

Original Research Article

A comparative study of the outcome of displaced fractures neck of femur treated with unipolar prosthesis and fenestrated bipolar prosthesis in active elderly patients

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ABSTRACT

Background: Fractures of the neck or femur are among the most serious surgical problems affecting older groups. These fractures constitute a large burden on families and society due to the inability to stand and walk. Objectives were to compare the functional outcomes of unipolar (Austin-Moore) versus uncemented bipolar hemiarthroplasty in displaced fractures neck femur among these active elderly patients.

Methods: This prospective interventional study was carried out at NITOR, Dhaka, Bangladesh in total 60 patients. Among them, 30 patients were treated with unipolar and 30 patients were treated with fenestrated bipolar prosthesis through a lateral approach.

Results: There was no significant age difference between the two groups. Regarding the functional outcome, 6 (20%) patients in the unipolar group and 11 (36.67%) patients in the bipolar group had excellent outcomes. About the same number of patients had good outcomes 36.67% in the unipolar and 43.33% in the bipolar group; the fair and poor outcome was more in the unipolar group than the bipolar group. So, the final outcome after 6 months of operation, 57.57% of patients had satisfactory results in the unipolar group whereas 80% of patients had satisfactory results in the bipolar group. The average Harris hip score was 77.14 ± 14.58 in the unipolar group and 84.63 ± 10.15 in the bipolar group and the $p=0.01$ which is below 0.05. So, the result is statistically significant.

Conclusions: Uncemented bipolar hemiarthroplasty with a fenestrated stem can give better functional outcomes for displaced intracapsular femoral neck fractures in active elderly patients compared to Austin-Moore prostheses.

Keywords: Displaced fractures neck, Unipolar, Prosthesis, Fenestrated bipolar prosthesis

INTRODUCTION

The quotation “we come out into the world under the brim of the pelvis and go out through the neck of the femur” reflects the defeatist attitude that has long been held by medical personnel and layman toward femoral neck fractures.¹ Intracapsular fractures of the proximal femur account for a major share of fractures in the elderly. Osteoporosis, co-morbidities, and increased incidence of

trivial trauma increase the incidence and complicates the treatment of these fractures. People in this age group suffer from numerous illnesses that can aggravate the morbidity following fractures. An increase in the average life span and improved medical facilities have greatly increased the incidence of these fractures.² Garden’s classification, which is the most widely accepted classification of a femoral neck fracture, is graded according to the degree of displacement. The grades correlate with the prognosis for healing and the rate of avascular necrosis or non-union.

Other alternative classification systems were proposed by Pauwel's in which the femoral neck fracture type is based on the angle of fracture line with a horizontal plane and Pauwel's has attributed a higher incidence of non-union to greater shearing force in the more vertical fractures.³

The choice of surgical treatment for a displaced intra-capsular fracture of the neck or femur in elderly patients remains as controversial now as it was almost 50 years ago when it was referred to as "the unsolved fracture".⁴ Management of femoral neck fractures in elderly patients has been controversial. Important factors to consider in choosing any treatment modality are intrinsic, viz. patient age, general medical condition, types of fracture, bone quality; and extrinsic, viz. availability of facilities and socio-economic status.² Endoprosthetic replacement of the femoral head can provide early ambulation, weight bearing, restoration of stability, walking activities and a reasonably good range of movement to accomplish functional activities such as squatting and sitting in a prayer position.⁵

The main theoretical advantage of a bipolar over a unipolar prosthesis in the reduction of acetabular erosion is due to movement taking place within the implant rather than between the head of the prosthesis and the acetabulum.⁶ Another controversial thing is cemented or non-cemented hemiarthroplasty. There are some advantages of cemented unipolar or bipolar prosthesis like early full weight bearing, less pain and less loosening.⁷ But more operative time, per-operative blood loss and perioperative mortality are more in cemented groups due to fat embolism and aggravation of cardiovascular disturbances.⁸ It was hoped that the bipolar femoral head would diminish acetabular wear, decrease the rate of failure, and produce a painless arthroplasty.⁹ Use of an uncemented bipolar stem has been claimed to reduce operating time, with less blood loss, fewer postoperative complications and a lower mortality rate.¹⁰

On the other hand, a potential disadvantage is the risk of polyethylene wear that may contribute to mechanical loosening over time and there is also a risk of interprosthetic dissociation in certain bipolar hemiarthroplasty necessitating open reduction. Another disadvantage of bipolar prosthesis lies within construction principle: after approximately one-year, bipolar hemiarthroplasty acts as unipolar hemiarthroplasty.¹¹ Dislocation is the most common postoperative complication after primary and revision total hip total hip arthroplasty. The bipolar reconstruction provided stability without significant migration into the acetabulum/pelvis. Bipolar reconstruction is a viable salvage when other techniques have failed to solve recurrent hip instability.¹² This is a prospective randomized study of the short-term results of hemiarthroplasty using Austin Moore unipolar prosthesis and bipolar prosthesis. Outcomes at six weeks, three months and six months were analyzed and compared using modified Harris hip score and radiographs.

Objectives

General objective

General objectives were our study aimed to compare the outcomes of patients with fractures of the neck of the femur who underwent either a unipolar or bipolar hemiarthroplasty. The goal was to determine the most appropriate prosthesis for elderly patients.

Specific objectives

Specific objectives were to compare the anatomical outcome between two groups mainly by radiological examinations, to compare clinical outcomes such as deformities, and rate of complications between two groups and to compare the functional outcome between the two groups.

Ambrose pare of France first recorded the existence of hip fracture 400 years ago. Early attempts of hip fracture treatment evolved from symptomatic treatment with bed rest throughout a period of traction and spica cast application to the patients. It was thought that about 1/3rd of the cases obtained union of the fracture.¹³ These techniques were also associated with a high mortality rate. Despite anatomical reduction and secured internal fixation, the overall union rate was only 47%. The blood supply of femoral head from capsular vessels running in retinacula close to the bone is often cut off by the fracture and lead to avascular necrosis, delayed union and non-union in elderly persons. The widely used hemiarthroplasties are stemmed, single-component, stainless steel implants named Austin Moore. After 1 year follow-up, the average Harris hip score in bipolar was 86.16±12.18 and unipolar was 79.79±15.55 and range of motion was 210.63±28.39 and 181.58±37 respectively. Functional activities were better in the bipolar group. Complications likes' painful hip, posterior dislocation, periprosthetic fracture and acetabular erosion were encountered in unipolar prosthesis.¹⁴ Krishnan and Kumar, in the department of orthopaedic, Sree Gokulam medical college and research foundation, Kerala, India from March 2004 to August 2006 reviewed 40 cases of displaced fracture neck femur in which 20 cases were treated by Austin-Moore prosthesis and 20 cases were treated bipolar prosthesis. After the final follow up Austin-Moore hemiarthroplasty showed 77.78% of an excellent result and 22.22% of good result whereas bipolar hemiarthroplasty showed 87.5% of excellent result and 12.5% of good result.¹⁵ Smrke and Biscevic, the department of orthopaedics and traumatology, Bosnia and Herzegovina (2006) examined 145 cases where 32 patients were operated on unipolar prosthesis, 70 patients with bipolar prosthesis and 43 patients with total hip endoprosthesis. The mean value of Harris hip score was 72.1±17.8, 74.27±19.1, and 78.2±22.5 for patients with unipolar, bipolar, and total hip arthroplasty respectively. The functional outcome was better in bipolar than unipolar

but the total hip was better than in bipolar prosthesis. But there was no statistically significant difference.¹⁶

Normal hip joint

The hip joint is a multiaxial ball and socket variety of synovial joints. It is the articulation between the head of the femur (the ball) and acetabulum of the pelvic bone (the socket).

The important structures of the hip joint can be categorized as bones, ligaments and tendons, muscles, nerves, blood vessels and bursae.¹⁷

Acetabulum

It is the cup-shaped socket, formed by the fusion of the 3 components of innominate bone: ilium, ischium, and pubis. The articular surface covered with hyaline cartilage, forms a c-shaped incomplete ring (lunate surface), which is broadest above, through which the body weight is transmitted in the erect posture, and is deficient opposite the acetabular notch and in the floor of the acetabular fossa. This central non-articular part is occupied by the pad of fat which is lined by a synovial membrane.¹⁷

Femoral head

It is more than half of a sphere, and is capped with articular hyaline cartilage. Posterio-inferior to its center has a small rough area called the fovea, which gives attachment to the ligament of the head of the femur (ligamentum teres). Anteriorly, articular cartilage extends onto the neck.¹⁷

Fibrous capsule

The capsule is strong and dense. It is attached circumferentially around the acetabular labrum and transverse ligament. From its acetabular attachment, it extends laterally to surround the femoral head and neck and is attached anteriorly to the intertrochanteric line, posteriorly 1 cm super medial to the intertrochanteric crest.

Synovial membrane

Starting from the femoral articular margin, the synovial membrane covers the intracapsular part of the femoral neck and then passes to the internal surface of the capsule to cover the acetabular labrum, ligamentum teres, and fat in the acetabular fossa. It is thin on the deep surface of the iliofemoral ligament where it is compressed against the femoral head and sometimes is even absent here¹⁷. Iliofemoral ligament (inverted Y-shaped ligament of Bigelow).

The transverse acetabular ligament

It is a part of acetabular ligament which bridges the acetabular notch. The notch is thus converted into a

foramen which transmits acetabular vessels and nerve to the joint.¹⁷

METHODS

Study design

This prospective interventional study was undertaken to evaluate the result of replacement hemiarthroplasty by Austin-Moore and bipolar prosthesis with the fenestrated stem.

Study period

This study was conducted during the period from July 2014 to June 2016 (24 months).

Place of study

The study was carried out at the national institute of traumatology and orthopaedic rehabilitation (NITOR), Dhaka.

Study population

All active elderly patients aged ≥ 65 years with clinical and radiological evidence of displaced fracture neck of the femur (Garden type-III and IV) were admitted to the hospital for an operation.

Sample size

The sample size was determined using following formula:

$$N = Z^2 [p_1(100-p_1) + p_2(100-p_2)] / d^2$$

P_1 = anticipated proportion in Austin-Moore group taken as 60% according to literature, P_2 = anticipated proportion in bipolar group taken as 80% according to literature, Z = standard normal deviate = 1.96 corresponding to 95% of CI, d = allowable error [here 10% of $(p_2 - p_1) = 10\% \times (80 - 60) = 2$], n = sample size, So, sample size, $n = 1.96^2 [60(100 - 60) + 80(100 - 80)] / 2^2 = 7683$.

Due to time and financial constraints as well as unavailability of patients, 60 patients were included up to the final follow up in which 30 patients were operated by Austin-Moore prosthesis and 30 patients were operated by fenestrated bipolar prosthesis.

Sample collection

From the emergency and outpatient department of NITOR.

Sampling method

Purposive sampling (nonrandomized) according to the availability of the patients and strictly considering the inclusion and exclusion criteria.

Criteria of selection of cases

Inclusion criteria. Fracture neck of the femur garden type-III and IV in active elderly patients. Sex: both sexes. Age: age ≥ 65 years. Either side is affected.

Duration of fracture more than 24 hours. Active elderly patient, functional ability according to Kantz ADL

Exclusion criteria

Age below 65 years. Unstable medical illness. Active hip joint infection or elsewhere in the body. Abductor insufficiency of the hip joint. Advanced osteoarthritis involving the acetabulum. Age of the fracture >2 months.

Study procedure

A data collection form was prepared by the researcher considering the key variables like age, sex, presenting symptoms, clinical findings, associated medical conditions, investigations, preoperative findings, and outcome of surgery which was verified by the guide. Data were collected by the researcher himself. The aims and objectives, procedure, risks, and benefits of the study were explained to the selected patients. The patients were encouraged for voluntary participation. They were also assured about the secrecy of information and records. Then written informed consent was taken from each patient.

Diagnosis of displaced fracture neck femur was made by: History- a complete history of the selected cases. clinical examination. Relevant investigations.

Pre-operative preparation

The patient was counselled regarding the treatment procedure with emphasis on the available options along with the merits and demerits of each. He/she was also informed about the possible post-operative sequel. Informed written consent was taken for each case included in the study. The pre-anesthetic check was done. The patient was asked to abstain from oral feeding for 6 hours before the operation. Appropriate size Austin-Moore prosthesis / uncemented bipolar prosthesis with fenestrated stem were selected.

Surgical procedure

With all aseptic precautions replacement hemiarthroplasty was achieved with Austin-Moore prosthesis or uncemented bipolar prosthesis with fenestrated stem by only lateral trans-gluteal (Hardinge) approach. Details surgical procedure has been described in appendix-IV.

Post-operative management

The principal aim of the operation was to set the elderly patients back to mobility and independence as quickly as possible. On the whole, the more aged the patient, the

sooner he/she should be encouraged to get out of bed and start weight bearing with gradually increasing walking.

First postoperative day

From the day after operation, each patient was instructed to get up from bed and sit on the edge of the couch. Static quadriceps exercise and active movement of the ankle and toes were encouraged. Pillow was maintained in bed between the knees and continued for three weeks during sleeping. Each patient was advised to take deep breath and cough out secretions from respiratory tract.

Follow-up

The patients were followed up at outpatient department.

Follow-up schedules and activities: 1st follow-up: 06 weeks after the operation, 2nd follow-up: 12 weeks after the operation and 3rd follow-up: 24 weeks after the operation.

During the final follow up radiological features of the patients were assessed by A/P view and lateral view of the affected pelvis. Ultimately, every patient was evaluated clinically by modified Harris hip score and radiologically.

Data collection

A structured data collection form was developed containing all the variables of interest. Data were collected by interview, observation, clinical examination and investigations.

Data analysis

Once data collection was completed, data compiled and tabulated according to key variables. Statistical analysis of different variables was analysed according to standard statistical methods by using Microsoft excel 2010.

RESULTS

This prospective interventional study was carried out at national institute of traumatology and orthopaedic rehabilitation, Dhaka, Bangladesh, from July 2014 to June 2016 (24 months). Total=60 cases were studied and were followed up ranging from 6 weeks to 24 months. The salient results based on a minimum 6-month follow-up were as follows.

Table 1: Ages distribution between two groups.

Age (years)	Unipolar group		Bipolar group		P value
	N	%	N	%	
65-74	17	56.67	18	60	0.134
75-84	12	40	12	40	
≥ 85	1	3.33	0		
Mean	71.83		70.24		
\pm SD	± 5.39		± 5.24		

In this study, the age of the patients ranged between 65-85 years. Maximum age incidence was found in 65-74 years of age in both unipolar and bipolar group and the mean age was 71.83±5.39 in Austin-Moore group and 70.24±5.24 in bipolar group. The p=0.134 which is >0.05. The ages of the patients between two groups were not significantly different. Student's t test (unpaired two-tailed) was employed to analyse the data and the data were presented as mean ± SD.

Sex distribution

In chart1 shows out of 30 patients 13 (42.86%) were male and 17 (57.14%) were female in Austin-Moore group. And in case of bipolar group out of 30 patients, 7 (23.33%) male and 23 (76.67%) female. So, females are more sufferers of fracture neck of the femur than males in both groups.

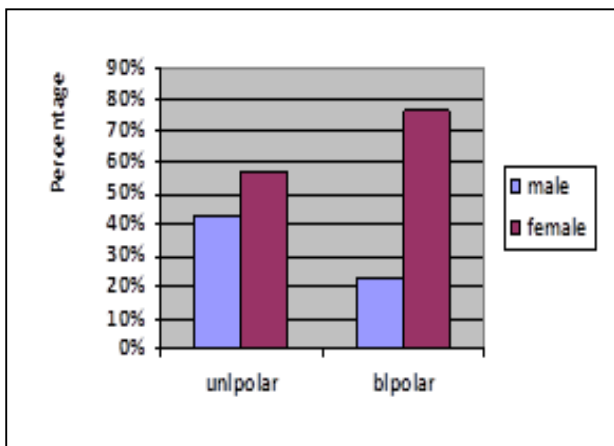


Figure 1: Comparison of sex between two groups.

Clinical information

Side involved: In chart 3 showed among 30 patients 17 (56.67%) had left-sided and 13 (43.33%) had right-sided neck fractures in the Austin-Moore group. But in bipolar group out of 30 cases 15 (50%) had left side and 15 (50%) had right-sided neck fractures. So left sided neck fracture more or equally affected.

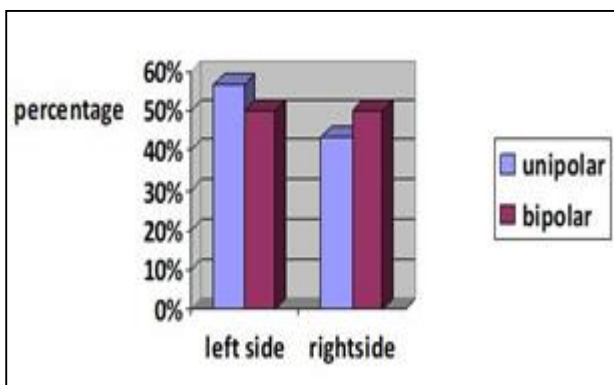


Figure 2: Comparison of the side involvement between two groups.

Table 2: Comparison of causes of injuries between two groups (n=30+30).

Causes of injury	Unipolar group		Bipolar group	
	N	%	N	%
Fall on slippery ground	15	50	20	66.67
Fall from rickshaw/ bicycle/ bus	10	33.33	3	10
Fall from stair	3	10	6	20
RTA	2	6.67	1	3.33
Total	30	100	30	100

In this study the causes of injury were fall on the slippery ground occurred in 15 cases (50%) in unipolar group and 20 cases (66.67%) in bipolar group, fall from rickshaw/bicycle/van/bus occurred in 10 cases (33.33%) in unipolar group and 3 cases (10%) in bipolar group, fall from stairs occurred in 3 cases (10%) and 6 cases (20%) in bipolar group, RTA occurred in 2 cases (6.67%) in unipolar group and 1 (3.33%) case in bipolar group. So, fall on the slippery ground were the main causes of neck fracture in both groups.

Table 3: Comparison of duration of fracture between two groups.

Age of fracture (In years)	Unipolar group	Bipolar group
The average time interval between injury and operation (days)	17.97	22.56

The minimum time interval between injury and operation was 3 days in unipolar group and 4 days in bipolar group, the maximum time interval in both unipolar and bipolar were 60 days. Table 3 showed the average duration fracture neck femur were 17.97 days in Austin-Moore group and 22.56 days in bipolar group.

Table 4: Distribution of patients by associated disorders in between two groups.

Associated medical disorders	Unipolar group		Bipolar group	
	N	%	N	%
Diabetes mellitus	05	16.67	04	13.33
Hypertension	05	16.67	03	10
Ischaemic heart disease	01	3.33	00	00
Bronchial asthma	01	3.33	03	10
No associated disorders	18	60	21	70
Total	30	100	30	100

In this series 5 patients (16.67%) had diabetes mellitus, was controlled by soluble insulin pre-operatively and post-op, 5 patients (14.28%) had hypertension which was controlled by anti-hypertensive medication, 1 patient (3.33%) had ischaemic heart disease and 1 patient (3.33%) had bronchial asthma in unipolar group. Whereas 4 patients had diabetes, 3 patients had hypertension and 3 patients had bronchial asthma in bipolar group.

Data was analysed by student's t test (unpaired, two tailed) and expressed as mean \pm SD. Table 5 showed during the initial follow up almost all patients complained of slight to mild pain. But at final follow up 7 patients (23.33%) had painless hip in unipolar group whereas 10 patients (33.33%) in bipolar group, 10 patients (33.33%) complained of slight pain on walking long distance in unipolar group whereas 14 patients (46.62%) had slight pain in bipolar group, 10 patients (33.33%) in unipolar group and 5 patients (16.67%) in bipolar group had constant mild pain which needed medication for relieve

after hemiarthroplasty, moderate and severe pain present only unipolar group 2 patients (6.67%) and 1 patient (3.33%) respectively which were not completely relieved by medications. Mean scores of pain were 35.26 ± 8.59 in unipolar group and 39 ± 5.96 in bipolar group, $p=0.027$ that is <0.05 which is statistically significant.

Data were analysed by student's t test (unpaired and double-tailed) and expressed by Mean \pm SD. Sitting capacity significantly improved in all the patients in both groups except 5 patients (16.67%) in the unipolar group could sit on a high chair. Mean scores were 4.67 ± 0.76 in case unipolar and 5 ± 0 in case of bipolar group. $P=0.01$ (<0.05) which is statistically significant were analysed by student's t test (unpaired and double-tailed) and expressed by Mean \pm SD. Sitting capacity significantly improved in all the patients in both groups except 5 patients (16.67%) in the unipolar group could sit on a high chair. Mean scores were 4.67 ± 0.76 in case unipolar and 5 ± 0 in case of bipolar group, $p=0.01$ (<0.05) which is statistically significant.

Table 5: Comparison of the patients by Harris hip score on pain between two groups, (n=30+30).

Pain	Unipolar			Bipolar			P value
	N	Score	%	N	Score	%	
No pain/ ignored	07	308	23.33	10	440	33.33	0.027
Slight	10	400	33.33	14	560	46.67	
Mild	10	300	33.33	05	150	16.67	
Moderate	02	40	6.67	01	20	3.33	
Severe	01	10	3.33	00	00	00	
Total	30	1058	100	30	1170	100	
Mean \pm SD		35.26 ± 8.6			39 ± 5.96		

Table 6: Comparison of the patients by Harris hip score on sitting capacity between the two groups, (n=30+30).

Sitting capacity	Unipolar group			Bipolar group			P value
	N	Score	%	N	Score	%	
Ordinary chair	25	125	83.33	30	150	100	0.01
High chair	5	15	16.67	0	0	0	
Unable	0	0	0	0	0	0	
Total	30	140	100	30	150	100	
Mean \pm SD		4.67 ± 0.76			5 ± 0		

Table 7: Distribution of the patients by complications between two groups, (n=30+30).

Complications	Unipolar group		Bipolar group	
	N	%	N	%
No complication	25	83.33	25	83.33
Per-operative	0	0	0	0
Post-operative				
Immediate				
Femoral fracture	0	0	0	0
Dislocation	0	0	0	0
DVT	0	0	0	0
Infection	02	6.67	3	10
Late:				
subsidence of prosthesis	0	0	0	0
Implant loosening	02	6.67	2	6.67
Acetabular erosion	1	3.33	0	0
Total	30	100	30	100

In this study, per-operative complications like fracture of the proximal femur during reaming/ cortical breakage/ steam breakage/failure of reduction did not occur in any patient of both groups. 25 patients (83.33%) in the unipolar group and 25 patients (83.33%) in the bipolar group had no complication post-operatively (immediate and late). Infections occurred in 2 patients (6.67%) in the unipolar and 3 patients (10%) in the bipolar group, loosening of femoral stem in 2 patients (6.67%) in the unipolar group and bipolar group, acetabular erosion occurred in 1 patient (3.33%) only in the unipolar group.

Table 8: Comparison of final outcome between the two groups, (n=30+30).

Outcome variable	Unipolar group		Bipolar group	
	N	%	N	%
Satisfactory	17	56.67	24	80
Unsatisfactory	13	43.33	6	20
Total	30	100	30	100

For valid statistical analysis, excellent and good results were grouped as satisfactory; and fair and poor results were grouped as unsatisfactory. According to Harris hip score 17 (56.67%) patients in the unipolar group and 24 patients (80%) in the bipolar group had satisfactory outcomes, 13 patients (43.33%) in the unipolar and 6 patients (20%) in the bipolar group had unsatisfactory outcomes post-operatively. Satisfaction was significantly higher than that unsatisfactory in both groups.

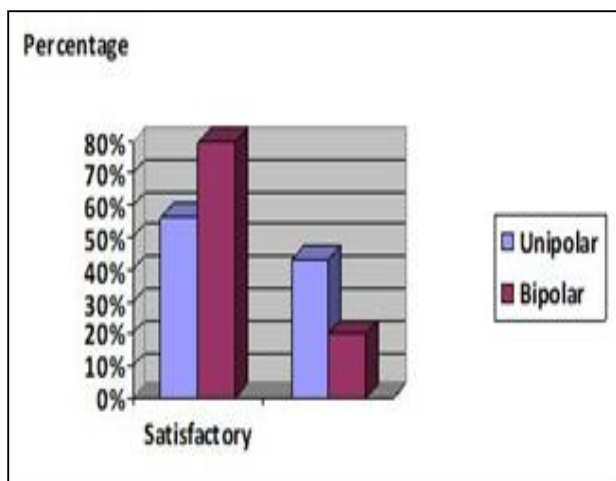


Figure 3: Comparison of final outcome between unipolar and bipolar groups.

DISCUSSION

Despite the frequency with which displaced intracapsular femoral neck fractures occur, the best management remains undecided. It is accepted that surgery is the mainstay of treatment, but debate continues on the role of internal fixation versus hemiarthroplasty, unipolar versus bipolar hemiarthroplasty and whether or not the prosthesis

should be cemented. In this study 30 patients of fracture neck of the femur were included for evaluation of the outcome of replacement hemiarthroplasty of the femoral component by Austin-Moore prosthesis and another 30 patients by uncemented bipolar prosthesis with the fenestrated stem in active elderly patients. The patients were purposively assigned. During the period of July 2014 to June 2016, these 60 patients with femoral neck fractures were treated in NITOR, Dhaka. In the unipolar group, the mean age was 71.83±5.39 years whereas in bipolar group the mean age was 70.24±5.24 years and the p=0.134 (>0.05). So, there was no significant age difference between the two groups. In the present study in unipolar group out of 30 patients 17 patients (57.14%) were female and 13 (42.88%) were male and in bipolar group out of 30 patient 23 patients (76.67%) were female and 7 patients (23.33%) were female. Similar sex incidence was observed by Krishnan et al in Kerala, India 2013 showed females constituted the majority, 60% of total cases in Austin-Moore prosthesis and bipolar group females constituted 70% of total cases.¹⁵ So, females are most prone to neck fractures in the elderly period.

In my study, the most common causes of fracture neck of femur were minor trauma such as falls on slippery grounds which constituted 50% of cases in unipolar prosthesis and 66.67% in bipolar prosthesis A similar result found that 17 (56.67%) patients in unipolar group and 24 patients (80%) in bipolar group had satisfactory outcomes, 13 patients (43.33%) in unipolar and 6 patients (20%) in bipolar group had unsatisfactory outcomes post-operatively.¹⁸ Rahman found left side (64.7%) was more affected than right side (35.3%) in Austin-Moore prosthesis which result was similar to my study. Islam found left side (71.43%) involvement was more right side (28.67%) which is not similar result to my study.¹⁹ Pain is a subjective sensation and its sensitivity varies from person to person. There is no definite method available to measure pain. In the present study, 56.67% of patients had no or slight pain in unipolar prosthesis group but 80% of patients had no pain or slight pain in bipolar group.

The mean pain scores were 35.3±8.59 in unipolar group and 39±5.96 in bipolar group and the p=0.03 (<0.05) which is a significant result. A similar result found Sabnis in the United Kingdom stated bipolar hemiarthroplasty offers better pain relief than unipolar prosthesis. Painful hip was found in 13.3% of unipolar prostheses whereas 6.7% was found in bipolar prosthesis.²¹ The slight difference was due to their long-term follow-up. In this present series, 83.33% of patients had no or slight limping in unipolar group and 93.33% of patients had no limping or slight limping in bipolar group. The mean scores on limping were 8.6±2.14 in unipolar group and 9.6±1.88 in bipolar group and the p=0.03 (<0.05) which is a significant result. This is similar to what showed no limping occurred in Austin-Moore group was 42.95% but in bipolar group 52.9%. In my study out of 30 patients, 7 patients in unipolar group and 14 patients in bipolar group could walk unlimited.¹⁴

The mean scores in distant walking were 8.1 ± 2.15 in unipolar group and 9.2 ± 1.86 in bipolar group. The $p=0.02$ (<0.05) which is statistically significant. In my study, 11 patients (36.67%) in unipolar group and 18 patients (60%) in bipolar group could use public transport independently. The mean scores were 0.37 ± 0.49 in unipolar group and 0.6 ± 0.50 in bipolar group. The $p=0.03$ which is statistically significant. Range of motion is a vital issue in hemiarthroplasty patients. In this series, 15 patients (50%) in unipolar group and 22 patients (73.33%) in bipolar group had reasonably good range of motion. The mean scores in unipolar and bipolar group were 4 ± 1.01 and 4.47 ± 0.9 respectively. The $p=0.03$ (<0.05) which is statistically significant. A similar result was found in Khalek study.²⁰ study at Mansoura University, Egypt where all types range of movements were more in bipolar than unipolar group. No erosion of the acetabulum has yet been found in bipolar series but one acetabular erosion occurred in Austin-Moore series. A similar result was found in where acetabular erosion was found in 6.67% of cases but no erosion was found in bipolar group.²¹ The same result was also found in where 5.2% acetabular erosion occurred in Austin-Moore but no acetabular erosion occurred in bipolar group.¹⁴

The functional outcome of this series was measured by Harris hip score. In my study, 6 patients (20%) in the unipolar group and 11 patients (36.67%) in the bipolar group recovered with excellent outcomes, 11 patients (36.67%) in unipolar and 13 patients (43.33%) in the bipolar group recovered with good outcomes, 8 patients (26.67%) in unipolar group and 4 patients (13.33%) in the bipolar group with the fair outcome, 5 patients (16.66%) in unipolar group and 2 patients (6.67%) in the bipolar group with poor outcome and the average Harris hip score in the unipolar group was 77.1 ± 14.58 and bipolar group was 84.63 ± 10.15 . The $p=0.01$ (<0.05) which is statistically significant. This same result was found in where 80% were satisfactory results in unipolar group and 86.6% satisfactory in bipolar group; 20% were unsatisfactory in the unipolar group and 13.4% in bipolar group.²¹ It is seen that replacement hemiarthroplasty for the displaced fracture of the femoral neck in the elderly does not carry excessive risk of morbidity and mortality. After good technical expertise during the procedure, good supportive care, prophylactic antibiotic, adequate physical therapy and nursing care, replacement hemi-arthroplasty by bipolar prosthesis with fenestrated stem is a rational choice in the treatment of displaced femoral neck fractures, it mobilises the patient faster, decrease the morbidity rate and thus maximally improves the overall results.

Limitations

Small sample size. The follow-up period in our study was short (6 weeks to 6 months) in comparison to other series. So, late postoperative complications could not be evaluated. Different cases were operated by different surgeons.

CONCLUSION

Uncemented bipolar hemiarthroplasty with a fenestrated stem can give better functional outcomes with minimal complications for displaced intracapsular femoral neck fractures in active elderly patients compared to Austin-Moore prosthesis.

Recommendations

Similar type of study should be performed on large sample size. Follow up of similar type of study should be done for prolong period. All operations would be operated by single surgeon. The patients, who had wide medullary cavity, should not be operated by cementless unipolar or bipolar prosthesis.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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