

AMP HEMIARTHROPLASTY IN THE MANAGEMENT OF INTRACAPSULAR FRACTURE FEMUR- STILL RELEVANT IN PRESENT ERA

Orthopaedics

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Abstract:

Fracture neck femur has been recognized since the time of Hippocrates. Various treatment methods have been employed since ages. The prolonged immobilization in elderly jeopardizes the patient's lifespan and complicates the problem. Osteosynthesis has nonunion and AVN of femoral head as main complications. To overcome these problems Austin Moore devised the prosthesis in the year 1950. It had limitations of stem loosening and acetabular erosion. These shortcomings were overcome by bipolar prosthesis. However, four times costlier bipolar prosthesis has only slight advantage over AMP in case of functional results.

This is a prospective study of AMP hemiarthroplasty done for displaced femoral neck fractures in elderly. The objectives were to assess- procedural morbidity and mortality, postoperative recovery of physical, social, vocational independence, Hospital stay, postoperative complications and life quality with the aim to decide the present relevance of use of AMP as primary treatment for intracapsular fracture neck femur.

Material and methods: It includes 63 cases (31 males and 32 females) of intracapsular fracture neck femur in patients above 65 years of age treated by hemiarthroplasty using AMP, from Feb 2011 - Dec 2014. Total functional outcome was graded using Harris Hip scoring system.

Results: There were 35% excellent results and 38% good results and 19% fair results. Thus total of 92 % excellent to fair results

Conclusion: In India having more of rural population, AMP hemiarthroplasty as primary treatment for femoral neck fracture in elderly patients is still a good option.

Key Words: Intracapsular fracture neck femur, Austin Moore's 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 the marked improvements in implant design, surgical technique and patients care hip fractures consume a potential proportion of our health care

resources.

Fracture neck of the femur has been recognized since the time of Hippocrates and is orthopaedic problem in elderly.¹ Various methods of treatment have been employed since ages. But the problem remains an enigma unsolved till today. The prolonged immobilization in elderly will jeopardize the lifespan of the patient

and further complicates the problem. This forces one to totally abandon the complete immobilization to achieve a bony union, or to resort to early ambulatory procedures by surgery.

The blood supply of the neck and head of the femur is extensive, intricate and complicated. Healing process mainly depends on the good blood supply. This further handicap the treatment of these fractures and healing process is always in doubt. Under such circumstances one has to decide 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.

Hip is a weight bearing joint and has to perform many functions. A successful operation should provide painless, stable hip with wide range of movements. But none of the accepted procedures of osteosynthesis have been able to achieve this goal fully. If we choose osteosynthesis, nonunion and AVN of femoral head are main complications. To overcome these problems Austin Moore devised the prosthesis in the year 1950.² In 1954, Thompson advocated primary replacement arthroplasty of the hip in fracture neck of the femur for technical simplicity and rapid recovery of the function.³

Innumerable reports similar to that of Thompson have appeared since then including those of McKeever (1961)⁴ who used stainless steel prosthesis. In India Bawadekar A.V. et al (1987)⁵, Saxena P.S. and Saraf J.K. (1978)⁶, Mukharji D.L and Puri (1986)⁷ had published similar work on the role of Austin Moore prosthesis for primary hemiarthroplasty in the treatment of intracapsular fracture neck of the femur.

Earlier hemi replacement arthroplasty as popularly practiced by Austin Moore's produced fairly good results. But it had limitations in stem loosening and reactions at acetabulum etc. These shortcomings were overcome by a new bipolar prosthesis. 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.

New generation arthroplasty surgeons even recommended for THR as primary treatment in active elderly patients having fracture neck femur. However, Bawadekar and

Manelkar (1987)⁵ feel that "In India the erotic and technically demanding procedure of total hip replacement will lack universal application for a long time to come and the hemi replacement procedure will need to have continued application to fill the lacuna produced by the deficient resources and finances..."

Also, Yerukula Ramana et al⁸, (2015) in their comparative study between the use of AMP (Austin Moore Prosthesis) and bipolar prosthesis for the management of intracapsular fracture neck femur observed that the choice between unipolar and bipolar prostheses is less clear. In their series they found that bipolar prosthesis has slight advantage over AMP in case of functional results but the cost of the implant is four times than that of AMP.

Anshu Shekhar, Gururaj Murgod et al⁹ (2013) published their study about use of cemented Austin Moore's prosthesis In 47 cases of intracapsular fracture neck femur and concluded that hemiarthroplasty with Austin Moore prosthesis is a good option in elderly patients with limited physical demands and mobility. Cementing the prosthesis can achieve better control of thigh pain, improves mobility, allows early mobilization and lesser use of walking aids. The use of cement does not increase peri-operative mortality or morbidity in patients without severe cardiopulmonary compromise.

This present study presents a prospective randomized trial of hemiarthroplasty for the treatment of displaced femoral neck fractures in the elderly. Outcomes of 6 weeks, 3months, and 6 months were analyzed by modified Harris hip scoring method and by radiographs taken during follow up.

Our objectives of this study were to assess-

1. The morbidity and mortality associated with the procedure.
2. The post-operative recovery of physical, social and vocational independence.
3. Hospital stay (number of days) required.
4. Various associated complications and
5. Finally the quality of life after hemi arthroplasty.

And aim was to decide the present relevance of the use of AMP as the primary treatment for the intracapsular fracture neck of femur.

Material and methods:

This study includes 63 cases (31 males and 32 females) of intracapsular fracture neck femur in elderly patients above the age of 65 years irrespective of sex treated by hemiarthroplasty using AMP, from Feb 2011 - Dec 2014.

Exclusion factors:

1. Age < 65 years.
2. Bedridden patient
3. Presence of infection in body
4. Presence of additional fracture in lower limb.

All the cases were followed for at least 6 months postoperatively. The functional results after hemiarthroplasty are analyzed for all 63 patients.

On admission, all the essential information was recorded in the proforma prepared for this study. They were observed regularly during their hospital stay. After discharge they were followed-up regularly in OPD.

Preoperative management:

On admission, detailed history with particular emphasizes on mode of injury and associated medical illness was noted. Preoperatively Buck's traction was applied, to the fractured lower limb to immobilize and relieve pain, prevent shortening. Oral or parenteral NSAIDS were given.

AP radiograph of pelvis with both hips were taken for all the patients, keeping the fractured limb in 15° internal rotations. Routine blood investigations, x-ray chest and ECG were done for assessing medical fitness for the surgery.

All the surgeries performed under spinal anesthesia using Moore's approach. Intraoperatively 2cm of calcar was preserved. AMP inserted with 15° of ante version.

Post operatively both lower limbs were kept in abduction with pillow in between the legs. Patients were made to stand up using walker on 3rd day; and were allowed for full weight bearing walking from 5th day onwards, depending on their pain tolerance. Sitting cross-legged and squatting were not allowed. Sutures removed on 12th PO day. Patients were assessed for limb length shortening and any

deformity before their discharge from the hospital. Regular follow-up at the interval of 3 weeks, 3 months and later at 6 months was advised to all. On follow-up, functional outcome was analyzed using Harris Hip Scoring system. During this evaluation, they were especially evaluated for pain, limp, and the use of the support, walking distance, ability to climb stairs, ability to put on shoes and sitting on chair, ability to enter public transportation, deformities, leg length discrepancies and movements. At each follow-up radiograph of the hip was taken for the radiological analysis.

Harris Hip scoring system:

Total functional outcome was graded as following depending on the total score as follows:

Poor	:	score < 70
Fair	:	score 71-80
Good	:	Score 81-90
Excellent	:	score 91-100.

Observations and results:

Age and sex distribution – In our series maximum age of the patient in males was 90 yrs and in females were 83 years. Most of the patients belonged to the age group 65-75 years with the mean age of 73.78 years for males and 73.25 years for the females. There were total of 32 females as against 31 males.

Side of the fracture:

Left hip was more often fractured than the right hip. There were 35 patients (56%) having fracture on Left hip and 28 (44%) having the same on right side.

Type of the fracture:

Majority of the fractures 45/63 (72%) were of subcapital type on radiographic examination. 18 patients (28%) had transcervical fracture.

Mechanism of injury:

Majority of (82.5%) the patients had minimal trauma. most of the slipped and fell down on flat ground or in bath room and were not able to stand or walk immediately after the fall. Six patients were involved in road traffic accidents. Two of them were hit by the vehicles and two fell down while riding the bicycle. Two patients had history of fall from moderate heights like staircase.

Associated medical problems:

35 patients had associated medical co-morbidities as shown in the following table:

Associated medical co-morbidity	Number of patients	Percentage
Nil	28	44.4%
Hypertension	19	30%
Diabetes Mellitus	19	30%
Anaemia	11	17%
Parkinsonism	2	3%
Psychosis	2	3%
COPD	2	3%

Preoperative hospital stay:

Forty eight patients (76%) were operated in the first week and overall 61 patients (97%) were operated within 2 weeks of admission. Remaining patients had a long pre-operative stay because of their associated medical co morbidities and were operated after treating and controlling those co morbidities by appropriate medical managements.

Pre-operative Hospital stay	Number of patients	Percentage
One week	48	76%
Two weeks	13	21%
More than 2 weeks	2	3%
Total	63	100%

Post-operative stay:

90% patients were discharged within 2 weeks of the surgery. 97% were discharged within 3 weeks. Remaining patients had long stay due to preoperative and postoperative complications.

Total Hospital stay:

The patients have stayed in the hospital for a duration ranging from 11 days to 34 days from the date of admission. Ninety four percent patients had total hospital stay of less than 30 days. Two patients had stay of more than 2 weeks due to their co morbid conditions and complications like bed sore.

Complications:

Various complications observed in our series are as follows-

Complications	Number of patients	Percentage
Death	0	0%
Swelling in the limb	2	3%
Prosthetic dislocation	2	3%
Superficial infection	7	11 %
Bed sore	6	10 %
Nil	46	73%

Assessment of the functional results:

The patients were followed up at 6 weeks, 3 months and 6 months interval. Some patients even had follow up of 1 year, but no significant difference in result was noted. We used Harris Hip Scoring method for the assessment and evaluated on following points:

1. Pain
2. Limp
3. Use of support
4. Walking distance
5. Climbing of stairs
6. Ability to put on socks and shoes
7. Sitting on chairs,
8. Ability to enter in public transportation
9. Deformities,
10. Leg length discrepancy
11. ROM of the hip joint.

1. Pain:

Criteria- Pain	Score	Number of patients	Percentage
None	44	23	37%
Slight	40	33	52%
Mild	30	5	8 %
Moderate	20	2	3%
Marked	10	0	0%
Pain at rest	0	0	0%

2. Limp:

Limp assessed in each patient and was scored accordingly. Majority (62%) of the patients in our series had slight to moderate limp. In rest of the patients no limp was seen.

Criteria	Score	Frequency	Percentage
None	11	24	38 %
Slight	8	36	57 %
Moderate	5	3	5 %
Severe	0	0	0%

3. Use of the support:

In our series 51% patients used cane for long walks only and 19% patients only used cane most of the time.

Criteria	Score	Frequency	Percentage
None	11	17	27 %
Cane for long walks	7	32	51 %
Cane most of the time	5	12	19 %
Used one crutch	3	2	3 %
Used two crutches	0	0	0%
Used two canes	2	0	0%
Unable to walk	0	0	0%

4. Walking distance:

Majority (97%) of the patients was able to walk for considerable distance and only 3% of the patients were restricted to indoors.

Criteria	Score	Frequency	Percentage
Unlimited	11	24	38 %
6 blocks	8	29	46 %
2-3 blocks	5	8	13 %
Indoors only	2	2	3 %
Bed and chair	0	0	0%

5. Ability to put on Shoes and socks:

Following observations were made in our series (table 17). In case of the patients who were nit using shoes and socks were asked about their ability to bend and cut their toe nails.

Criteria-Put on shoes and socks	Score	Frequency	Percentage
With ease	4	42	68 %
With difficulty	2	18	29 %
Unable	0	3	5 %

6. Stair climbing: 52 patients (82.5%) in our series were able to climb the stairs without difficulty.

7. Sitting on chair:45 patients (71%) were able to sit on the ordinary chair. 18 patients (29%) were able to sit on high chair.

8. Enter public transportation: 48 patients (76%) were able to enter into public transportation.

9. Deformities of the hip:

Deformity	Frequency	Percentage
Nil	45	72 %
FFD 5°	11	17 %
FFD 10°	4	6 %
IR 5°	2	3 %
IR 10°	0	0%
Adduction deformity 5°	1	2 %
ER 5°	0	0%

10. Leg length Discrepancy:

The observations made regarding leg length discrepancy are shown as follows:

Leg length discrepancy in cms	Frequency	Percentage
Nil	38	60 %
0.5	13	21 %
1	10	16 %
1.5	2	3 %

11. Range of movements:

The following table shows the postoperative range of movements achieved by various patients in our series. Most of them (64.45%) had good range of motion.

ROM	Score	Frequency	Percentage
211°-300°	5	17	27 %
161°-210°	4	27	42 %
101°-160°	3	18	28 %
61°-100°	2	1	3 %
31°-60°	1	0	0%
0°-30°	0	0	0%

The total functional outcome after hemiarthroplasty intracapsular fracture neck femur was graded excellent, good and fair after adding the scores given for each criteria of assessment of the hip. In our series total Harris hip score

at the end of the six months ranged from 45-96 as shown below:

Results	Harris hip scores	Frequency	Percentage
Excellent	91-100	22	35 %
Good	81-90	24	38 %
Fair	71-80	12	19%
Poor	<70	5	8 %

Discussion:

Management of fracture of femoral neck still remains major and difficult undertaking for an orthopedic surgeon. The pendulum of treatment modality 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 can be done at a later date. Primary prosthetic replacement in older patients who are active and need early mobilization should be considered.

In this context we undertook the present study to evaluate the immediate results of hemiarthroplasty in fracture neck of the femur using Austin Moore Prosthesis keeping in view the living condition of an average Indian.

As to the question of unipolar versus bipolar prosthesis, 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)¹⁰. 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.¹¹ performed a prospective six month follow-up of thirty-three bipolar and fifteen unipolar hemiarthroplasty and found no differences in post-operative complication rates, length of hospitalizations, or hip rating outcomes between the two groups of patients.

Hudson et al.¹², in an eight-year retrospective review of ninety unipolar and forty-eight bipolar hemiarthroplasty, 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 hemiarthroplasty, showed that patients with bipolar hemiarthroplasty had better pain relief and function.¹³

In our series most of the patients (56/63) were in the age group of 65-79 years, the mean age of the sample is 73.5 years, mean age for males is 73.78 yrs and that for females in this series is 73.25 years. This is comparable to other series.

The majority of fractures (45/63=72%) were subcapital as seen in x-rays as well as seen intraoperatively.

82.5% fractures were due to trivial trauma. Amongst the associated medical conditions hypertension, diabetes and gross anemia were common. We used southern approach for the surgical exposure in all the patients and appropriate size of AMP was selected depending upon the size of the head excised. Most of the patients were made ambulatory early and were discharged within two weeks of the surgery.

Various complications following hemiarthroplasty in our series were comparable to other series.

There were 35% excellent results and 38% good results and 19% fair results. Thus total of 92 % excellent to fair results are comparable to other series as shown in following table.

Investigators	No. of Patients	Excellent	Good	Fair	Poor
14Hinchey and Day(1964)	225	52.4	20.4	10.7	16.4
15Lanceford (1965)		30	51	9	10
16Anderson and Hamsa(1964)	356	51.9	28.4	14.8	4.9
17Salvatti et al (1974)	251	31	26	25	8
6Saxena and Saraf (1978)	82	46.1	44.8	6.5	2.6
7Mukharjee and Puri (1986)	55	29	49	18	4
5Bawadekar and Manelkar(1987)	328	60 (including good)		30	10
18Arwade(1987)	104	70 (including good)		16	14
Our Series	63	35	38	19	8

The poor results in our series were due to:

Mild-moderate pain in the hip or thigh after hemiarthroplasty and was found in patients who had superficial infection, prosthetic dislocation and various other co-morbid medical ailments.

The success of hemi arthroplasty no doubts depends on preoperative planning and proper attention to surgical details to achieve the optimum biomechanical conditions.

Conclusion:

In conclusion, hemiarthroplasty of the hip for femoral neck fracture is still a good option even in present era in elderly patients for following reasons:

1. The mortality and morbidity are not high.
2. Operative procedure is simple.
3. Complications are less disabling.
4. Weight bearing is early and prevents the complications due to recumbence.
5. Early functional results are satisfactory.
6. Second operative procedure is less frequently required.
7. It is cost effective as compared to bipolar and THR.

India having more of rural population, it has been recognized that after injury, elderly people should be mobilized and weight bearing commenced as soon as possible to avoid

complications of prolonged recumbency and immobility and to return to activity, to restore patients to the fullest physical, mental, and social capabilities. This can be achieved by hemiarthroplasty using AMP and should be considered as one of the primary treatments for fracture neck of femur in elderly patients who are not much active.

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