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Comparative study between functional outcomes of fracture neck of femur treated with cemented total hip replacement vs cemented bipolar hemiarthroplasty in elderly

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Abstract

Hip fracture is a conventional trauma and occurrence of neck of femur fractures is increased in cases of osteoporosis, comorbidities and increased trauma. Modality of treatment for neck of femur fracture depends on functional demand and mobility of the patient. Role of operative treatment is to decrease complications and get back the patient to pre morbid condition. Hemiarthroplasty is a major surgery, which has a large exposure, thus more intraoperative bleeding when compared to the counterpart surgery. Bipolar cemented hemiarthroplasty has another advantage of fast mobilization and decreased pain post-surgery. If required, it can be extended into a THR with the same femoral prosthesis. Cemented hemireplacements has less peri-prosthetic fracture rate and loosening of prosthesis is less common.. Cementing will give a tighter attachment and will also decrease post-surgical pain in mid-thigh region and less chances of re surgery.

Keywords: Neck of femur fracture, hemiarthroplasty, total hip arthroplasty, cemented bipolar hemiarthroplasty, harris hip score, avascular necrosis of femoral head, ICNF

Introduction

Hip fracture is a conventional trauma. With growing life expectancy globally, the elderly population is on rise. 53% of hip fractures are constituted by ICNF fractures of which 33% is non displaced and 67% are with displacement. Proximal femur fractures are a common reason for hospitalization among trauma cases. Classification is based on the anatomical site of fracture into: neck of femur fracture, inter trochanteric fracture and subtrochanteric fracture. Every fracture pattern needs specific treatment and have subsequent complications and dispute regarding the ideal modality of treatment. Femur neck fracture management in old age has always been controversial. Due to large number of complications linked to fracture of neck of femur, like failure to unite, loosening of implants and avascular necrosis of head of femur, these fractures were believed to be “unsolvable fractures” in older times. Now a days, many operative options (CC screw, DHS, blade plate, hemi and THA) are possible. Before selecting the modality of treatment certain factors, like age of patient, comorbidities, fracture type availability of facility and socio-economic condition of the patient has to be taken care of.

Femoral neck and head replacement with a prosthesis is a better option to problems that were present with internal fixation and is henceforth an appealing choice in older population.

Due to limited success of unipolar hemiarthroplasty bipolar hemiarthroplasty was evolved which had less chances of gradual erosion of acetabulum and protrusion. Age, comorbidities, fracture type, socioeconomic condition and accessibility of facility to the patient are the elements considered for choosing this modality of treatment. Prosthetic replacement and osteosynthesis are the 2 treatment modalities in elderly population. Prosthetic replacement is preferred choice of treatment as they have less chances of osteonecrosis and non-union^[1].

Absolute management for neck of femur fracture is surgical, but it has its own pro's and con's. There is a higher incidence of repeat surgical procedure after open reduction and internal

fixation due to AVN and failure to unite. Total or partial hip arthroplasty is being considered as a superior option to any other operative procedure. These options should be given to such elderly patients which are affordable and are ready for lifestyle modification so that the joints can last for longer period. Prosthetic replacement helps in early mobilization to return elderly patients to activity and help avoid complications. As a principle process, prosthetic replacement will remove chances of osteonecrosis and failure to unite as complications of neck of femur fracture. It further reduces the risk of revision surgery as compared to osteosynthesis.

When comparing the theoretical advantage between bipolar and unipolar prosthesis there is significant decrease in acetabulum erosion seen in bipolar implants due to the movement which takes place in the implant than between the acetabulum and head of prosthesis. This will also reduce pain. Modality of treatment for neck of femur fracture depends on functional demand and mobility of the patient. Cementing will give a tighter attachment and will also decrease post-surgical pain in mid-thigh region and less chances of re surgery. Cementing decreases the residual mid-thigh pain and has a better anatomical and physiological outcome has been proved in many studies. Therefore, the following study was taken up at our tertiary care centre to assess the functional outcome of neck of femur fracture (intracapsular) with total hip replacement and hemiarthroplasty as a primary method of treatment.

Aims and Objectives

Aims

To assess functional outcome of intracapsular fracture of femoral neck with THR and hemiarthroplasty as a primary modality of treatment with regard to

Objectives

- Patients mortality and morbidity
- Need for secondary surgery
- Implant failure

Material and Methods

A hospital based prospective, comparative study was conducted with 40 patients to compare functional outcome of fracture neck of femur treated with cemented total hip replacement vs. cemented bipolar hemiarthroplasty in elderly. The patients were divided in the following two groups of 20 patients:

- THR Group: Patients treated with cemented total hip replacement
- HA Group: Patients treated with cemented bipolar hemiarthroplasty

Study design

A hospital based prospective comparative study

Study duration

18 months

Study area

The study was done at our tertiary care centre in the department of orthopaedics, Dr. D. Y. Patil Medical College & Hospital & Research Centre, Pimpri, Pune on attending OPD/IPD.

Study population

All patients with fracture neck of femur who fulfilled the

inclusion criteria.

Sample size

40 patients

Sample size was calculated using the formula:

$$n = [z^2 p(1-p)]/d^2$$

Where: Z = table value of alpha error from Standard Normal Distribution table (1.96)

Power (p) = 80%

Precision error of estimation (d) = 0.18

$$n = [1.96 \times 1.96 \times 0.8 (0.2)]/0.18 \times 0.18 = 18.9$$

20 patients per group will be required to detect a significant difference and hence sample sizes of 40 patients were selected for the study.

Inclusion criteria

- Patients with age group above 60 yrs.
- Gardens all types
- Patients who were mobile prior to fall/ fracture

Exclusion criteria

- Patients with age group below 60 yrs.
- Patients unwilling to give consent
- Patients medically unfit for surgery
- Patients with Dementia and bed ridden

Methodology

The study was done at our tertiary care centre in the department of orthopaedics, Dr. D. Y. Patil Medical College & Hospital & Research Centre, Pimpri, Pune, on attending OPD/IPD after due permission from the Institutional Ethics Committee and Review Board and after taking Written Informed Consent from the patients.

After approval from the Institutional Ethics Committee a valid informed consent was taken. Once the patients were enrolled for the study, a thorough history and physical examination was done as per proforma. An informed consent was taken in written from patients or patient's attendant.

Surgical approaches

All surgeries were performed by an experienced chief orthopaedist specialized in hip joint surgery. They were performed using the posterolateral approach with spinal anesthesia (total hip replacement was performed with combined spinal/epidural anesthesia). The femur was reamed to a diameter for inserting the uncemented prosthesis. For patients undergoing total hip replacement, the metalpolyethylene and ceramic-polyethylene interfaces of hip joint were used, where the acetabular bone was ground to a diameter of 1 mm smaller than the inserted prosthesis, and screws were used to enhance the fixation stability. In the anteroposterior X-ray of the hip joint, patients with an angle between the long axis of prosthetic stem and that of the femur of $\leq 3^\circ$ underwent central fixation, while those with an angle $> 3^\circ$ underwent varus or valgus fixation. No drainage tube was placed after surgery. Patients received 2g intravenous of second-generation cephalosporin to prevent infection half hour before surgery and at 6 and 12 hours after surgery.

Postoperative care

The following measures were applied to prevent deep vein thrombosis: 1) patients started oral rivaroxaban tablets on the first day after surgery (10 mg, once per day), and they began functional exercises of the lower extremities on the day of the surgery including isometric muscle contraction and relaxation, abduction, and hip and knee extension not exceeding 90°.

Activity intensity and frequency were determined based on individual tolerance. After X-ray verification and incision oozing disappearance, patients were guided to walk with aids with partial weight loading. Patients were informed of the risk factors for postoperative dislocation of hip joints such as excessive internal and external rotation, excessive flexion, flexion adduction, internal rotation, and other special positions. All patients aimed to be able to walk with full weight loading 6 weeks after surgery, without any restriction in daily life 3 months after surgery.

Follow-up

Patients underwent annual follow-up. HHS, complications and reoperation were recorded. Anteroposterior pelvic and lateral hip joint X-rays were observed by two experienced physicians, and correlated to the HHS. Complications were defined as any medical event arising from the surgery including hip osteoarthritis, dislocation of hip joint, intraoperative and postoperative periprosthetic fracture, prosthetic loosening, deep vein thrombosis, severe prosthetic deformation or even failure, superficial or deep infections, etc. Non-surgery-related complications such as urinary tract infection, lung infection, and cerebral infarction were not considered. Superficial infection in the hip area was defined as "no evidence showing that the infection extended to the periprosthetic area", while deep infection in the hip area was defined as "periprosthetic infection". Reoperation included reoperation due to acetabular osteoarthritis, loosening, infection, dislocation, and postoperative periprosthetic fracture. Follow-up ended with death or reoperation of hip joints.

Follow-up X-rays were compared with the initial X-rays, and the changes in the locations of femoral stem and acetabular prosthesis, heterotopic ossification, acetabular liner wear as well as wear and osteolysis of acetabular bone were recorded. The stability of the femoral prosthesis was determined using the Engh criteria [2]: bone ingrowths and no prosthesis subsidence (stem subsidence referred to a reduction of 5 mm of the distance between the apex of the lesser trochanter and medial apex of femoral stem) without or less hardening lines in prosthetic area. Stable fiber fixation referred to the presence of ≤ 1 mm periprosthetic radiolucent lines that were continuous and parallel to the prosthesis while there was no progressive displacement. Instable prosthesis meant that there was conclusive evidence showing progressive prosthetic subsidence, or presence of new varus and valgus, or appearance of separation of porous surface or prosthetic fracture.

Observations and Results

A prospective, comparative study was done with 40 patients to compare operative outcome of patients operated with

cemented total hip replacement vs. cemented bipolar hemiarthroplasty in older population. The patients were divided in the following two groups of 20 patients:

- THR Group: Patients treated with cemented total hip replacement
- HA Group: Patients treated with cemented bipolar hemiarthroplasty

Allotment of cases according to age

Majority of the patients (45%) in THR Group were from the age- range of 61-70 years followed by 40% from the age-range of 71-80 years and 15% from the age- range of 81-90 years. The mean age in THR Group was 71.65 ± 7.69 years.

Maximum patients (55%) in HA Group were from the age-range of 71-80 years followed by 35% from the age- range of 61 -70 years and 10% from the age- range of 81-90 years. The mean age in HA Group was 72.85 ± 6.85 years. No meaningful difference was observed between the groups as per Student t test ($p > 0.05$).

Table 1: Allotment of cases according to age

Age (Years)	THR group		HA group		p value
	N	%	N	%	
61-70 years	9	45%	7	35%	>0.05
71-80 years	8	40%	11	55%	
81-90 years	3	15%	2	10%	
Total	20	100%	20	100%	
Mean $\pm$ SD	71.65 ± 7.69		72.85 ± 6.85

Fig 1: Allotment of cases according to age

Allotment of cases according to sex

Majority of the patients in both groups were females. There were 85% and 75% female patients in THR Group and HA Group respectively whereas male patients constituted 15% and 25% of the study group respective. There was no meaningful intergroup variance in accordance with Chi-Square test ($p > 0.05$).

Table 2: Allotment of cases according to sex

Sex	THR group		HA group		p value
	N	%	N	%	
Male	3	15%	5	25%	>0.05
Female	17	85%	15	75%	
Total	20	100%	20	100%

Fig 2: Allotment of cases according to sex

Allotment of cases according to laterality

In THR Group, there were 8 (40%) and 12 (60%) cases of right hip and left hip respectively while in HA Group, there were 9 (45%) and 11 (55%) cases of right hip and left hip respectively. There was no meaningful intergroup variance in accordance with Chi-Square test ($p > 0.05$).

Table 3: Allotment of cases according to laterality

Laterality	THR group		HA group		p value
	N	%	N	%	
Right	8	40%	9	45%	>0.05
Left	12	60%	11	55%	
Total	20	100%	20	100%

Fig 3: Allotment of cases according to laterality

Allotment of cases according to mode of injury

Fall was observed to be the main cause of fracture in both the groups (90% and 85% respectively) followed by Road Traffic Accident (10% and 15% respectively). There was no meaningful intergroup variance in accordance with Chi-Square test ($p > 0.05$).

Table 4: Allotment of cases according to mode of injury

Mode of injury	THR group		HA group		p value
	N	%	N	%	
RTA	2	10%	3	15%	>0.05
Fall	18	90%	17	85%	
Total	20	100%	20	100%

Fig 4: Allotment of cases according to mode of injury

Allotment of cases according to comorbidities

4 (20%) patients in THR Group had hypertension while 2 (10%) patients each had diabetes mellitus and anemia. 1 (5%) patient had Chronic Obstructive Pulmonary Disease (COPD). 3 (15%) and 2 (10%) patients in HA Group had hypertension and diabetes whereas 1 (3.6%) patient each had Anaemia and COPD. There was no substantial variation among the clusters according to Chi-Square test ($p > 0.05$).

Table 5: Allotment of cases according to comorbidities

Comorbidities	THR group		HA group		p value
	N	%	N	%	
Hypertension	4	20%	3	15%	>0.05
Diabetes Mellitus	2	10%	2	10%	
Anaemia	2	10%	1	5%	
COPD	1	5%	1	5%	

COPD - Chronic obstructive pulmonary disease

Fig 5: Allotment of cases according to comorbidities

Comparison of duration of surgery between groups

In THR Group, 7 (35%) patients had operative time of 60-90 minutes whereas 13 (65%) patients had operative time of 90-120 minutes. In HA Group, 3 (15%) patients had operative time of <60 minutes whereas 13 (65%) and 4 (20%) patients had operative time of 60-90 minutes and 90-120 minutes respectively. The mean operative time was significantly longer in THR Group compared to HA Group as per Student t-test (103.90 ± 19.26 minutes vs. 77.75 ± 12.73 minutes; $P < 0.05$).

Table 6: Comparison of duration of surgery between groups

Duration of surgery (Mins)	THR group		HA group		p value
	N	%	N	%	
<60 mins	0	-	3	15%	<0.05
60-90 mins	7	35%	13	65%	
90-120 mins	13	65%	4	20%	
Total	20	100%	20	100%	
Mean $\pm$ SD	103.90 $\pm$ 19.26		77.75 $\pm$ 12.73

Fig 6: Comparison of duration of surgery between groups**Comparison of blood loss between groups**

In THR Group, 4 (20%) patients had bleeding <200 ml whereas 7 (35%) and 9 (45%) patients had bleeding of 200-300 ml and >300 ml respectively. In HA Group, 5 (25%) patients had bleeding <200 ml whereas 15 (75%) patients had bleeding of 200-300 ml. The mean bleeding was significantly greater in THR Group compared to HA Group as per Student t-test (294.60 $\pm$ 100.61 ml vs. 214.65 $\pm$ 58.36; $P < 0.05$).

Table 7: Comparison of blood loss among groups

Blood loss (ml)	THR group		HA group		p value
	N	%	N	%	
<200 ml	4	20%	5	25%	<0.05
200-300 ml	7	35%	15	75%	
>300 ml	9	45%	0	-	
Total	20	100%	20	100%	
Mean $\pm$ SD	294.60 $\pm$ 100.61		214.65 $\pm$ 58.36

Fig 7: Comparing blood loss between groups**Comparison of duration of hospital stay between groups**

In THR Group, greater part of the cases (40%) had a hospital stay of 7-14 days followed by 1-7 days (35%) and >14 days (20%). The mean duration of hospital stay was 9.95 $\pm$ 5.57 days.

In HA Group, majority of the patients (45%) had a hospital stay 1-7 days followed by 7-14 days (35%) and >14 days

(20%). The mean duration of hospital stay was 9.05 days. There was no meaningful difference between the groups as per Student t-test ($p > 0.05$).

Table 8: Comparison of duration of hospital stay between groups

Duration of hospital stay	THR group		HA group		p value
	N	%	N	%	
1-7 days	7	35%	9	45%	>0.05
7-14 days	8	40%	7	35%	
>14 days	5	20%	4	20%	
Total	20	100%	20	100%	
Mean $\pm$ SD	9.95 $\pm$ 5.57		9.05 $\pm$ 5.61

Fig 8: Comparison of duration of hospital stay between groups**Allotment of cases according to complications**

In THR Group, 3 (15%) patients had superficial infection while 1 (5%) patient each had periprosthetic fracture and dislocation of hip joint. No patient had prosthetic loosening. In HA Group 2 (10%) patients each had superficial infection and periprosthetic fracture. No patient had dislocation of hip joint and prosthetic loosening. There was no death in our study. There was no meaningful intergroup variance in accordance with Chi-Square test ($p > 0.05$).

Table 9: Allotment of cases according to complications

Complications	THR group		HA group		p value
	N	%	N	%	
Superficial Infection	3	15%	2	10%	>0.05
Periprosthetic fracture	1	5%	2	10%	
Dislocation of hip joint	1	5%	0	-	
Prosthetic loosening	0	-	0	-	
Mortality	0	-	0	-

Fig 9: Allotment of cases according to complications

Allotment of cases according to Need for Secondary Surgery 1 (5%) patient in THR Group required secondary surgery while no patient in HA Group required secondary surgery.

There was no meaningful difference between the groups in accordance with Chi-Square test ($p>0.05$).

Table 10: Allotment of cases according to need for secondary surgery

Need for secondary surgery	THR group		HA group		p value
	N	%	N	%	
Yes	1	5%	0	-	>0.05
No	19	95%	20	100%	
Total	20	100%	20	100%

Fig 10: Allotment of cases according to need for secondary surgery

Comparison of Harris hip score in patients during follow-up period

The mean pre-op Harris Hip Score (HHS) was comparable between both the groups as per Student t-test ($67.607.35$ vs. 66.35 ± 8.83 ; $p>0.05$). The post-op HHS during follow-up period was comparable between both the groups - post-op 2 weeks (74.90 ± 7.24 vs. 75.60 ± 5.30), post-op 1 month (76.20 ± 5.31 vs. 77.90 ± 5.56) and post-op 3 months (82.10 ± 4.33 vs. 83.30 ± 1.63). There was no meaningful intergroup variance as per Student t-test ($p>0.05$). It was also observed that there was significant improvement in Harris Hip Score within both the clusters during review period ($p<0.05$).

Table 11: Comparison of Harris hip score in patients during follow-up period

Harris hip score	THR group		HA group		p value
	Mean	SD	Mean	SD	
Pre-op	67.60	7.35	66.35	8.83	>0.05
Post-op 2 weeks	74.90	7.24	75.60	5.30	
Post-op 1 month	76.20	5.31	77.90	5.56	
Post-op 3 months	82.10	4.33	83.30	1.63	
p value	<0.05		<0.05

Fig 11: Comparison of Harris hip score in patients during follow-up period

Discussion

A prospective, comparative study conducted in a hospital with 40 patients to compare functional outcome of fracture neck of femur treated with cemented total hip replacement vs. cemented bipolar hemiarthroplasty in elderly. The patients were divided in the following Mo groups of 20 patients:

- THR Group: Patients treated with cemented total hip replacement
- HA Group: Patients treated with cemented bipolar hemiarthroplasty

Femur neck fractures are very common injuries among elderly population.

Replacement of femoral head is the increasingly used procedure for a displaced intracapsular neck of femur fracture. The arthroplasty can be either THR or Bipolar prosthesis.

In the present study, majority of the patients (45%) in THR Group were from the age- range of 61-70 years followed by 40% from the age- range of 71-80 years and 15% from the age- range of 81-90 years.

The mean age in THR Group was 71.65 ± 7.69 years. Majority at the patients (55%) in HA Group were from the age- range at 71-80 years followed by 35% from the age- range of 61-70 years and 10% from the age- range of 81- 90 years. The mean age in HA Group was 72.85 ± 6.85 years. There was no meaningful intergroup variance as per Student I test ($p>0.05$).

In our study, majority of the patients in both groups were female. There were 85% and 75% female patients in THR Group and HA Group respectively whereas male patients constituted 15% and 25% of the study group respectively. No significant variation was observed among the clusters in accordance with Chi-Square test ($p>0.05$). This is similar to the studies of Shukla R *et al.*, Xu F *et al.**, Yurdakul E *et al.*, Kalantri A *et al.* and Goyal D *et al.*

Xu F *et al.** single-center, open-label, randomized controlled study comparing between bipolar hemiarthroplasty with total hip replacement in old age cases found out of seventy six cases twenty seven males and forty nine females, with an average age of 75.9 years.

Yurdakul E *et al.** retrospective multi-center study comparing the outcome of hemiarthroplasty with a cemented or uncemented implant found mean age of the sixty seven female cases and sixty six male cases was 78.14. Forty four years (array: 60-110 years) at the time of trauma.

Kalantri A *et al.* in a prospective observational study evaluating the outcome of hemiarthroplasty found average age of the patients was 71.6 years (61-87). Most of the cases which were in the age- range between 60 to 69 years. Females were more common 56.7% than males.

Goyal D *et al.* hospital based, randomized, comparative observational study found mean age of patients in Group 1 was 60.64 years. All cases were above 50 years and maximum number was between 50 and 55 years. There were 1B males (72%) and 7 (2B%) females. In uncemented group, mean age of the patient was 59.72 years and range was 5 B1 years. There were 15 (60%) males and 10 (40%) females.

It was observed in the present study that in THR Group, there were 8 (40%) and 12 (60%) cases of right hip and left hip respectively while in HA Group, there were 9 (45%) and 11 (55%) cases of right hip and left A hip respectively. There was no meaningful intergroup variance in accordance with Chi-Squ are test ($p>0.05$). This is comparable to the studies at Xu F *et al.* and Kalantri A *et al.*

Xu F *et al.** single-center, open-label, randomized controlled study found forty two patients of right hip and thirty four patients of left hip.

Kalantri A *et al.* [3] in a prospective observational study found fracture neck of femur was more common on left side. There were nineteen (63.3%) cases with fracture neck of femur (left) and (36.7%) patients with fracture neck of femur (right).

It was observed in our study that fall was the main cause of fracture in both the groups (90% and 85% respectively) followed by Road Traffic Accident (10% and 15% respectively). There was no significant intergroup variance in accordance with Chi-Square test ($p>0.05$). This is concordant to the study at Kalantri A *et al.*

Kalantri A *et al.* in a prospective observational study found road traffic accident caused 23.3% neck of femur fracture than compared to fall from height which was 13.3%.

In the present study, 4 (20%) patients in THR Group had hypertension while 2 (10%) patients each had diabetes mellitus and anemia. 1 (5%) patient had Chronic Obstructive Pulmonary Disease (COPD). 3 (15%) and 2 (10%) patients in HA Group had hypertension and diabetes mellitus respectively whereas 1 (3.6%) patient each had anemia and COPD. There was no meaningful intergroup variance as per Chi-Square test ($p>0.05$). This is consistent with the studies of Shukla R *et al.* [4] and Kalantri A *et al.*

Kalantri A *et al.* in a prospective observational study showed Systemic morbidities was found in 17 of 30 cases (56.7%), 20% of the cases had solely cardiovascular disorders, ten percent had diabetes, 6.7% had solely hypertension, 10% solely increased blood pressure, ten percent had cardiovascular disease along with diabetes, ten percent had cardiovascular disease along with hypertension along with increased blood pressure and 23.3% had hypertension and diabetes mellitus both.

In our study, in THR Group, 7(35%) patients had operative time of 60-90 minutes whereas 13 (65%) patients had operative time of 90-120 minutes. In HA Group, 3 (15%) patients had operative time of <60 minutes whereas 13 (65%) and 4 (20%) patients had operative time of 60-90 minutes and 90-120 minutes respectively. The mean operative time was significantly longer in THR Group compared to HA Group as per Student t-test (103.90 ± 19.26 minutes vs. 77.75 ± 12.73 minutes; $P<0.05$). This is in concordance to the study of Shukla R *et al.*

It was observed in the present study that in THR Group, 4 (20%) patients had bleeding <200 ml whereas 7 (35%) and 9 (45%) patients had blood loss of 200-300 ml and >300 ml respectively. In HA Group, 5 (25%) patients had bleeding <200 ml whereas 15 (75%) patients had bleeding of 200-300 ml. The mean bleeding was significantly greater in THR Group compared to HA Group as per Student t-test (204.60 ± 100.61 ml vs. 214.65 ± 58.36 ; $P<0.05$). Shukla R *et al.*, Xu F *et al.** Kalantri A *et al.* [1] and Zacharia B *et al.* [1] noted similar observations in their studies.

Xu F *et al.* [5] single-center, open-label, randomized controlled study observed blood loss was significantly greater in the total hip replacement group (247 ± 109 vs. 148 ± 90 ml, $P<0.001$), and the operation time was longer (107 ± 18 vs. 72 ± 18 min, $P<0.001$).

Kalantri A *et al.* in a prospective observational study observed average blood loss during surgery was below 750 ml except for 3 cases (10%) as two had bleeding diathesis.

Zacharia B *et al.* [6] prospective comparative study assessing the differences in functional and anatomical outcomes of

elderly patients with fracture neck of femur showed total blood loss was 263.1 mL (intraoperative) and 319 mL (postoperative) in the AMP group. The blood loss was about 329.37 mL (intraoperative) and 393.15 mL (postoperative) in bipolar group which showed a statistically significant difference.

It was observed in our study that in THR Group, majority of the patients (40%) had a hospital stay of 7-14 days followed by 1-7 days (35%) and >14 days (20%). The mean duration of hospital stay was 9.95 ± 5.57 days. In HA Group, majority of the patients (45%) had a hospital stay of 1-7 days followed by 7-14 days (35%) and >14 days (20%). The mean duration of hospital stay was 9.05 ± 5.61 days. There was no significant difference between the groups as per Student t-test ($p>0.05$). This finding was consistent with the studies of Xu F *et al.* and Kalantri A *et al.*

Xu F *et al.** single-center, open-label, randomized controlled study stated no distinction in the mean HHS prior to surgery and at 1 year. The HHS was significantly greater and hence superior at survival years in the total hip replacement group ($B7.6z4.0$ vs. $B2.Bz11.7$).

Yurdakul E *et al.** retrospective multicenter study reported average HHS of the cohort operated by cemented partial prostheses was $72.10z9.12$, and that of the cohort operated by cementless partial prostheses was $75.36z3.88$ points (no meaningful difference). Both the Barthel activity and pain scores have been superior in the cemented group. Henceforth, cases in both the cohort attained equally good functional outcomes.

Kalantri A *et al.* [1] in a prospective observational study observed at the end of 6 months, Harris hip score, was from 35 to 94.6. At exact 6 months follow up 53% had excellent outcome, 33% had good results, 17% came out to be fair and 7% had poor outcome.

Goyal D *et al.* [7] hospital based, randomized, comparative type of observational study compared functional outcome of cemented and uncemented total hip replacement reported difference of HHS between cemented and uncemented group was significant at 3 months. This difference became nonsignificant at 6 months. HHS 88% of patients in cemented group showed excellent and good results and 84% in uncemented group showed excellent and good results. There was one case of excessive bleeding during surgery in uncemented group and one case of foot drop in cemented group.

Veeranna HD *et al.* randomized prospective study cornering the outcome AMP with uncemented bipolar prosthesis reported mean Harris score in bipolar and AMP group was 86.31 ± 12.1 and 79.86 ± 15.42 , respectively ($p=0.182$). The range of motion was $204.52z28.2$ and $183.62z36$ ($p=0.014$) respectively. Functional activities like use of public transport and ability to wear shoe or socks was better with bipolar group. Incidence of complications like painful hip, posterior dislocation, periprosthetic fracture and acetabular erosion was encountered in AMP group.

Zacharia B *et al.* [1] prospective comparative study reported HHS score turned out to be 60.47 and 70.49 for Austin Moore's prosthesis and Bipolar clusters respectively at final clusters accordingly in the last follow up. No meaningful variance in pain score among both the groups. There were three patients cohorts. Four patients of femoral subsidence and three patients of acetabular erosion in the AMP cluster Austin Moore's prosthesis cluster

Conclusion

Neck of femur fracture in elderly patients has good prognosis. The morbidity and mortality are low. Operative method is straight forward, with minimal disabling complications. Initial functional outcomes are favourable which in eludes early full weight bearing and chances of second operation is decreased. Outcomes of neck of femur fractures treated with a cemented hemiarthroplasty and THA, revealed the perceived superiority of THA. Cemented bipolar prosthesis and cemented total hip replacement is a superior option for grade 4 intracapsular neck of femur fracture in old patients.

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