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Functional Outcome of Hemiarthroplasty Fracture with Austin Moore and Bipolar Prosthesis

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ABSTRACT

Objective: To determine the functional outcome of Austin Moore Prosthesis (AMP) Versus Bipolar hemiarthroplasty prosthesis in fracture neck of femur. **Methods:** This Prospective randomized controlled trial was conducted at the Department of Orthopaedics, in SLIMS Pondicherry from 2016 to 2019. The patients included 60 years or older, having displaced intra capsular neck of femur fractures. Patients with comorbid, arthritis and pathological fractures were excluded. Patients were randomly divided equally into 2 groups, each group operated upon using standard techniques for Austin Moore and Bipolar hemiarthroplasties, respectively. Functional outcome was measured as very good, good, fair, and poor using Harris Hip Score in follow-up visit at the monthly interval and 6th months. **Results:** The total numbers of patients were 30(15 in each group). The final functional outcome showed that, in Bipolar prosthesis, 14(97.3%) patients had satisfactory status while 1 (2.7%) patients had unsatisfactory status in Austin Moore group 11. Patients had satisfactory status while 4 had unsatisfactory status. **Conclusion:** Bipolar prosthesis had better functional outcomes than Austin Moore hemiarthroplasty. We suggest this as the first choice of treatment in elderly patients with fractured neck of femur.

Keywords: Austin Moore Prosthesis, Bipolar Prosthesis, Harris Hip Score, hemiarthroplasty.

Introduction

Femoral neck fractures remain clinical problem for orthopedic surgeons (Alik et al., 2009) Intracapsular fracture of the proximal femur account for a major share of fractures in the elderly. The primary goal of treatment is to return the patient to his or her pre-fracture functional status (Nizami et al., 2009). For displaced fractures of the femoral neck, reduction, compression, and rigid internal fixation are required if union is to be predictable. Because nonunion and osteonecrosis develop frequently after internal fixation of displaced femoral neck fractures, many surgeons recommend primary prosthetic replacement as an alternative in elderly ambulatory patients (Gierer, Mittlmeier, 2015). The decision to perform hemiarthroplasty using a unipolar or bipolar prosthesis remains controversial, with proponents on either side. Advantages of the unipolar prosthesis include lower cost and no risk of polyethylene wear debris. Proposed advantages of the bipolar prosthesis include less acetabula wear and potentially less hip/groin pain (Parker, 2000). So in view of these varied opinions we desire to compare the efficiency of these two prosthesis austinmoore and bipolar prosthesis for the management of fractures of neck of femur in elderly people.

Materials and Methods

Our study included patients of either gender, 60 years and above with fractured neck of femur which was displaced and classified according to the Garden classification¹¹ as Garden Type III and Garden Type IV. The fracture should be sustained within a week of presentation to the hospital. All others with co-morbid, arthritis and pathological fractures were excluded. All the participants were allotted either group A (AMP) or group B(Bipolar) randomly. Counseling regarding the merits and demerits of each prosthesis were explained to all the participants. All the surgeries were performed by experienced orthopaedic surgeon. The same standard protocol of surgery was adopted for all the patients.¹²Postero lateral Moore's approach was used for both hemiarthroplasties. Bipolar prosthesis was fixed with bone cement, while Austin Moore prosthesis was press fit. Wounds were closed over suction drain. Active and passive exercises of the limb under the supervision of physiotherapist was started on the first post op day and patients were send home on fourth or fifth post op day.

They were advised to do assisted partial weight bearing with walker for 2 weeks. At 2 weeks suture were removed, and then patient was allowed weight bearing as tolerated with walker for one month. Patients were followed up for 3 months and then alternate month for 6 months

post operatively, with gradually increasing weight bearing till 3 months and independent walking onwards. On each post-operative visit Harris Hip Score¹³ was used for functional outcome. The Score interpretation was No disability (100 points). Very good function was labelled if Harris hip score was 91-100. Good functional outcome was labelled if Harris hip score was 81-90. Fair functional outcome was labelled if Harris hip score was 61-80. Poor functional outcome was labelled if Harris hip score was less than 60. Very good, good and fair results were considered as satisfactory while poor functional results were labelled as unsatisfactory. Comparison (Bipolar and Austin Moore) was performed between both groups for functional outcome. Effect modifier like age, gender and type of fracture was controlled by stratification to see impact on this outcome variable.

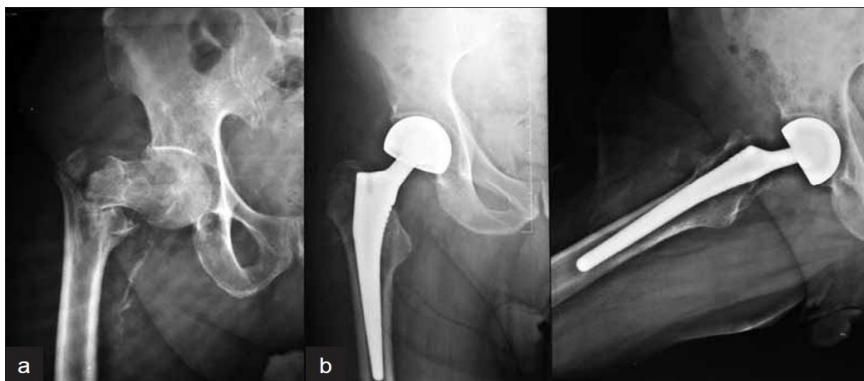


Figure 1: Pre op and post op x-ray of bipolar hemiarthroplasty x-ray

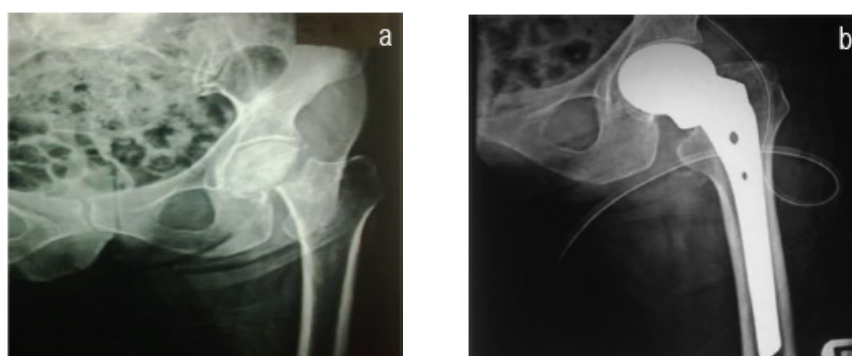


Figure 2: a. Pre and b. post op x-ray of Austin moore hemiarthroplasty

Result and Discussion

Thirty patients were enrolled. A total of 15 patients were assigned in each group i.e. Austin Moore group and Bipolar Prosthesis group (age range 61 to 75 years). The functional outcome in Bipolar Prosthesis 14 patients had satisfactory status while 1 patient had unsatisfactory status. In Austin Moore group 11 patients had satisfactory while 4 had unsatisfactory status? Functional outcome shows, in Bipolar Prosthesis 14 patients had satisfactory status while 1 patient had unsatisfactory status. In Austin Moore group 11 patients had satisfactory while 4 had unsatisfactory status? As per age groups functional outcomes shows, in between 61-65 years of age group, 7 patients have satisfactory outcome in Bipolar Prosthesis while only 5 patients have satisfactory outcome in Austin Moore. In between ages 66-70 years both Bipolar Prosthesis and Austin Moore have same frequency of functional outcome 6? On stratification of gender, 6 male have satisfactory outcome in Bipolar Prosthesis while 5 have satisfactory functional outcome in Austin Moore hemiarthroplasty. In female 7 have satisfactory outcome in Bipolar Prosthesis while, 5 have satisfactory functional outcome in Austin Moore hemiarthroplasty.

The femoral neck fractures in elderly when displaced (Grade II & IV) often need replacement. The bipolar hemiarthroplasty is preferred because of its better outcome compared to unipolar and less complication rates. The bipolar prosthesis with cement fixation is costlier than Austin Moore prosthesis, but it has better long term benefits to the patient, that outweighs the cost¹⁵. Movement in bipolar is over two surfaces i.e. metal and cartilage, and metal and polyethylene interface, contrary to Austin Moore where movement is between metal and cartilage i.e. implant bone interface, that causes more wear in cartilage. Additional use of bone cement with bipolar gives exact placement in femur, whereas Austin Moore prosthesis gets loosened in femur mostly resulting in pain and early loss of function and mobility, hence patients with bipolar have better rehabilitation. Our study comparing bipolar with unipolar Austin Moore prosthesis did support that, in terms of pain, function, mobility and deformity. We found better outcome with bipolar than unipolar prosthesis.

Similar were the observation made by Lestrage¹⁶. His opinion that bipolar is a two piece prosthesis and had more satisfactory functional outcome than single-piece AMP. Lin^{CC17} and colleagues also found better survival in bipolar hemiarthroplasty group as compared to

Austin Moore hemiarthroplasty. AbdelKhalek¹⁸, Sabnis¹⁹ and Jeffcote²⁰ observed Harris Hip Score to be 92 in bipolar and 84 in AMP group and had superior functional outcome. This is comparable with our study which also shows better Harris hip score, range of motion and less pain. Hedbeck²¹ preferred bipolar hemiarthroplasty over unipolar because of less acetabular erosion in long term and hence better functional outcome, similar to our study. We would recommend longer follow up studies to document any complications in either group.

Conclusion

Bipolar prosthesis had better functional outcome than Austin Moore hemiarthroplasty. We recommend this as a treatment of first choice in elderly patients with fracture neck of femur. It gives patients better post-operative outcome and quality of life compared to unipolar prosthesis.

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Conflict of interest: Nil

Study significance: This is comparable with our study which also shows better Harris hip score, range of motion and less pain. Hedbeck²¹ preferred bipolar hemiarthroplasty over unipolar because of less acetabular erosion in long term and hence better functional outcome, similar to our study. We would recommend longer follow up studies to document any complications in either group.

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