

Original Research Article

Comparative Study of Management of Fracture Neck of Femur in Elderly Patient by Austin Moors Prosthesis (AMP) Vs Bipolar Hemi Arthroplasty (BHA)

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Abstract: Fracture neck of the Femur remains as an unsolved problem till today and is a common orthopaedic problem in old age group. Various methods of treatment have been employed since ages but without a universally accepted procedure till today. In our study the advantages of cemented and uncemented Bipolar Hemi Arthroplasty (BHA) over the Austin Moors Arthroplasty (AMP) well documented. Our study conducted in Gandhi Hospital Secunderabad from May 2004 to Oct 2007 retrospectively evaluated patient's records from case files and also called the patients for clinical and radiological follow up. 20 patients with intracapsular fracture neck of the femur were treated with AMP and 20 patients were treated with BMA. In both the categories sub capital and Trans cervical fractures of the neck of the femur were taken in our study and in both groups 60 - 73 years (average 65.5 years) patients were included. Exclusion criteria are fractures secondary to malignancies, fractures associated with acetabular fractures, shaft femur fractures and fracture dislocations. Clinical and radiological follow up was done for groin and thigh pain, subsidence and loosening of the prosthesis. In results the mean follow up was three years (range six months - three and half years) the Harris Hip Score in AMP is 76.4 (range 74 - 86) and in BHA the HHS 92 (range 80 - 96). According to Hhs grade the final outcome was excellent in 94, good in 86 and fair in less than 76 Hips with BHA, excellent in 85, good in 75 and fair in less than 70 Hips with AMP. Hip and groin pain reported in 2 patients in uncemented BHA and 6 patients in AMP but did not limit activity in both the groups. Subsidence of the prosthesis less than 5mm was seen in 8 cases in AMP and none in BHA. 2 cases of protrusio acetabuli were reported in AMP group. In conclusion the Patients with intracapsular neck of the femur treated by cemented BHA are devoid of groin and thigh pain or subsidence / protrusio acetabuli compared to patients treated with AMP who complained of groin and thigh pain due to protrusio acetabuli or loosening and subsidence of the femoral stem.

Keywords: Austin Moors Prosthesis, Bipolar Hemi Arthroplasty, Protrusio Acetabuli and Subsidence of the stem

INTRODUCTION

Management of the Fracture neck of the femur is a challenging for Orthopaedic Surgeons for the years all over the world. Various methods of treatment have been employed but without a universally accepted procedure. BHA is often a versatile and durable solution for fracture neck of the femur like rapid return of function with a pain free hip in addition it is less expensive and easy to perform than Total Hip Arthroplasty[1-3].

The objective of the study is to evaluate the functional outcome of fracture neck of the femur managed by AMP in comparison with BHA. Acetabular

wear is diminished through reduction of total amount of motion that occurs between the acetabular cartilage and metallic outer shell by the inter position of a second low friction inner bearing within the implant. Because of compound bearing surface bipolar designs provide overall range of motion than either unipolar designs or conventional Total Hip Arthroplasty. The unique - self centering feature of BHA reduces the chances of dislocation of prosthesis at the extremes of motion and fracture of poly ethylene bearing. BHA rests on the calcar and its shoulder abuts the cal car femorale and transmits the stress of weight bearing to the shaft via the cal car. Cement less insertion generally produces strains in the bone that are more physiological than those

caused by fully cemented stems, depending on the stem size and the extent of porous coating. The protrusio acetabuli frequently seen in AMP is not seen with BHA in our study of short term period. Dislocation of the prosthesis is very rare with BHA compared to unipolar prosthesis (AMP) or Total Hip Replacement. Too long neck, excessive anteversion or retroversion and varus can cause pain. These can be prevented by precise technique in selecting, seating and placing of the prosthesis. The single assembly in BHA is safer system with the implant encasing a multiple bearing insert locked in place. Usually a shorter femoral neck is associated with extra capsular fractures and long femoral neck is associated with intra capsular fractures. In our study the patient selection is Garden types 3 & 4 and Pauwells type 1 and 2 and AO types B1 - B3, sub capital and Trans cervical #with impacted and unimpacted cases only included. Basi cervical fractures are not included in this study. BHA may be used as

cemented or cementless arthroplasty. The large contact area and the two planes of rotation reduce the wear and tear at acetabular surface and preserve the native acetabulum and acetabular cartilage. The positive eccentricity of centres of rotation in BHA corrects the alignment. The advantage of BHA is self locking action i.e. the fenestrations in the prosthesis permit ingrowth of bone over time which enhances the fixation. In our study we used BHA of 39 -53 mm size in 2 mm increments sterilized by gamma irradiation.

Protocol for the study:

All the patients were selected from among the admissions in the department of Orthopaedics Gandhi Hospital Secunderabad. The patients were counseled and consent taken for participation in the study. They were investigated and informed of all possible complications that can happen during or as a result of surgery.



Fig-1: Periprosthetic # with AMP



A



B

Fig-2(A & B): Subsidence and varus position of the implant

Selection Criteria :

All the patients above 60 years of age with displaced intracapsular #neck of femur were operated with insertion of endoprosthesis. Pre operative treatment with skin traction with 3 kgs of weight with aim of relieving pain and preventing proximal migration. Oral / parenteral NSAIDS were given to relieve pain. Necessary and adequate treatment was given for associated medical illness like DM, HTN,

IHD, COPD and Bronchial Asthma etc., Consultations were taken from other departments where ever required. Blood transfusion and medicines were used to correct the anemia. Certain exercises like deep breathing exercises, static quadriceps exercises, ankle movement and hip exercises with particular emphasis on abduction. To prevent DVT as prophylaxis we covered chemical and mechanical methods.

Table-1: Age Distribution in the Study - BHA and AMP

Age Group	No. of Patients
50-60	2
61-70	15
71-80	3

Table-2: Male and Female Patients in the Study

Sex	No. of Patients
Male	8
Female	12

Operative Method:

Prophylactic antibiotics given one hour prior to induction of anaesthesia. All surgeries were performed in elective OT using standard aseptic precautions. The surgical approach we used is Moore's / Southern in lateral position, patient lying on unaffected side. At least one finger breadth of calcar is left behind. A bipolar prosthesis one no. less is selected for insertion. Joint capsule and short lateral rotators are sutured before closing the wound in layers with suction drain. In old cases closed adductor tenotomy was done.

tolerance and encouraged to walk thereafter. Sitting cross legged and squatting were not allowed for 3 to 4 months. All patients were followed up at 6 weeks, 3 months, 6 months and 1 year. The outcome of results in BHA is: Fair - Harris hip score 70 - 80, Good 80 -90, Excellent in > 90. 20 Cases of BHA, almost all patients in the study returned for clinical and radiological examination at regular intervals. They were reviewed at 6 weeks, 6 months and 1 year. Of these 20 cases, IC # NF 9 are grade III Garden, 11 are grade IV Garden. 8 males and 12 females. Of these 2 patients are between 50 - 60 years, 15 patients are between 61 - 70 years, and 3 patients are 71 - 80 years. 8 patients had the duration of # s for > 2 weeks. Average follow up in our study was 36.5 weeks (range 6 - 40 weeks).

Post Operative Care:

From third post operative day patients are allowed weight bearing depending on their pain

Table-3: Duration of Complaints in The Intra Capsular Fracture Neck Of Femur

Duration of complaints	No. of Patients
Upto 1 week	4
Between 1 - 3 weeks	3
Between 3 - 6 weeks	2
Between 6 - 12 weeks	7
Between 12 - 24 weeks	4

The mechanism of injury causing femoral neck # is trivial in most cases - 80 %, few cases 20% are due to RTA. In our study of 20 Cases 12 pts (60%) had excellent results with HHS more than 90, 6 pts had good results with HHS 80 - 90 (30%) and 2 pts had fair results with Harris hip score between 70 - 80 (10%). HHS with AMP: Excellent 12 cases 85, Good 6 cases 75 and Fair 2 cases < 70. The average Harris hip score for all pts in our study is 87.65 there was 1 case with superficial infection which subsided with oral antibiotics. There was no deep infection, dislocation or

protrusio acetabuli. None of the pts had persistant thigh pain after surgery. Uncemented stems are used for DORR type A & B, Cemented stems used in DORR type C (broader femoral medullary canal). Cemented stems prevented the chances of # in osteoporotic bones, subsidence and delay in full weight bearing. Elderly active patients with # NF could be treated with THA. It is common in our practice to see elderly active patients above 70 years of age with good bone stock. Clinical and radiological assessment was done about the limb length discrepancy, loosening of the prosthesis, varus

deformity, acetabular protrusion and subsidence of the stem. The average Harris hip score in our study is 87.65, maximum Harris hip score is 94 and minimum

Harris hip score is 76 with BHA, and with AMP average HHS is 77 maximum HHS is 84 and minimum HHS is < 70.

Table-4: Duration of Follow Up

Follow Up	No. of Patients
Up to 6 weeks	2
Between 6 - 12 weeks	1
Between 12 - 24 weeks	3
Between 24 - 52 weeks	10
Above 52 weeks	4



Fig-3(A, B & C): Medialisation of implant with step at prosthesis and cal car junction

DISCUSSION

In our study of Bipolar Hemi arthroplasty of the hip, we have evaluated 20 cases that were performed using bipolar prosthesis at our hospital. The study was conducted over a period of 3 years 5 months. The concept of dual bearing surfaces offers considerable advantages. It results in sharing of motion at the two surfaces and hence, reduction of net wears and tears at either surface, thus reducing the erosion at the acetabular joint surface. In addition the total range of movement at the joint is increased.

Mean Harris hip score for bipolar prosthesis in our study was 87.5 and in unipolar arthroplasty it was 77. There was no deterioration of results over the period of the study during which we have found no incidence

of protrusio acetabuli. According to McConville *et al.*[4]; anterior thigh pain attributed to the femoral component loosening would be decreased by the use of proportionately sized femoral components and use of cement when indicated especially in DORR type C femoral canals. In our study we have not found any case of persistent anterior thigh pain or evidence of loosening of the prosthesis or subsidence of stem in cemented ones. Dislocation is not seen in our study, it has been reported in literature ranging about 1%. Infection rate in other series was 2.63 - 7.8%. We had one case of superficial infection. There was no mortality in our study. Other complications like # of endoprosthetic stem or # of the polyethylene cup have not occurred in our series.

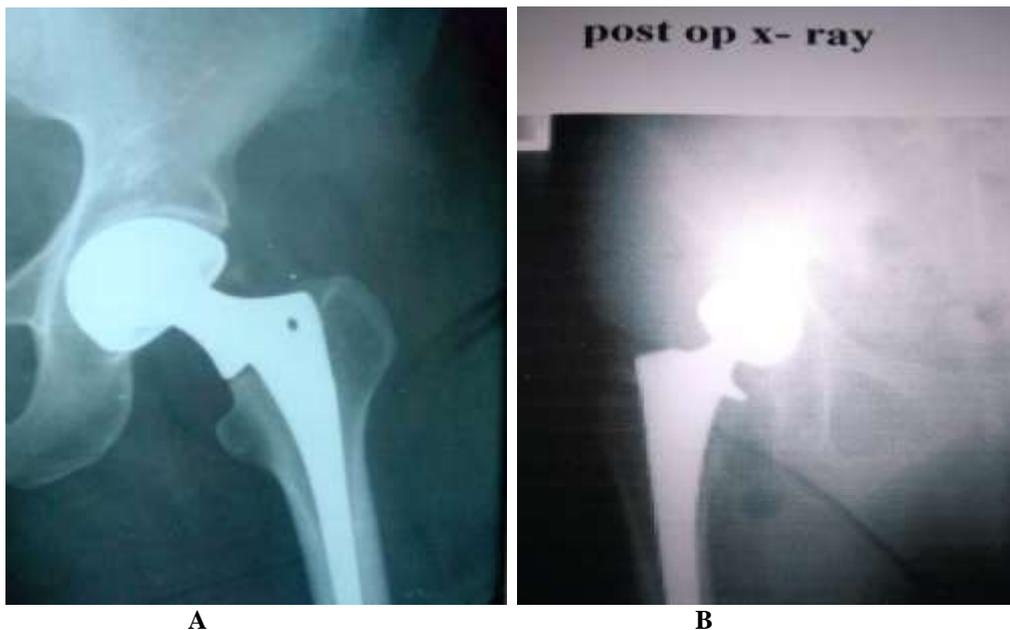


Fig-4 (A & B) :Appropriate position of Prosthesis and good alignment and offset



Fig-5 (A & B): Patient in squatting and crossed leg position

CONCLUSION

The study concludes that bipolar hip prosthesis offers a long term solution in old age and in pts with neglected, displaced IC # NF compared to Austin Moor's prosthesis.

The procedure has the following advantages -

1. It offers excellent, pain less mobility and ease of rehabilitation and return to early function.
2. These achievements surpass the result of other methods of treatment for IC # NF in the elderly and in neglected cases of physiologically younger pts.
3. The surgery is relatively easy to perform, takes less operating time with less blood loss, hence safer.
4. The bipolar hip prosthesis in our study had satisfactory results of 96 % when standard techniques are used. This speaks the superiority of the procedure.

5. The durability of the implant and potential for preservation of acetabular cartilage allow this prosthesis to be used in physiological younger and more active pts.
6. The low rate of complication when compared to unipolar prosthesis indicates the superiority of the implant.
7. The potential for its use in varied indications and in different age groups show the versatility of the implants.

As the acetabular erosion and protrusion appear to have been reduced to some extent, the bipolar hip prosthesis is a good alternative to conventional unipolar prosthesis in # NF in the elderly. Pts who underwent bipolar replacement for # NF with either cemented or press fit prosthesis had better pain relief and function than pts who had uncemented unipolar prosthesis at a minimum of 24 months after surgery. The dislocation rate is lower in Bipolar Hemi

Arthroplasty than Total Hip Arthroplasty. The inflammatory membrane associated with large amounts of poly ethylene debris may have contributed to aseptic loosening and osteolysis in pts with bipolar hip prosthesis

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