the short term results of prospective randomized trial of hemiarthroplasty for the treatment of displaced femoral neck fractures. Outcomes at 6 weeks, 3 months and 6 months were analysed by modified Harris hip scoring system and by radiographs taken during follow up.

MATERIALS AND METHODS: The present prospective study includes 50 cases of intracapsular fracture neck of femur in elderly patients above the age of 55 years irrespective of sex treated by hemiarthroplasty using unipolar (Austin Moore's) or bipolar(non-modular) endoprosthesis, in the Department of Orthopaedics at Kurnool general Hospital, kurnool between August 2007 to October 2009.

The exclusion criteria included: 1) Patients with dementia 2) Patients who were non ambulatory 3) Patients with pathologic femoral neck fracture and 4) Patients with additional acute lower extremity fractures in addition to the femoral neck fracture.

Fifty cases treated by hemiarthroplasty were followed up for 6 months. After surgery all the cases were followed up. The functional results after hemiarthroplasty are therefore analysed for fifty patients.

In all patients preoperatively skin traction with appropriate weight was applied. Antero posterior radiographs of the affected hip joint of pelvis with both hips were taken for all the patients, keeping the fractured limb in 15° internal rotation. Routine blood investigations, blood grouping and typing, urine routine, RBS, serum urea, creatinine, HbsAg, HIV, chest x-ray, ECG, were done in all cases..

Intravenous antibiotics and tetanus immunization were given an hour before the surgery.

RESULTS: The following observations were made from the data collected during the study of treatment of intracapsular fracture neck of femur in elderly above the age of 55 years by hemiarthroplasty using either unipolar (AMP) or bipolar endoprosthesis in the Department of Orthopaedics, Kurnool medical college, Kurnool. Where 50 consecutive patients of Intracapsular fracture neck of femur in elderly patients were studied.

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In the present study the average age of patients in our series was ranging from 57 years to 78 years. Female patients are 29 (58%) and male patients are 21(%). Female predominance is due to early development of severe osteoporosis and less activity than males in the older age.

In the present study left side is more commonly involved in our study with 54 patients (60%) than right side 36 patients (40%). Trivial fall was the commonest mode of injury for intracapsular fracture neck of the femur, while walking inside and outside the house which includes 35 patients. Majority of patients in this study sustained fracture due to trivial trauma. According to many authors it is observed that trivial trauma appears to be the commonest causative factor for intracapsular fracture neck of femur. One of the reasons is probably due to post-menopausal osteoporosis in the elderly female.

Majority (74%) of fractures were subcapital type on radiographic examination There were 37 patients with subcapital type of fracture and 13 patients with transcervical type of fracture. Seven patients had other associated injuries in our series.

Twenty patients in our series had various medical problems. Hypertension, anaemia and diabetes mellitus were the most common problems. They were seen by physician in the early period of hospitalization and were given necessary treatment. The patients were taken for surgery only after they became fit for the surgical procedure.

Eighty percent of our patients were discharged within 2 weeks of the surgery. Ninety four percent were discharged within 3 weeks Remaining patients had long stay due to preoperative and postoperative complications. The various complications observed in our series are as follow one patient had bed sore and prosthetic dislocation. One patients had developed bedsore in the second week after hemiarthroplasty.

The patients were followed up at 6 weeks, 3 months and 6 months. Few patients were followed up to 1 year, but there were no significant changes in the results. Functional results of hemiarthroplasty were assessed by using modified Harris hip scoring system. In our series following observations were made regarding the range of movements of the hip. Majority (86%) of the patients had good range of movements.

The functional outcome after hemiarthroplasty for intracapsular fracture neck of femur was graded as excellent, good and fair after adding the scores given for each criteria, for assessment of hip. In our series total Harris hip score at the end of six months ranged from 24 to 100. Seventeen (34%) hemiarthroplasties had hip scores from 91 to 100 (excellent). Seventeen (34%) had hip scores 81 to 90 (good). Ten hips (20%) were rated 71 to 80 (satisfactory) and six (12%) were rated 24 to 69 (poor). Thus 88% of the hips were classified as having a satisfactory to excellent result and 12% of the patients had a poor result. Between bipolar and austinmoore prosthesis, eight (16%) patients with amp had harris hip score 91-100(excellent). Nine (18%) patients with bipolar had harris hip score 91-100(excellent).

DISCUSSION: Management of fracture of femoral neck still remains major and difficult undertaking for an orthopaedic surgeon. The pendulum 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

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prosthetic replacement in older patients who are active and need early mobilization should be considered.

The average age of our patients was 67.5. Majority of the patients were between 60-70 years. Saxena & Saraf(1978) had age distribution 45-90 years (Mean 66 years).⁴

In our series the intracapsular fracture of femoral neck were found to be more common in females. The elderly females are more prone to fracture neck of femur due to osteoporosis (Choudhari & Mohite 1987).⁵ Female preponderance has been reported in several series. In our series 52% of the patients were females.

The left sided hip was fractured in 31 patients (62%) of our series. This has been a subject of limited studies. Boyd and Salvatore (1964) reported 55% fractures on left side.⁶ D'Acry and Devas (1976) similarly found 55.4% fracture in left hip of their patients.

In our series 74% patients had subcapital fracture and 26% had transcervical type of fracture. Klenerman and Marcuson (1970) defined subcapital fracture as the one that occurs immediately beneath the articular surface of the femoral head along the old epiphyseal plate and a transcervical fracture was referred to the fracture passing across the femoral neck between the femoral head and greater trochanter. Klenerman and Marcuson (1970) and Garden (1974) suggested that this differentiation cannot be made distinctly in radiographs. Klenerman and Marcuson couldnot find transcervical fractures in their series and all were subcapital type on operation.⁷ Our operative findings are similar to that of Klenerman and Marcuson.

All the fractures in our series belonged to displaced fractures of Garden Type III and IV. Depending on the anteroposterior radiographs available, we could group 32 patients (64%) into type III and 18 patients (36%) into Garden type IV. G.S. Kulkarni (1987) had grouped type III and type IV into one group of 'displaced fractures' and reported it in 82.5% of his patients.⁸ Sanchetti et al. (1987) reported 30% Garden type III and 22.5% Garden type IV in a series distributed between 20 to 80 years of age. Mukherjee & Puri (1986) had 85% patients of Garden type III and IV fractures.⁹ The type (subcapital or transcervical) or the displacement (Gardens III & IV) are not taken as the criteria to choose the procedure for the management of fracture neck of the femur.

Eighty five percent of our patients had trivial trauma and rest of the cases of fracture were due to severe trauma like fall from height or vehicular accidents.

In our series 2 patients (4%) had superficial wound infection. Both the patients were nondiabetic and non-hypertensive. Gingras et al (1980) stated that infection was the devastating complication of hemiarthroplasty.

In our series there was one case of posterior dislocation of the AMP prosthesis which was found on the third post-operative day. The dislocation was successfully reduced under general anaesthesia on the same day.

Whittaker et al. found that patients who were treated with hemiarthroplasty had an almost three times greater risk of dislocation and infection. The risk of dislocations is high in patients who have Parkinson's disease treated with hemiarthroplasty. Coughlin and Templeton found 37% of Parkinsonism patients treated with hemiarthroplasty had prosthetic dislocation and all died subsequently.

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Salvatti et al. (1974) believed that excessive postoperative flexion or rotation with hip adducted is the main cause for dislocation of the prosthesis and they also observed that dislocation was commonly caused while shifting the patients from the operation theatre to the ward.

We had one posterior dislocation in our series following hemiarthroplasty. In our series no patient has periprosthetic fracture. Anderson and colleagues (1964), and Hinchey and Day (1964) emphasize that all fractures occur when the surgeon attempts to reduce the prosthesis

We observed that 27 patients (54%) in our series had no pain. Out of 14 patients (28%) who had slight pain, five patients had mild pain. Three patients with marked pain had no post-operative complication.

The choice between unipolar and bipolar prostheses is less clear. The main theoretical advantage of a bipolar over a unipolar prosthesis is the reduction of acetabular erosion due to movement taking place within the implant rather than between the head of the prosthesis and the acetabulum, although there is variation in the comparative distribution of the movement (Brueton et al 1993). Movement within the prosthesis may also reduce the pain caused by the prosthesis moving against the acetabulum. Retrospective studies, however, may suggest better results with the bipolar prosthesis because the patients may have been selected for this procedure by virtue of their younger age. A bipolar prosthesis costs four times more than a unipolar prosthesis; this difference is significant, given the high incidence of these fractures.

Cornell et al. performed a prospective six month follow-up of thirty-three bipolar and fifteen unipolar hemiarthroplasties and found no differences in post-operative complication rates, length of hospitalizations, or hip rating outcomes between the two groups of patients.^{10A} Hudson et al., in an eight-year retrospective review of ninety unipolar and forty-eight bipolar hemiarthroplasties, showed no statistically significant differences in the rates of mortality, surgical complications, or other events including medical complications. However, Kenzora et al., in a prospective outcome study at twenty-four months of follow-up of 195 bipolar and seventy-five unipolar hemiarthroplasties, showed that patients who underwent bipolar hemiarthroplasty had better pain relief and function. In our series bipolar prosthesis has slight advantage over Austin Moore in case of functional results. Bipolar has 46% -excellent to fair (harris hip score) whereas Amp has 42% excellent to fair (harris hip score). Bipolar has 4% poor (harris hip score) whereas Amp has 8% poor (harris hip score).

CONCLUSION: Fifty cases of fracture neck of femur who were treated by hemiarthroplasty using either unipolar (Austin Moore) or bipolar (non modular) prosthesis have been presented. The follow up results are analyzed and discussed.

Most of the patients were in the age group of 60 to 70 years with mean average age of 67.5 years. Eighty five percent of the fractures were due to trivial trauma. We used Moore's posterior approach for all the patients and appropriate sized prosthesis were selected depending on the size of the femoral head. Patients were ambulated early. Most of the patients were discharged within two weeks of surgery. There were 34% excellent results and 34% good results, 20% satisfactory, these results are comparable to other series. All of the patients who had received bipolar prosthesis showed satisfactory results. Bipolar has 46% -excellent to fair score

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whereas AMP has 42% excellent to fair score. Bipolar has 4% poor score whereas AMP has 8% poor score.

In conclusion, hemiarthroplasty of hip for femoral neck fractures is a good option in elderly patients. The mortality and morbidity are not high, operative procedure is simple, complications are less disabling, weight bearing is early, early functional results are satisfactory and second operation is less frequently required. In our series bipolar prosthesis has slight advantage over Austin Moore in case of functional results.

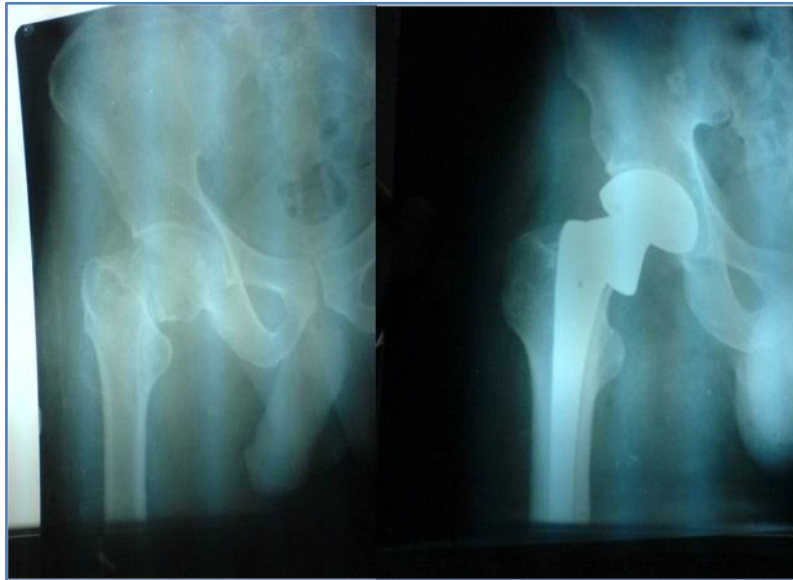


Fig. 1: Pre-operative and postoperative radiographs of case 1 operated with bipolar prosthesis

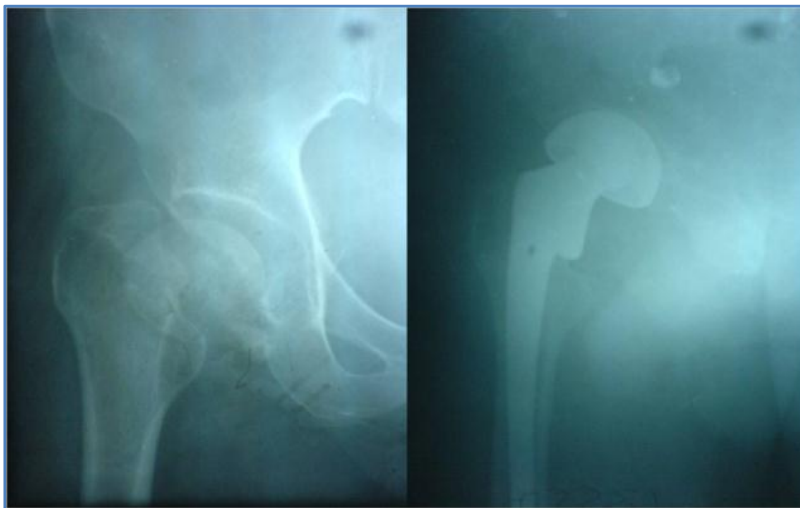


Fig. 2: Pre-operative and postoperative radiographs of case 2 operated with bipolar prosthesis

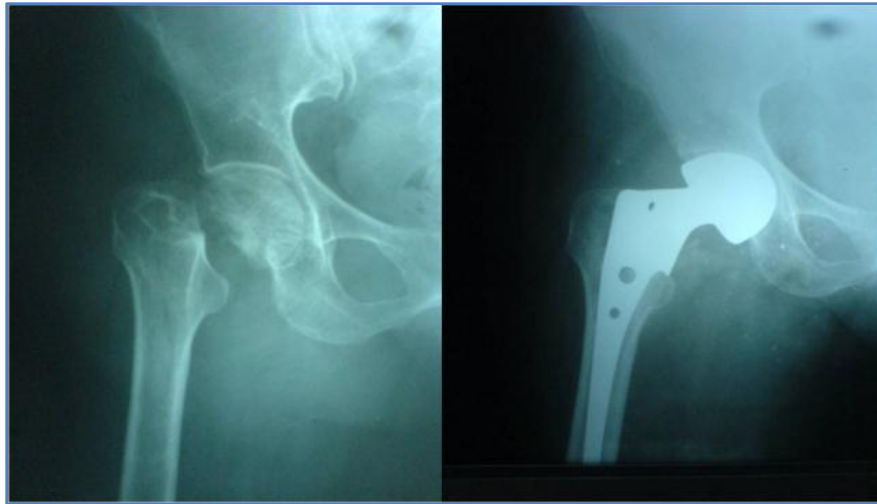


Fig. 3: Pre-operative and postoperative radiographs of case 3 operated with Austin moore prosthesis

REFERENCES:

1. Mark F. Smiontkoski et Al. Current concepts review of intracapsular fracture of hip. JBJS 1994; 76A: 129 -135.
2. Elizabeth O Johnson et Al. Vascular anatomy and microcirculation of skeletal zones vulnerable to osteonecrosis. Clinical Orthop 2004; 35: 285-291.
3. Bateman J. E: Single assembly total hip arthroplasty, preliminary report. Orthop Digest 1974; 15: 35-43.
4. Saxena P.S. and Saraf J.K. Moore Prosthesis in fracture neck of femur. Indian Journal of Orthopaedics 1978; 12: 138-145.
5. Choudhary and Mohite. Pathology of fracture neck of femur. Clinical Orthopaedics India 1987; 1: 45-48.
6. Boyd H.B. and Salvatore J.E. Acute fractures of the femoral neck: Internal fixation or Prosthesis? JBJS 1964; 46A: 1066-1068.
7. Klenerman L. and Marcuson R.W. Intracapsular fractures of the neck of the femur. JBJS 1970; 52B: 514-517.
8. Kulkarni G.S. Pathology of fracture neck of the femur. Clinical Orthopaedics of India 1987; 1; 92-96.
9. Mukherjee D.L.(Col), Maj. Gen. H.C. Puri. Early hemiarthroplasty for fresh fractures of the neck of the femur in geriatric patients. Indian Journal of Surgery 1986; 48: 77-80.
10. Cornell CN, Levine D, O'Doherty J, Lyden J: Unipolar versus bipolar hemiarthroplasty for treatment of femoral neck fractures in the elderly. Clin Orthop 348: 67-71, 1998.

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