



Prospective study in surgical management of fracture neck of femur with hemiarthroplasty using modular bipolar prosthesis

Pradeep Kumar Natikar¹, Abrar Mohammed², Ambreen Fathima³, Amaan Mahajabeen⁴

¹ Assistant Professor, Department of Orthopaedics, Khajabandanawaz Institute of Medical Sciences and Research Centre, Karnataka, India

^{2, 3, 4} Junior Resident, Department of Orthopaedics, Khajabandanawaz Institute of Medical Sciences and Research Centre, Karnataka, India

Abstract

Background: The number of femoral neck fractures increases with advancing age. Surgery is the mainstay of treatment for displaced fractures of neck of femur, hemiarthroplasty being a common operative procedure in elderly patients. The main objective of treatment in the elderly active individual is early restoration of pre-morbid walking state.

Materials and Methods: A prospective study with 30 cases were selected according to inclusion and exclusion criteria and treated by modular bipolar prosthesis.

Results: In our series of 30 cases there were 13 males and 17 females, with a maximum age of 85 yrs, minimum age of 62 years and an average age of 73 years. 10% of patients had Garden type II fracture 30% of them had a Garden type III fracture radiologically, while 60% had a Garden type IV. Patients were discharged at two weeks after suture removal. At the final one year follow up assessment with Harris Hip Score 11 patients (36.6%) achieved 'Excellent' result, 14 patients (46.6%) achieved 'Good' result, 3 patients (10%) achieved 'fair' result and 2 patients (6.6%) achieved 'poor' result. Overall, 83% of the patients achieved an excellent or good result.

Conclusion: Femoral neck fractures treated by modular bipolar prosthesis ensues better range of movement, freedom from pain and early recovery to unassisted activity with an acceptable complication rate. Variable sized stem, shells gives advantage of exact matching of head.

Keywords: trauma, bipolar, hemiarthroplasty, neck of femur fracture, hip fracture, elderly

Introduction

Femoral neck fractures have most common incidence in elderly poses a great challenge to orthopaedic surgeons. The prevalence of these fractures is proportionate to improvement in life expectancy, increased incidence of osteoporosis, neuro-muscular incoordination, poor vision and sedentary lifestyle habits. The incidence of these fractures is expected to double in the next twenty years and triple by the year 2050 [1]. The prevalence of the fracture also doubles for each decade of life after the fifth decade [2]. In spite of remarkable improvements in surgical treatment modalities, it's a topic of debate the treatment of fracture neck of femur, especially in the elderly individuals. Modular bipolar gives unique advantage of reduced wear of acetabular surface and hence reduced occurrence of pain and acetabular protrusion because movement occurs within the two components of the implant and also exterior of the implant and joint [3]. The modular nature of the prosthesis gives advantage of adjusting the length of the neck and variable stem sizes. It is easier to convert to total hip replacement as only the acetabular component needs to be added. Bipolar prosthesis is now preferred over conventional unipolar prosthesis because of its better benefits and pricing [4, 5]. Bipolar hemiarthroplasty seem to be a go-to option for the fracture neck of femur in elderly as it gives satisfactory results, reduced post-operative pain, good range of movements, early return to unassisted activity and reduced acetabular erosion [5, 6].

Objective of the study is to assess the functional outcome of intracapsular fracture of femoral neck with modular bipolar prosthesis and to study the end results of modular bipolar prosthesis with respect to pain, mobility and stability and also the complications of modular bipolar hemiarthroplasty.

Materials and Methods

A prospective, single blinded, randomized control trial in the Department of Orthopaedics in Khaja Bandanawaz Teaching and General Hospital in Kalaburagi, Karnataka, India from September 2017-June 2019 was conducted after obtaining approval from College Ethics Committee. Written informed consent was undertaken before enrolling to the study.

Inclusion Criteria

- Intracapsular Femur Neck fractures
- Age of the patient >60 years
- Failed internal fixation
- Avascular necrosis of femoral head secondary to Femur Neck fracture
- Non union Femur Neck fracture

Exclusion Criteria

- Patient medically not fit for surgery
- Patient not willing for surgery
- Patient below age of 60 yrs
- Pathological hip fractures

- Patients with acetabular fractures
- Patients with hip arthritis

Results

Data was collected based on detailed patient evaluation with respect to history, clinical examination and radiological examination. The postoperative evaluation was done both clinically and radiologically. Out of the 30 cases, all patients were available for follow up till one year.

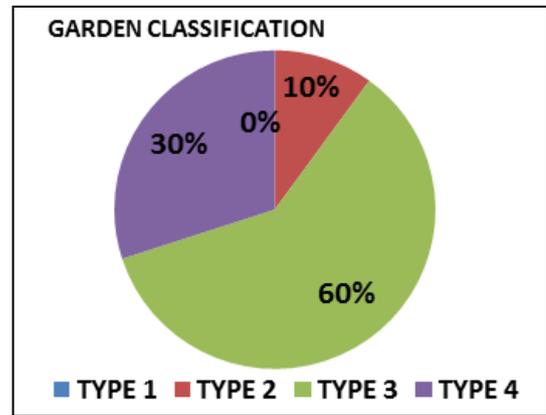


Fig 2: Type of fracture

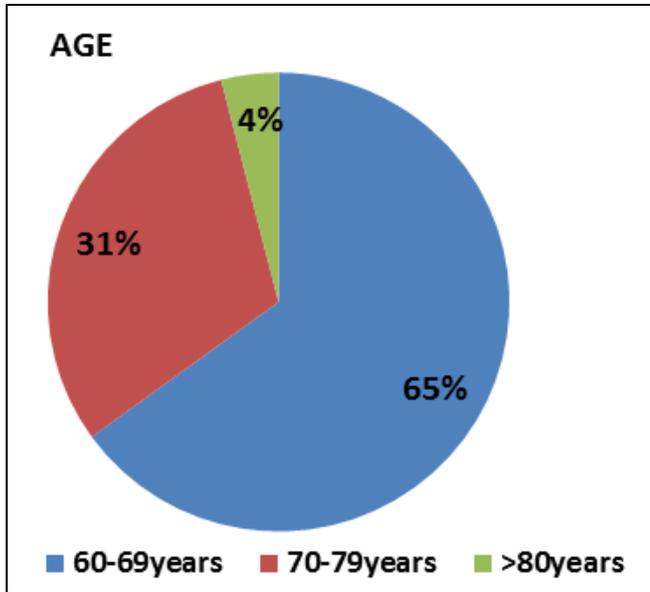


Fig 1: Age Distribution

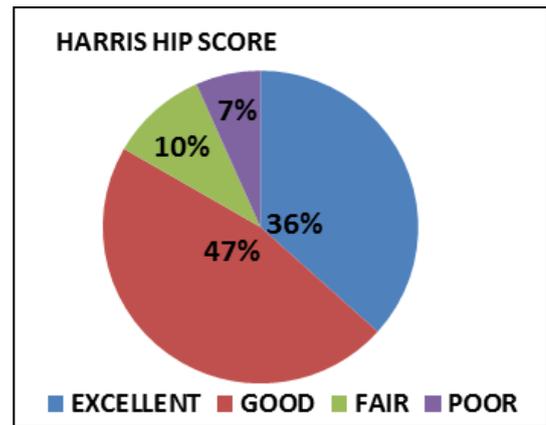
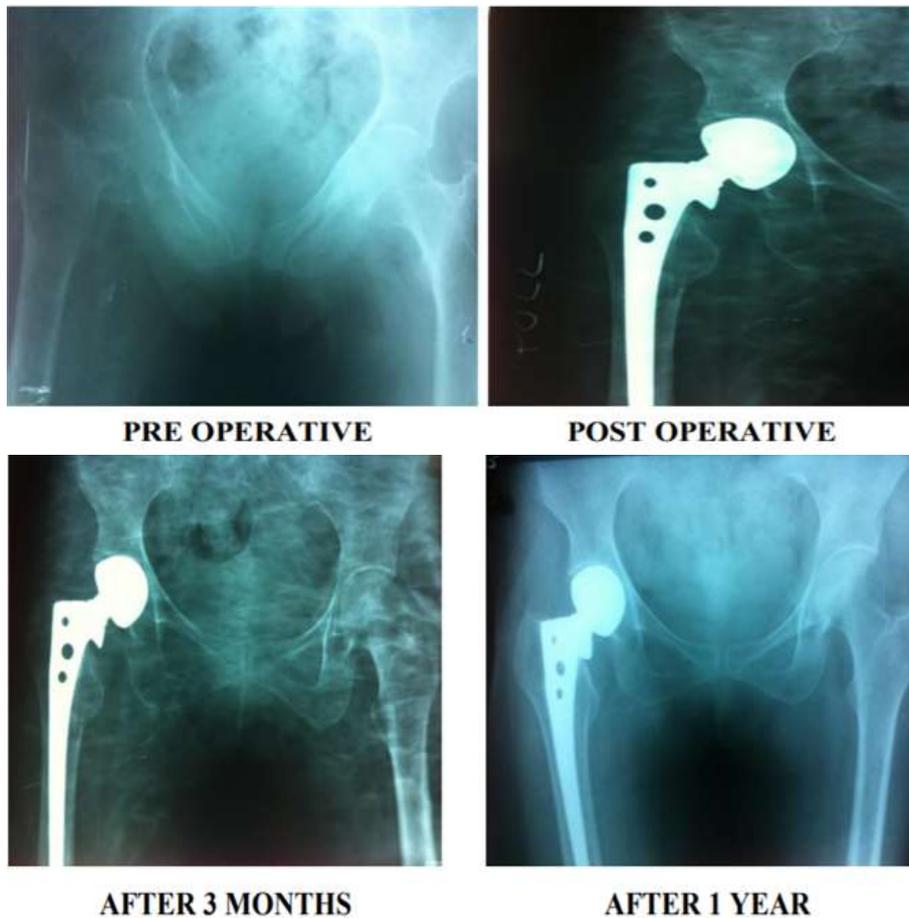


Fig 3: Harris Hip Score (at one year follow-up)





Case 1



Case 2

Discussion

During our study period, 30 patients were treated by modular bipolar hemiarthroplasty, for fracture neck of

femur. The patients data was collected after thorough clinical examination and required Xrays were taken. Patients were called for follow up upto 1year. Our study

consisted of 13 males and 17 females, with a maximum age of 85 yrs, minimum age of 62yrs and an average age of 73 years. 25 patients (83.3%) had injury due to trivial trauma like slipping and fall. Five patients (16.6%) sustained the fracture secondary to road traffic accident. 60.6% of the patients were brought to the hospital 7 – 14 days of the injury and another 15.2% presented for treatment after 14 days. 10% of patients had Garden type II fracture 30% of them had a Garden type III fracture radiologically, while 60% had a Garden type IV. All the systemic co-morbidities were evaluated which showed- 15% had heart disease, 10% had diabetes, 10% had hypertension, 10% had heart disease as well as diabetes mellitus, 5% of the patients had heart disease and hypertension and 5% had both hypertension and diabetes mellitus.

All the study patients were taken up for the surgical procedures within 4 days of admission. Patients underwent pre anaesthetic evaluation and were operated under spinal anaesthesia/epidural anaesthesia as per anaesthetists' discretion. Moore's approach was used for all the patients. Size of the bipolar prosthesis which was used varied from 41 mm to 47 mm. 43mm prosthesis was used in 10 patients. Cement was used in 26 cases and uncemented in 4 cases. Cementing was done in the canal after washing by normal saline. The prosthesis was hammered and inserted maintaining the anteversion carefully. Early mobilization was started in most of patients on day 1 post-operative period with weight bearing as tolerated using walker. In five patients (15.2%) wound dehiscence was seen who were also diabetic. It was overcome by appropriate use of intravenous antibiotics and adequate sugar control. Low molecular weight heparin was administered on 1st and 5th post-operative day. The duration of hospital stay ranged from 15 to 25 days with the average being 20 days, for optimizing co morbid conditions. Parker *et al* [8] found that hospital stay was mean 4 days shorter in those treated with a cemented prosthesis. Every patient was followed up at 6weeks, 3months, 6months and one year. The patient were evaluated by Harris hip score at each follow-up visit at 6weeks, 3months, 6months and one year. One patient had dislocation in post-operative period which was reduced in OT and found satisfied post reduction. Pain following hemiarthroplasty is a major concern. Hinchey and Day in their series of 294 patients found pain following hemiarthroplasty in 22 patients in the early post-operative period [9]. Lanceford predicted the causes of pain could be due to infection, improper prosthetic seating, metallic corrosion and tissue reaction, improper sized femoral head, contractures and periarticular ossification [10]. 13 patients complained of pain on final follow up in our study. These patients were counseled, advised exercises and reassured about the condition, and prescribed medication in case the pain was intolerable. In our study, we evaluated using Harris hip score at one year follow-up which averaged 81.96 with the maximum score being 100 and the minimum score being 75. Overall, 11 patients (36.6%) achieved 'Excellent' result, 14 patients (46.6%) achieved 'Good' result, 3 patients (10%) achieved 'fair' result and 2 patients (6.6%) achieved 'poor' result. On a whole, 83% of the patients showed excellent or good result.

Conclusion

Fracture neck of femur treated by modular bipolar hemiarthroplasty gives good range of moments, freedom

from pain and early mobilisation. The end result however depends on the associated co-morbidities and post-operative rehabilitation. However, with respect to the present study we have observed that the modular bipolar hemiarthroplasty is significantly better than the conventional Austin Moore's prosthesis. The advantage being the variable size of the stem and neck through which modularity is obtained and also easier conversion to total hip arthroplasty without replacing the femoral stem. Since it was a short study duration, no patients were subjected to total hip replacement. It needs further study with larger population to assess the long term results of modular bipolar hemiarthroplasty.

References

- Schmidt AH, Swiontkowski MF. Femoral neck fractures. *Orthop Clin North Am.* 2002; 33(1):97-111.
- Leighton RK: Fractures of the Neck of the Femur. In: Rockwood and Green's fracture in Adults. Ed: Bucholz RW, Heckman JD, Court-Brown CM. 6th edn. Philadelphia, Lippincott Williams & Wilkins, 2006, 1753-1791.
- Hanu Tej Adapureddi, Kamareddy SB, Anand Kumar, Sri Krishna Paturi, Sandeep Anne, Jaya Prakash Reddy. Prospective Study of Management of Femur Neck Fracture by Hemiarthroplasty with Cemented Bipolar. *Journal of Evolution of Medical and Dental Sciences.* 2015; 4(98):16309-16314.
- Zofka P. Bipolar hip hemiarthroplasty. *Acta Chir Orthop Traumatol Cech.* 2007; 74(2):99-104.
- Malhotra R, Arya R, Bhan S. Bipolar hemiarthroplasty in femoral neck fractures. *Archives of Orthopaedic and Trauma Surgery.* 1995; 114(2):79-82.
- Sud A, Sood LK. Bipolar hip replacement for displaced fracture neck of femur in elderly patients. *Indian Journal of Orthopaedics.* 1998; 32:270-271.
- Anil Rai K, Rakesh Agarwal, Saurabh Singh, Ratnav Ratan. The BHU bicentric bipolar prosthesis in fracture neck femur in active elderly. *Journal of Trauma Management & Outcomes.* 2008; 2:7.
- Han SK, Kim YS, Kang SH. Treatment of Femur Neck Fracture with bipolar hemiarthroplasty using a modified minimally invasive posterior approach in patients with neurological disorders. *Orthopaedics.* 2012; 35(5):e635-40.
- Hinchey, Day. Primary prosthetic replacement in fresh femoral neck Fractures. *JBJS.* 1960; 42B:633-640.
- Lance Ford EM. Use of Moore self-locking Vitallium prosthesis in acute fractures of the femoral neck. *JBJS.* 1965; 47A:832-841.