



COMPARISON OF RESULTS OF AUSTIN MOORE PROSTHESIS AND BIPOLAR PROSTHESIS IN FRACTURE INTRACAPSULAR NECK FEMUR IN ELDERLY PATIENTS

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ABSTRACT

Introduction: Hip fractures one of the commonest fractures of old age. The present study was planned to compare between short terms results of Austin Moore prosthesis and bipolar prosthesis in fracture intracapsular neck of femur in the elderly patients, at our institute.

Materials and methods: The present interventional study includes 80 cases of intracapsular fracture neck of femur in elderly patients above the age of 60 years treated by hemiarthroplasty using Austin Moore or bipolar endoprosthesis, in Department of Orthopedics in SVNGMC Yavatmal between August 2015 to December 2016. The study was carried out to compare the immediate and early results of Austin Moore prosthesis and bipolar prosthesis for intracapsular fracture of neck of femur in elderly patients. All the patients were evaluated using the Harris hip score.

Results: Harris hip score for patients with AMP was found to be 71.86 and that for patients with bipolar prosthesis was 85.06. Majority of patients from Austin Moore prosthesis group showed good results i.e. 10 (33.3%) followed by poor results in 8 (26.6%) patients. Bipolar prosthesis group had 12 (40%) patients with excellent results followed by good results in 9 (30%) of cases.

Conclusion : Hemireplacement arthroplasty compared with other fixation techniques, permits a more rapid recovery with immediate weight bearing and reduces the complications arising due to longer bed rest seen with internal fixation; thereby reducing the long term morbidity

KEYWORDS :

Introduction

Hip fractures one of the commonest fractures of old age. Hip fractures in elderly are caused by trivial trauma, because of the osteoporotic bones. Hip fractures are mainly of two type's i.e. intracapsular and extracapsular neck femur fractures. Of this, intracapsular neck femur fracture is a fracture of necessity; mainly due to the complicated blood supply and absence of periosteum.^{1,2} Hip is a weight bearing joint and has to perform many functions. So a successful treatment of hip fracture should provide a stable and painless hip joint with a near normal range of movements. Many treatment techniques have been tried in fracture neck of femur like closed reduction, autogenous bone peg graft, Smith Peterson nail, mould arthroplasty, fixation with multiple pins, sliding plate, hemiarthroplasty and total hip replacement.^{3,5}

Hemiarthroplasty is both unipolar (Austin Moore prosthesis and Thompson prosthesis), or bipolar (modular and non modular). Unipolar prosthesis is fixed neck prosthesis with movement occurring at the head-acetabular interface. In active elderly patients, this leads to acetabular wear, loosening of prosthesis and residual pain. This lead to the development of a new type of prosthesis, bipolar prosthesis, with two joints one between outer head and acetabulum and second between inner and outer head.^{6,8}

The present study was planned to compare between short terms results of Austin Moore prosthesis and bipolar prosthesis in fracture intracapsular neck of femur in the elderly patients, at our institute.

Methodology

The present interventional study includes 80 cases of intracapsular fracture neck of femur in elderly patients above the age of 60 years treated by hemiarthroplasty using Austin Moore or bipolar endoprosthesis, in Department of Orthopedics in SVNGMC Yavatmal between August 2015 to December 2016. The study was carried out to compare the immediate and early results of Austin Moore prosthesis and bipolar prosthesis for intracapsular fracture of neck of femur in elderly patients. All the patients were evaluated using the Harris hip score.

Displaced fracture intracapsular neck femur and mentally healthy / co-operative patients were included in the study. Patients age < 60

years; undisplaced fracture intracapsular neck femur; pathological fractures and mentally unhealthy / uncooperative patients were excluded from the study.

Once the patient was admitted to the hospital, all the essential information was recorded in the proforma prepared for this study. They were observed regularly during their hospital stay till they get discharged. They were asked to come for follow up regularly to the outpatient department.

In the present study, patients with intracapsular neck femur fracture were classified according to Garden's classification.⁹ Only Garden's type 3 and type 4 are included in the study. Austin Moore prosthesis is unipolar, fixed angle prosthesis; where motion occurs only between the metal head and acetabulum. It has fenestrations, which allows the in growth of cancellous bone and anchors the prosthesis. In bipolar prosthesis, motion is present between metal head and polyethylene socket (inner bearing) as well as between metallic cup and acetabulum (outer bearing). Because of this design, it provides greater overall range of motion than unipolar design and less acetabular erosion and loosening.

All patients were examined and all necessary investigation was done. Treatment was given for those associated with medical problems such as anemia, diabetes, hypertension; IHD, COPD, asthma, etc. were evaluated and treated before taking them to surgery.

Patients as well as the relatives were explained about the surgery and its risk factors and written consent for the surgery was taken for all patients. Intravenous antibiotics and were given an hour before the surgery. The limb was prepared from umbilicus to knee including perineum and back. For all patients posterolateral approach (Moore's Approach) was used.

The follow-ups were done at regular intervals of 1, 3, 6 months post-operatively and results were tabulated as per Harris Hip Score (1969).¹⁰ Follow up included complete clinical and radiological evaluation. Radiographs were assessed in terms of diminished joint space, acetabular erosion, loosening of the prosthesis, angular shift or dislocation, calcar resorption if any. Pain was taken into

consideration, only when it was localized to the operated hip or when it radiated to the anterior thigh, which increased with movements or when weight bearing on the affected limb. In Harris Hip Score, walking distance is measured in blocks; we modified it in terms of kilometers as concept of block is not common in India. Similarly, we modified the activity of Putting on shoes and socks of Harris Hip Score to simply putting on Chappals as none of our elderly patients wear shoes and socks in their daily activities.

Results

A total of 60 patients above 60 years of age with intracapsular neck femur fractures were selected for the study. Among them 30 patients each were operated with Austin Moore prosthesis and bipolar prosthesis. All the patients were selected randomly and there were no significant differences between patients undergoing surgery by Austin Moore and bipolar prosthesis with respect to age, sex, side and type of fracture and other characteristics.

Table 1: Baseline variables in study participants

Variable	Group A	Group B	Significance
Age			
60 – 69	14 (46.6%)	18 (60%)	• 0.05 ; NS
70 – 79	12 (40%)	10 (33.3%)	
≥ 80	4 (13.3%)	02 (6.6%)	
Sex			
Male	20 (66.6%)	18 (60%)	• 0.05 ; NS
Female	10 (33.3%)	12 (40%)	
Side of Hip			
Right	12 (40%)	14 (46.6%)	• 0.05 ; NS
Left	18 (60%)	16 (53.3%)	
Mode of Trauma			
Fall	26 (86.6%)	23 (76.6%)	• 0.05 ; NS
Road traffic accidents	04 (13.4%)	07 (23.3%)	
Type of fracture			
Garden 3	19 (63.3%)	16 (53.3%)	• 0.05 ; NS
Garden 4	11 (36.6%)	14 (46.7%)	

Total 51 patients had an associated medical disease, 25 (83.3%) in the bipolar group and 26 (80%) in Austin Moore group. Hypertension was the most common disease affecting in both groups of patients.

Average interval between injury and surgery was 9.76 days; 9.06 days in bipolar group and 10.46 days in Austin Moore group. Total 33 (55%) patients were operated between the first and second week

Table 2: Associated medical complications and injury-surgery interval among study participants

Variable	Group A	Group B	Significance
Associated medical complications			
Hypertension	15 (50%)	13 (43.3%)	• 0.05; NS
Ischemic Heart Disease	4 (13.3%)	5 (16.6%)	
Anemia	3 (10%)	2 (6.6%)	
Diabetes Mellitus	2 (6.6%)	1 (3.3%)	
COPD	1 (3.3%)	1 (3.3%)	
Hyperthyroidism	1 (3.3%)	0	
No Disease	5 (16.6%)	4 (13.3%)	
Injury - Surgery Interval			
< 1 Week	5 (16.6%)	6 (20%)	• 0.05; NS
1 week – 2 Weeks	17 (56.6%)	16 (53.3%)	
2 Weeks – 3 Weeks	6 (20%)	4 (13.3%)	
> 3 Weeks	2 (6.6%)	4 (13.3%)	

Both groups had 2 (6.66%) case each of dislocation in the immediate postoperative period. One case (6.66%) of deep infection was found in patients with Austin Moore prosthesis. Loosening of prosthesis was present in 3 (10%) cases with AMP, and 1 (6.66%) case with bipolar prosthesis. Mortality rate was 13.3% in patients with AMP

and 6.6% in patients with bipolar prosthesis. Average time required for full weight bearing was 12.23 days; with an average of 13.73 days for patients with Austin Moore prosthesis and 10.73 days for patients with bipolar prosthesis.

All the patients were assessed by Harris hip score based on the parameters of pain, function, absence of deformity and range of motion. Harris hip score at the latest follow up was considered for calculation. Harris hip score for patients with AMP was found to be 71.86 and that for patients with bipolar prosthesis was 85.06.

Majority of patients from Austin Moore prosthesis group showed good results i.e. 10 (33.3%) followed by poor results in 8 (26.6%) patients. Bipolar prosthesis group had 12 (40%) patients with excellent results followed by good results in 9 (30%) of cases.

Table 3: Complications and Harris Hip Score among study participants

Variable	Group A	Group B	Significance
Complications			
Dislocation	2 (6.6%)	2 (6.6%)	• 0.05; NS
Deep Infection	1 (3.3%)	2 (6.6%)	
Loosening Of Prosthesis	3 (10%)	1 (3.3%)	
Death	2 (6.6%)	1 (3.3%)	
No Complications	22 (73.3%)	24 (80%)	
Time To Full Weight Bearing (days)			
8 – 10	14 (46.6%)	18 (60%)	• 0.05; NS
11 – 15	10 (30%)	08 (26.6%)	
> 15	06 (20%)	04 (13.3%)	
Harris Hip score (Modified) (Mean)			
Pain (44)	33.60	39.60	< 0.05; S
Function (47)	31.86	37.53	
Absence Of Deformity (4)	3.4	3.73	
Range Of Motion (5)	3.2	4.26	
Total	71.86	85.06	
Functional results based on Harris Hip Score			
Excellent (≥ 90)	6 (20%)	12 (40%)	< 0.05 S
Good (80-89)	10 (33.3%)	9 (30%)	
Fair (70-79)	6 (20%)	5 (16.6%)	
Poor (< 70)	8 (26.6%)	4 (13.3%)	

Discussion

Fracture neck of femur and its management still remain an unsolved problem for orthopedic surgeons. Reduction and internal fixation have been widely accepted as a treatment modality in young patients. In present study, the mean age of patients was 70.4 years with 68.4 years in bipolar group and 72.53 years for Austin Moore group. It is comparable with international and Indian studies done by authors like A K Basu et al ; Nottage WM, etal and Sanjay A etal.¹¹⁻¹³

In present study, we have found 60% patients having Garden type 3 fracture and 66.6% patients having subcapital fracture of femoral neck. It is comparable with other studies like JH Hinchey et al ; L Klenerman et al and HB Boyd et al.¹⁴⁻¹⁶

Hypertension was the commonest co-morbid disease followed by ischemic heart disease, anemia, diabetes, and chronic obstructive pulmonary disease. The higher co-morbidity resulted in increase in hospital stay and increased postoperative morbidity and mortality. Dinesh D 2007,¹⁷ in his study of 52 patients with fracture neck femur reported 57.6% patients with associated one or more co-morbidity. Dutta D⁸ in their study of 34 patients with hip fractures reported 70% patients with co-morbid disease in Austin Moore group and 66.7% in bipolar group.

In present study, the complication rate was found to be 26.6%. The complication rate in Austin Moore group was 33.3% and that in bipolar group was 20%. This was comparable with other studies. No acetabular erosion, protrusion acetabulae and periprosthetic

fractures were found during the study. Bhagawat et al¹¹ in their study of bipolar prosthesis in neck femur fractures reported complication rate of 30%. Dinesh D¹⁷ in his study of 52 patients with Austin Moore prosthesis reported a complication rate of 35%. Dutta D, Bajracharya AR¹⁸ in their study of 34 patients reported a complication rate of 26% in Austin Moore group and 20% in bipolar group.

In present study, the mortality rate was found to be 10% with 13.3% in Austin Moore group and 6.6% in bipolar group. It was related to the age and underlying medical condition. No association with the surgical intervention was found. This was comparable with other studies. Dudhani BG¹⁹ in their study of bipolar prosthesis reported a mortality rate of 10%. Ahmad I²⁰ in his study of 46 patients with Austin Moore prosthesis reported a mortality rate of 17.4%. Dinesh D¹⁷ in his study of 52 patients with Austin Moore prosthesis reported a mortality rate of 11%.

Harris hip score was calculated on assessment of parameters like pain, function, absence of deformity and range of motion in each patient. In present study, the mean Harris hip score was found to be 78.46; with an average of 85.06 in bipolar group and 71.86 in Austin Moore group. Nottage WM¹² in their study reported a Harris hip score of 85 in bipolar group and 77 in Austin Moore group. Cornell CN et al 1998,¹⁸ in their study of 47 patients with fracture neck femur reported that patients treated by bipolar prosthesis had greater range of hip motion than those treated with unipolar prosthesis.

In present study, we found 87.66% satisfactory results with bipolar prosthesis and 73.33% satisfactory results with Austin Moore prosthesis. It is comparable to other studies. AK Basu¹³ in his study of 55 patients with bipolar prosthesis in subcapital fracture of neck femur reported 85.4% satisfactory results. Sanjay A¹¹ in their study of bipolar prosthesis in neck femur fractures reported 90% satisfactory results. Ahmad I²⁰ in his study of 46 patients with Austin Moore prosthesis reported 76% satisfactory results. Dinesh D¹⁸ in his study of 52 patients with Austin Moore prosthesis reported 82.7% satisfactory results.

Hemireplacement arthroplasty compared with other fixation techniques, permits a more rapid recovery with immediate weight bearing and reduces the complications arising due to longer bed rest seen with internal fixation; thereby reducing the long term morbidity. Minimal hospital stay, early return to activities, less number of re-operations and less complication with hemireplacement arthroplasty reduce the mental and physical stress and financial burden of patient's relatives. Bipolar prosthesis has lower complication rates and better functional results than Austin Moore prosthesis.

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