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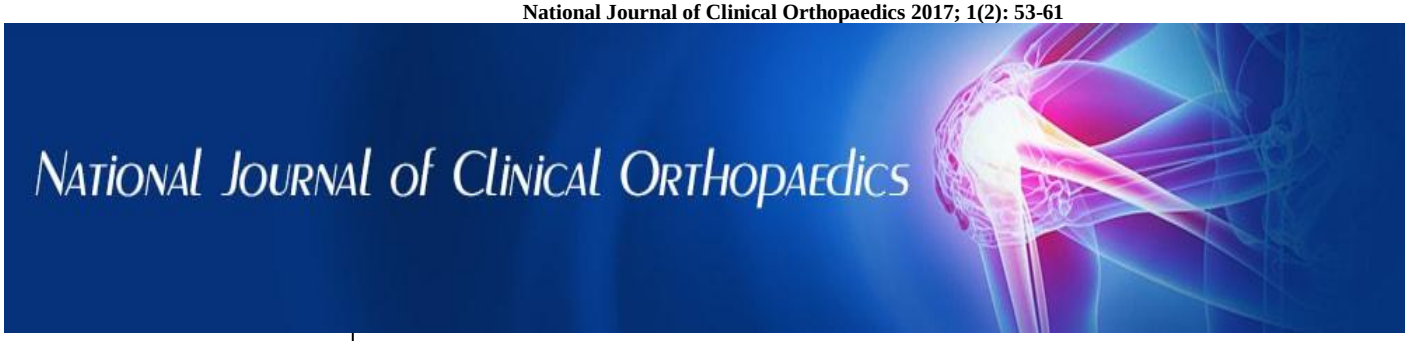

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Comparative study between Austin Moore prosthesis and bipolar prosthesis in fracture neck of femur

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Abstract
Background and Objective: Femoral neck fractures have been considered 'unsolvable fracture' in the olden era of orthopaedics due to high rate of associated complications, which include nonunion and avascular necrosis of the femoral head.
Prosthetic replacement as a primary procedure eliminates osteonecrosis and non union as complications of femoral fractures and also allows immediate weight bearing to return elderly patients to activity and help avoid complications of recumbency and inactivity.[2] The decision to perform hemi arthroplasty using a unipolar or bipolar prosthesis remains controversial, with proponents on either side. So, in view of varied opinions we desire to compare the efficiency of these two prosthesis unipolar and bipolar prosthesis for the management of intra capsular fracture neck femur in elderly.
Methods: 112 patients above 60 years and an acute displaced fracture of the femoral neck were randomly allocated to treatment by either AMP or bipolar HA, in the department of Orthopaedics, AIMS BG Nagara between May 2013 to May 2016.The patients were followed up at 6weeks, 12 weeks, 6 months and 1year. Functional outcome was assessed and compared with Harris hip score and radiological parameters
Results: The two groups of patients with mean age of 70.4 in AMP group and 69.1 in Biploar group did not differ in their pre-injury characteristics (sex, fracture pattern, comorbidity, mode of injury and pre-injury ambulatory status) and perioperative parameters such as duration of operation, blood loss, hospital stay and mortality.
The mean Harris hip score in Bipolar and AMP group was 90.03 and 84.4, respectively. Functional activities like use of public transport was better with bipolar group. Incidence of complications like Superficial infection, haematoma and acetabular erosion was encountered in AMP group.
Conclusion: The use of a bipolar endoprosthesis in the management of displaced femoral neck fractures in the elderly was associated with better mean Harris hip score and incidence of complications was limited. Hence, bipolar would be a better option in elderly patients with fracture neck of femur. Moreover the cost difference between AMP and Bipolar prosthesis is not much in our country.

Keywords: Unipolar, Bipolar, Hemiarthroplasty, Femoral neck fracture-AMP

Introduction
Hip fractures are devastating injuries that most often affect the elderly population and have a tremendous impact on the health care system and the society in general [2]. It has been shown that hip fractures occur a decade earlier in Indians in comparison with western Caucasian counterparts [2].
Osteoporosis, co-morbidities, increased incidence of trivial trauma increases the incidence and complicates the treatment of these fractures. This high incidence is due to weak bones and increased incidence of trivial trauma. The treatment goal is to return the patient to his or her pre-morbid status of function. Increase in the average lifespan and improved medical facilities have greatly increased the incidence of these fractures [1].
Management of femoral neck fractures in elderly patients has been controversial. Femoral neck fractures have been considered 'unsolvable fractures' in the older era of orthopaedics [1] due to the high rate of associated complications, which include nonunion,lack of rigid fixation and avascular necrosis of the femoral head, among others. Presently, there are multiple surgical treatment options (cannulated screws, dynamic hip screw systems, blade plates, hemi and total hip arthroplasty) available.

Intracapsular extent of the fracture, tenuous blood supply to the femoral head going through the neck and difficulty in maintaining fracture reduction have been cited as reasons for failure of fixation. Although treatment methods have been refined over the years, a consensus on the ideal treatment remains elusive [1].

Important factors to consider in choosing any treatment modality are intrinsic, viz. patient age, general medical condition, type of fracture; and extrinsic, viz. availability of facilities and socio-economic status [1].

Surgical treatment has been established as the gold standard; however, the surgical option remains a dilemma [3]. Open reduction and internal fixation has been shown to have a high rate of revision surgery due to nonunion and avascular necrosis Hip replacement arthroplasty (partial or total) is emerging as the most viable treatment option [3].

Replacement arthroplasty (total hip arthroplasty, bipolar prosthesis and hemi-arthroplasty) are very useful procedures and have to be carried out when it is not possible to achieve union of fracture or in old people who have to be put on their feet without loss of time [4]. These procedures have to be offered to those who can afford and are capable of modifying their life style so that the artificial joint lasts for longer period.

Prosthetic replacement allows immediate weight bearing to return elderly patients to activity and help avoid complications of recumbency and inactivity [4]. As a primary procedure, prosthetic replacement eliminates osteonecrosis and nonunion as complications of femoral neck fractures [2]. Prosthetic replacement of displaced femoral neck fractures reduces the incidence of re operation compared with internal fixation. This argument applies only to elderly individuals with a limited life expectancy because the cumulative rate of re operation for prosthetic replacement increases with time [4].

The decision to perform hemi arthroplasty 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 acetabular wear and potentially less hip/groin pain [5].

The choice between unipolar and bipolar prostheses is less clear. 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. Movement within the prosthesis may also reduce the pain caused by the prosthesis moving against the acetabulum [5].

Materials and methods

Comparitive Study between Austin Moore prosthesis and Bipolar prosthesis in Fracture neck Femur‖-A Prospective Comparitive Study was conducted in the period from May 2013 to May 2016

- **Study Area:** Adichunchungiri institute of medical sciences.
- **Study Population:** All Male\Female patients aged 60 or more admitted in the hospital.
- **Study Sample size:** 112 elderly patients who were admitted and operated between may 2013 to may 2016 and had fulfilled the inclusion criteria, were enrolled for this study. Patients operated with Austin Moore‘s prosthesis were allocated to Group A and operated with Bipolar Prosthesis were allocated to Group B. 56 patients each were allocated into 2 groups A and B according to randomized tables. 3 patients from group A were lost to follow up and 3 patients died. 2 patients from group B were lost to follow and 2 patients died. 102 patients who completed follow up till one and half year postoperatively were included in this study.
- **Study Type:** Prospective study.
- **Study Design:** Randomised Comparative with two groups
- **Study Title:** Comparitive Study between Austin Moore prosthesis and Bipolar prosthesis in Fracture neck Femur‖
- **Duration of study:** May 2013 to May 2016

Inclusion Criteria

Cases of fracture neck Femur of Age group above 60 years.

All patients medically fit for surgery even with hypertension and diabetes mellitus.

All types of fractures under Gardens Classification are considered Closed Fracture.

Exclusion Criteria

Seriously ill patients and Pts not fit for surgery.

Fracture due to tumour or any other pathological cause.

Compound Fractures Other limb fractures and diseases Neurovascular injuries In this study primary hemireplacement arthroplasty of hip is done in 112 cases of fracture neck of femur, using bipolar prosthesis for 56 cases and Austin Moore‘s Prosthesis for 56 cases. The operative procedure is meticulously followed; the results are evaluated and compared.

Preoperative Management

Patients were admitted to the ward. Detailed history was taken with particular emphasize on mode of injury and associated medical illness. In depth, clinical assessment was carried out in each case. In all patients preoperatively Buck's traction with appropriate weight was applied, to the fractured lower limb, with the aim of relieving pain, preventing shortening and to reduce unnecessary movements of the injured limb. Oral or parental NSAIDs were given to relieve the pain. Anteroposterior radiographs of the affected hip joint of pelvis with bone hips were taken for all the patients, keeping the fractured limb in 15 degree internal rotations to bring the neck parallel to X-ray film.

Necessary and adequate 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

Assessment of fitness was done by the anaesthetist and physician. The patients were graded as per the American Society of Anaesthesiologists (ASA) Scores. All patients were treated surgically with hemiarthroplasty using the Austin Moore‘s / Bipolar prostheses with the same approach.

Surgical Procedure

All surgeries were performed on an elective basis using standard aseptic precautions surgery was performed under spinal or General anaesthesia

Position of the patient

Lateral position with the patient lying on the unaffected side. The skin over the hip was scrubbed with Povidone-iodine. The

lower extremity from the groin to the toes was draped in sterile towels separately to enable easy manipulation of the limb during surgery.

Approach: For all patients Posterolateral approach (Moore's Approach) was used in our series.

Fig 1: Position

Fig 2: Incision

Fig 3- Suturing Rotators

Fig 4: Prothesis Insertion

Fig 5: Instruments

Postoperative Management

Buck's skin traction was continued for 24 hours with both the lower limbs kept in abducted position, with a pillow in between both the legs. Drain removal was done after 48 hours. Exercises like deep breathing exercises, quadriceps exercises and movements are taught. Patients were made to sit up, standup with support (walker) on the second day and were allowed to full weight bear and walk with the help of a walker on the third postoperative day depending on his/her pain tolerance and were encouraged to walk thereafter. Sitting cross-legged and squatting were not allowed.

Suture removal was done on the twelfth postoperative day. The patients were assessed for any shortening or deformities if any and discharged from the hospital.

Patients were followed up at an interval of 6 weeks, 3 months, 6 months and one year. Functional outcome was analyzed by modified Harris hip scoring system. At each follow up radiograph of the hip was taken for radiological analysis.

Follow Up

At the time of discharge the patients were asked to come for follow up after 6 weeks and for further follow up at 3 months, 6 months and one year. The patients who turned for follow up or whose details could be collected were finally taken up for the assessment of functional results.

At follow up, detailed clinical examination was done systematically. Patients were evaluated according to Harris hip scoring system for pain, limp, the use of support, walking distance, ability to climb stairs, sitting on chair, ability to enter public transportation, deformities, leg length discrepancy and movements. All the details were recorded in the follow up chart. The radiograph of the operated hip was taken at regular intervals, at each follow up.

Observations and Results

Following are the details collected from our study. Out of 112 cases enrolled in the study 3 cases from Group A were excluded from the study as they were lost to follow up and 3 patients died. 2 patients from Group B were excluded as we lost follow up and 2 patients died.

So at the end 102 patients finished the study with 50 in AMP group and 52 in Bipolar group.

Of the 102 patients 62 were females and 40 were males. The youngest patient in our series was 60 years old and the oldest patient was 91 years old. The average age of the patient in

group A was 70.4 years and in group B was 69.1 years. In our study Group A patients were mobilised on an average of 4.04 post operative day where as Group B were mobilised on 3.76 post op day. The patients walked (partial weight bearing) on an average 3.64 days after surgery.

2 patients in group A and 3 patients in group B developed superficial infection. All of them settled with IV antibiotics according to culture and sensitivity.5 people developed haematoma probably due to early removal of drain. Acetabular erosion was noted in 2 patients of Group A, there were no incidences of posterior dislocation or peri prosthetic fractures in our study.

Table 1: Age Incidence

Age groups	AMP	Bipolar
60-70	34	35
71-80	12	14
>81	04	03

Table 1A: Association of Age Group with Outcome – AMP

Age Groups	Excellent	Good	Fair	Poor
60-70	20	09	05	0
71-80	07	03	02	0
>81	01	02	0	01

Table 1B: Association of Age Group with Outcome – Bipolar

Age groups	Excellent	Good	Fair	Poor
60-70	22	08	05	0
71-80	08	04	02	0
>81	02	01	0	0

This study signifies that with age group ranging 60 –70, 85.4% of the cases in Group A had Excellent to good outcome which was more compared to 85.6% of the cases in Group B, but the difference was insignificant. Age group ranging from 71-80, 83.3% of the cases in Group A had excellent to good as their outcome which was less compared to 85.7% results in Group B. Whereas age group belonging to >81years, 75.0% of the cases in Group A had excellent to good outcome which was less compared to 100% in Group B, but the difference was not significant.

Table 2: Sex Incidence.

Sex	Amp	Bipolar
Male	18	22
Female	32	30

Table 2a: Association of Outcome with Sex – AMP.

Sex-AMP	Excellent	Good	Fair	Poor
Male	07	09	02	0
Female	21	05	05	01

Table 2b: Association of Outcome with Sex – Bipolar.

Sex-AMP	Excellent	Good	Fair	Poor
Male	14	05	03	0
Female	18	08	04	0

In our study 88.9% of male patients in group A had excellent to good results which was compared to 81.2 of females with excellent to good results, but the difference was statistically insgnificant. Similarly, in Group B both males and females had 86% excellent to good results.

Table 3: Side of Fracture

Side	AMP	Bipolar
Left	21	24
Right	29	33

Table 4: Gardens Type

Garden Type	AMP	Bipolar
TYPE 1	06	05
TYPE 2	16	19
TYPE 3	17	16
TYPE 4	11	12

Table 5: Post-op Stay

Post Op. Stay	AMP	Bipolar
<10	13	15
10-15	28	31
15-25	09	06

In our study the average post op days in Group A is 14.9 and in Group B is 13.3.

Table 6: Prosthesis Size

Prosthesis Size	AMP	Bipolar
39	10	05
41	16	21
43	19	18
45	04	06
47	01	02

In our study 43mm was the most commonly used prosthesis in Group A where as 41mm was the most commonly used prosthesis in Group B.

Table 7: Outcome at 6 weeks.

Hip Score @ 6 weeks	AMP	Bipolar
Poor (60-69)	36	35
Fair (70-79)	12	14
Good (80-89)	02	03
Excellent (90-100)	0	0

Table 8: Outcome at 3 months

Hip Score @ 3 Months	AMP	Bipolar	
Poor (60-69)	09	04	
Fair (70-79)	24	29	
Good (80-89)	17	19	
Excellent (90-100)	0		0

Table 9: Outcome at 6 months.

Hip Score @ 6 Months	AMP	Bipolar
Poor (60-69)	01	00
Fair (70-79)	15	09
Good (80-89)	17	23
Excellent (90-100)	17	20

Table 10: Outcome at 1 Year.

Hip Score @ 1 Year	AMP	Bipolar
Poor (60-69)	01	00
Fair (70-79)	07	07
Good (80-89)	14	12
Excellent (90-100)	28	32

Assessment of functional results

Table 11: Pain

Pain	AMP	Bipolar
Marked pain with limitation of activities	0	0
Moderate	0	0
Mild	12	02
Slight occasional	18	12
None	20	38

The patients were enquired about the kind of pain they experienced during their daily activity and recorded according to the grades and scores.73.1% of Bipolar Group and 40% of AMP Group had no pain. The difference in pain is statistically significant with a p value=0.0095.

Table 12: Distance walked

Pain	Amp	Bipolar
Bed and Chair only	0	0
2-3 Blocks	02	0
6 Blocks	25	16
Unlimited	23	36

All the patients the study were enquire about the distance that they are able to walk and recorded and graded accordingly. 69.2% of Bipolar group were able to walk unlimited and 46% of AMP group were able to walk unlimited. Difference in distribution of distance walked is statistically insignificant. (p=0.2592)

Table 13: Public Transport.

Public Transport	AMP	Bipolar
Yes	27	36
No	23	14

69.2% of bipolar group were able to use the public transport compared to only 54% of AMP group, and the difference is statistically significant {p=0.0452 (Fischer t test)}

Table 14: Use of support

Support	AMP	Bipolar
1 Crutch	02	00
Cane most of the time	09	05
Cane for long walks	12	09
None	27	38

In our study, 73% of Bipolar group used no support for walking whereas 54% of AMP group used no support for walking. The difference is statistically insignificant.

Table 15: Ability to climb Stairs

Stairs	AMP	Bipolar
Unable	0	0
Using railing	34	32
Without railing	16	20

All patients analyzed for the ability to walk stairs and scored accordingly. 61.5% of Bipolar group climb with help of support and 68% of AMP Group can climb with the help of support.

Distribution of ability to climb stairs with or without support is statistically insignificant.

Radiological assessment

Table 16: Radiological Changes

Radiological	AMP	Bipolar
Femoral stem loosening	0	0
Femoral stem-subsidence of prosthesis	0	0
>5mm		
Sclerosis at the tip of prosthesis	0	0
Acetabular erosion	02	0
Acetabular protrusion	0	0
Hetero topic ossification	0	0
Dislocation or subluxation	0	0

At the end of 6 months all patients X-ray was taken and assessed

Table 17: Complications

Complications	AMP	Bipolar
Superficial infection	2	3
Haematoma	3	2
Gaping	0	0
Post. dislocation	0	0
Prosthetic migration	0	0
Acetabular erosion	2	0
Restricted ROM	1	0
Late infection	0	0
Sciatic nerve paresis	0	0
Peri prosthetic fracture	0	0

We noticed acetabular erosion in 2 cases in AMP group.

Discussion

Age Distribution

The average age of the patient in group A was 70.4 years and in group B was 69.1 years.

Majority of the patients were between 60-70 years [2]. The physiological age of our patients is more than the chronological age in all our patients.

Sex Incidence

The elderly females are more prone to fracture neck of femur [5, 6]. Female preponderance has been reported in several series: Moore (1957): 62.5%, Campbell (1960): 80.9%; Cone (1963): 73.6%; Anderson and Neilson (1972): 85%; Sikroski and Barrington (1981): 66.7%; Arwade (1987): 68.3%, John E. Kenzora (1998): 77.4%;.Carl Johan Hedbeck (2010):76%; Bhushan MS (2011):78.5%.

Male preponderance is reported in few series: D'Acry and Devas (1976) [8]: 91.4%; Mukherjee and Puri (1986): 58.3%; Amte and Sanchetti (1987): 55%; Bavadekar and Manelkar (1987): 60.9%.Male femoral neck fracture patients are in general younger than female patients. In our study female preponderance was 60.8% [9].

Side of Fracture

Boyd and Salvatore (1964) reported 55% fractures on left side. D'Acry and Devas [8] (1976) similarly found 55.4% fracture in left hip of their patients. Left sided hip was fractured in 60.9% of our cases. 65% of bipolar group and 57.1% of AMP were left sided fracture. In our study we reported 58% right sided fractures in Group A and 63.5% in group B.

Type of fracture

Depending on the anteroposterior view in internal rotation the fracture pattern is classified among Garden type 1 to 4. Majority of the fractures in our study belong to types 2 and 3 66% in Group A and 63.7% in Group B. Kulkarni GS (1987) had grouped type III and type IV into one group of displaced fractures' and reported it in 82.5% of his patients. Sanchetti *et al* (1987) reported 30% Garden type III and 22.5% Garden type IV in a series distributed between 20 to 80 years of age. Mukherjee and Puri (1986) had 85% patients of Garden type III and IV fractures. The types of displacement (Gardens III and IV) are not taken as the criteria to choose the procedure for the management of fracture neck of the femur. The age of the patient are taken into consideration while selecting hemiarthroplasty for the management of fracture neck of femur.

Nature of Injury

100.0% of our patients had trivial trauma (self fall). This is in accordance with majority of the series reported - [Gyepes (1962), Solomon (1968), Evarts (1973), Fielding (1974), Ingalhalikar (1987), Seth (1987) etc.] [10, 11].

Stevens *et al*. (1962), Scott and Gray (1980), Urovitz *et al* (1977), Colonel M.K. Seth (1987) and several other authorities believe that the intracapsular fracture are stress fractures through pathological bone secondary to osteoporosis or osteomalacia.

Mortality

We had no operative deaths in our series. Totally 5 patients (4.9%) expired during the follow in our series, from Group A 3 patients and group B 2 patients. The death was due to myocardial infarction in 4 patients and Chronic Kidney disease in one patient.

Interval of postoperative stay

In our series, all the patients were discharged after the patient is trained for active mobilisation and when fit were for discharge. Most of our patients, 59.6% of Bipolar and 56% of AMP group stayed between 10-15 days. But 29% of Bipolar were discharges within 10 days because of their active recovery when compared to 26% in AMP group. Post operative stay is statistically similar.

According to Cornell [12] there was no differences in the postoperative complication rates or lengths of hospitalization were seen between the two groups.

Interval from surgery to mobilisation

All our patients were mobilised as early as possible depending on patient compliance. Most of the patients were mobilised within 3 days in both groups, 61.5% in bipolar and 63.6% in AMP

Acetabular erosion

Two patients from AMP group when followed up to one year presented with painful hip and acetabular erosion. Shortening of 2 cm was noted and gross restricted range of motion was observed, thereby limiting his functional activity. It was classified as grade 2 according to Baker.

Acetabular erosion was graded according to the criteria of Baker *et al*. as grade 0 (no erosion), grade 1(narrowing of articular cartilage, no bone erosion), grade 2(acetabular bone erosion and early migration), and grade 3 (protrusion acetabuli) [92].

Whittaker *et al* reported in a series of 160 hemi arthroplasty cases, rate of joint spacing in 5-year study was 64% with AMP prosthesis [13].

D Arcy and Devas reported experience in unipolar prosthesis in a study of361 cases, acetabular erosion of 11% and posterior dislocation in 2% [8].

D'Arcy and Devashave shown that acetabular erosionafter hemi arthroplasty, usually begins at 3 years, and Wetherell and Hinveshave pointed out that once it begins, erosion appears to progress at a steady rate [7].

Baker *et al* reported acetabular erosion in 21 out of 32 patients treated with a unipolar HA after a mean follow-up of 39 months, giving an overall rate of acetabular erosion of 66% [14].

Acetabular erosion occurs as a result of impact causing injury to the acetabular cartilage at the time of the accident, especially as the elderly often sustain injury by a fall directly on the hip. Excessive pressure onthe acetabular cartilage after arthroplasty also produces erosion when insufficient femoral neck is resected in the anxiety to obtain a firm, stable reduction. It is felt that the exact matching of the size of the prosthetic head is particularly important, too large a head producing ring wear of the acetabulum and too small a head increased point bearing with subsequent wear. Finally, the cemented metal implant within the upper part of the femoral shaft will be more likely to transmit the impact of each footfall with greater stress across the prosthesis to bone interface than would normal bone in which there is considerable resilience.[15]

Skala-Rosenbau (2009) observed that prosthesis migration depended on the position of the head, CE angle and position of the prosthetic stem in the medullary canal. The resection level of the femoral neck and resulting from it the position of the prosthetic head is a significant factor influencing the progress of acetabular erosion James and Gallannaugh reported no evidence of acetabular erosion in 323 patients treated with bipolar prosthesis followed for more than 7 years [16].

Goldhill *et al* reported on a series of 246 bipolar patients with 1-6 year follow-ups, showing no evidence of significant acetabular wear or femoral component loosening [17].

The theoretical advantage of the bipolar design was to dissipate the joint forces through the inner bearing surfaces, thereby decreasing the rate of superior acetabular erosion. Cadler described acetabular erosion after hip hemiarthroplasty is a longer- term problem in younger patients. There were three cases in the unipolar group and none in the bipolar, which may demonstrate the theoretical benefit of the bipolar prosthesis,although the differences were not statistically significant [18].

Sepsis

In our study, we had 5 cases of superficial infection, 3 (11.5%) in bipolar and 2 (9%) in AMP group. It was managed conservatively with IV antibiotics, based on the culture growth. 3 (13.6%) patients in AMP Group and 2 (7.6%) patients in Bipolar Group developed Haematoma.

Reported incidences of superficial infection after primary prosthetic arthroplasty include Salvatti *et al* (1973) -8.3%; Salvatti *et al* (1973) 8.3%; Saraf and Saxena (1978) 3.7%; Mukherjee and Puri (1986) 3%; Bavadekar and Manelkar (1987) 7.6% and Jack and Moshein (1990) 2.3%. The infection was no ways related to the prosthesis. Overall, the incidence of complication rate is more noted with AMP group.

Pain

Lanceford (1965) felt that the pain following hemiarthroplasty should not be the cause for condemning the procedure. He listed following causes for pain: Infection, improper prosthetic seating, metallic corrosion and tissue reaction, improper sized femoral head, contractures, periarticular ossification, toggle or acetabular wandering and redundant ligamentum teres [19].

In our series, 73.1% of bipolar and 40.1% of AMP had no pain. Distribution of pain is less in Bipolar group and the difference is statistically significant p=0.009.

Limping and use of cane

Limping is a common consequence of hemiarthroplasty in adults. Exact cause cannot be attributed to this. Alteration in the abductor mechanism due to excision of little more neck is the most probable cause [Saraf and Saxena, (1978); Hinchey and Day (1964)] [20].

All the patients were asked to use a cane on the sound side regularly. This decreases load on the prosthetic head. Once the patient got enough endurance they were advised to discard the cane.

Stinchfield and Cooperman (1957) reported 14% of their patients using cane regularly. 16% of Barr and Donovan (1964) series were using the cane always, 34% were using occasionally and 20% discarded it. Saraf and Saxena (1978) reported 52.7% patients using cane regularly, 23.1% occasionally and 21.8% were not using it.

In a study of forty cases of Austin Moore replacementdone for femoral neck fractures over an average follow-upperiod of 26 months. Malhotra *et al* reporteda limp was seenin 35 cases (87.5%) due to pain, shortening, or abductormuscle weakness [21].

Sitting on chair

80.8% of bipolar group and 59.09% of AMP group were able to sit in a chair comfortable for more than a hour. Statistically both the groups are similar with p value=0.1219

Use of public transport

In our series, 69% of bipolar group were able to use public transport compared to 54% of AMP group (p=0.0452) and the difference was statistically significant.

Use stairs

Maximum of our patients, 68% of AMP and 61.5% of bipolar group use support for climbing stairs. Statistically both the groups are similar with p=0.4251.

Distance walked

69.2% of bipolar were able to walk unlimited compared to only 46% of AMP. There was no statistical difference between the two groups (p=0.2592). Bhushan M Sabnis, Ivan J Brenkel [22] reported 14% unipolar walking unaided compared 54% of bipolar walking alone outside.

Harris Hip Score

All the cases in our series were assessed according to Harris Hip Score and graded accordingly as Excellent, Good, Fair, Poor and Failure. We got 61.5% excellent result with Bipolar group and 56% with AMP group. The mean HHS was 90.03 in Bipolar and 84.4 in AMP group. Distribution of result is statically similar in both groups (p=0.3283) but the mean score is statistically more associated with patients with bipolar prosthesis.

Yamagata *et al*, in their classical study of, reviewed 1001 cases of hip hemi arthroplasty, there were 682 unipolar and 319 bipolar cases. patients undergoing bipolar exhibited higher hip score and lower acetabular erosion rates compared to unipolar patients [23].

Bochner *et al* reported their experience with bipolar arthroplasties in a consecutive series of 120 hemiarthroplasties. In this group, 90 patients were followed for at least 2 years, with 91% being pain free and 92% demonstrating satisfactory power and motion [24].

Lestrange reviewed496 patients with bipolar replacements for displaced femoralneck fractures and compared them with patients havingfixed-head prosthesis. He found that the bipolarprosthesis offered advantages over one-piece designs interms of stability, decreased acetabular erosion, andimproved function [25].

According to Wathne, based on the results of this study, there does not appear to be any advantage to the use of bipolar endoprosthesis for the treatment of femoral neck fractures in the elderly patient [26].

Calder *et al* published the results of a study including 250 patients, all aged 80 years or more, with a 1.5–2-year follow-up. A higher proportion of patients returning to their preinjury condition was found in the unipolar HA group, but no other differences were found [18].

In 2001, Davison *et al* presented the results from the same study for the 187 patients aged 65–79 years with a minimum two-year follow-up. No differences between randomization groups were reported, but the interpretation is limited by the fact that 18% of the patients were lost to follow-up [27].

According to Ong BC, there was no significant differences were found between the unipolar and bipolar groups [28].

Finally, in 2003, Raia *et al*, reported the results of a study including 115 patients randomized to a more modern cemented unipolar HA or bipolar HA with identical stems. At the one-year assessment there were no significant differences between the groups in terms of surgical complications, functional outcome [29].

Hence, compared to previous studies, in our study there appears to be a significant difference between the two groups functionally; better function with range of movement, use of public transport and pain, are associated better with bipolar group. And also, mean HHS is better with bipolar group.

Conclusion

- Primary Hemi arthroplasty is an efficient way for treatment of displaced intra capsular neck of femur in elderly patients. The success of hemi arthroplasty depends on proper pre operative planning, aseptic precautions, co-morbid conditions and attention to surgical details.
- At the end of 1 year the percentage of patients achieving good to excellent outcome with Bipolar prosthesis were more than those with AMP though the difference was not statistically significant.
- After the end of 1 year mean Harris Hip score was 84.4 in Group A which was less when compared to 90.03 of Group B.
- Incidence of complications also were more in Group A when compared to Group B though the difference was not statistically significant.

- The mortality, post op stay and time of mobilisation also was similar between the two groups.
- There was no significant radiological difference between the two groups.
- Comparing the functional assessment, all the parameters were similar except for use of public transport being better with bipolar group.
- Pain also was better in Group B when compared to Group A.
- Which type of hemiarthroplasty should we select for the most elderly patients with displaced fractures of the femoral neck? Based on the results of our study and previous ones, there appears to be any statistical difference between the two groups, that is bipolar being better in functional aspects. On the other hand, the results of our study showed that incidence of complication were lower after the bipolar HA, which in turn may indicate an advantage in the longer term.
- Some of the western literature, report that disadvantage of Bipolar being a higher cost but it was not considered in our institution, as there not much cost difference between the two prosthesis.
- Limitation of the study is that the period of study is less, and sample is small number. Although an unbiased observer assessed all clinical variables except hip motion, this observer was not blinded to the type of surgical intervention, which may add a risk of bias.

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