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PROSPECTIVE STUDY OF FRACTURE NECK OF FEMUR ABOVE 65 YRS TREATED WITH HEMI ARTHROPLASTY AND CEMENTED BIPOLAR AMP

Orthopaedics

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ABSTRACT

1.To evaluate clinical outcome of patients treated with cemented bipolar hemiarthroplasty .
2.To evaluate the complications .

MATERIALS AND METHODS:

Source of data :

This is a one and a half year from December 1st 2017 to May 30th 2019 study of patients with fracture neck of femur admitted in Lalitha hospital , guntur

RESULTS:

In our study, the final Harris Hip Score as evaluated at 2weeks after discharge all patients had poor functional outcome results. After 3 months follow up patients functional outcome improved with 60 % fair results , 17 % good results and poor results decreased dramatically from 100% at 2 weeks to 23 %at 3 months . At six months after sugery final follow up done and assessed for clinical and radiological outcomes . Hence , among 30 patients averaged 92 with the maximum score being 97 and the minimum score being 87 .Out off 30 patients, 23 patients (77%) achieved Excellent result, 7 patients (23 %) achieved Good result**.**

CONCLUSION

- Female predominance is common in fractures around the hip .Most of the fracture neck of femur were sustained due to trivial injuries like slip and fall. Femoral canal diameter is wider and in female than males . Proximal femoral trabeculations deteriorate as age progresses . Garden type 3 fractures were the most common pattern of neck of femur fracture observed which accounted to 60%. Hypotension seen commonly seen in patients with systemic co-morbidities . Lengthening not more than 2 cm is common complication . The final functional outcome was excellent in 77 % of the patients. Limitation of the study included a small sample size of 30 patients and a short follow up period of 6 months.

KEYWORDS

INTRODUCTION

In geriatric population femoral neck fracture is one of the most common injuries. Prevalence of these fractures increased with increasein life expectancy.1 The goal of treatment of these fractures is mobilization of patient as early as possible and to become independent to carry out their basic daily needs .

Intra-capsular fractures of the proximal femur have a tremendous effect on both the health care system and society in general. Despite the marked improvements in surgical interventions, treatment of fracture neck of femur remains debatable in elderly.1Open reduction and internal fixation of these fractures in elderly has poor outcome including high rate of non – union and avascular necrosis.[1]

Hip replacement (hemi or total) is a successful procedure for the elderly population with femoral neck fractures .However , disadvantages of primary total hip replacement like dislocations , prolonged time of surgery , amount of blood loss and cost of implants , etc have made to choose hemi-arthroplasty as treatment for fracture neck of femur. 2Also , return to pre-morbid level of activity and independent functions occur very swiftly , avoiding the hazards of prolonged incumbency.[2]

Prosthetic replacement of the femoral head with Austin Moore, Thompson and Bipolar hemiarthroplasty has undoubtedly played an important role in the treatment of these fractures, especially in those who require immediate mobilization with full weight bearing.[3]

However acetabular erosion is a significant long term complication of one piece hemiarthroplasty and is particularly common in active individuals .[3]

Unipolar hemiarthroplasty with an Austin Moore prosthesis or Thompson prosthesis is not commonly used in the developed countries though it is very commonly used in developing countries like India. It should ideally be reserved for very limited or non-ambulatory patients.[2]

Bipolar prosthesis is slowly replacing the conventional unipolar prosthesis in the ever increasing segment of 'active elderly' because of its superior benefits. Its advantages over unipolar endoprosthesis are higher in terms of greater percentage of satisfactory results - fewer dislocations, less post-operative pain, greater range of movements, more rapid return to unassisted activity and reduced incidence of acetabular erosion.[2]

Bipolar hemiarthroplasty has emerged as a good option for
-Active elderly patients.

- Elderly Patients who had developed non union of the fracture or avascular necrosis of the femoral head with osteosynthesis.

Bipolar hemiarthroplasty thus appears to be the best option for acute fracture neck femur in the elderly. However, not much literature is available about its long term results.

The bipolar endoprosthesis which was introduced by Bateman and Giliberty in 1974 has a great advantage of presence of motion between the metal head and polyethylene socket inner bearing of the prosthesis, as well as between the metallic cup and acetabulum, since the cup is not fixed .5 There is a distribution of shear forces between the inner and outer bearings due to which acetabular erosion is reduced

and moreover due to this compound bearing surface, bipolar designs provide greater overall range of motion than either unipolar or conventional total hip arthroplasty .

In present study, 30 patients , age around 68 years with female predominance with fracture neck of femur were treated with cemented bipolar prosthesis . Intraoprerative andpost operative complications were noted . Regular follow up done at 3 settings and functional outcome of surgery are recorded with Harris hip score which showed excellent results .

CLINICAL FEATURES AND DIAGNOSIS OF INTRACAPSULAR FRACTURE NECK OF THE FEMUR . 39

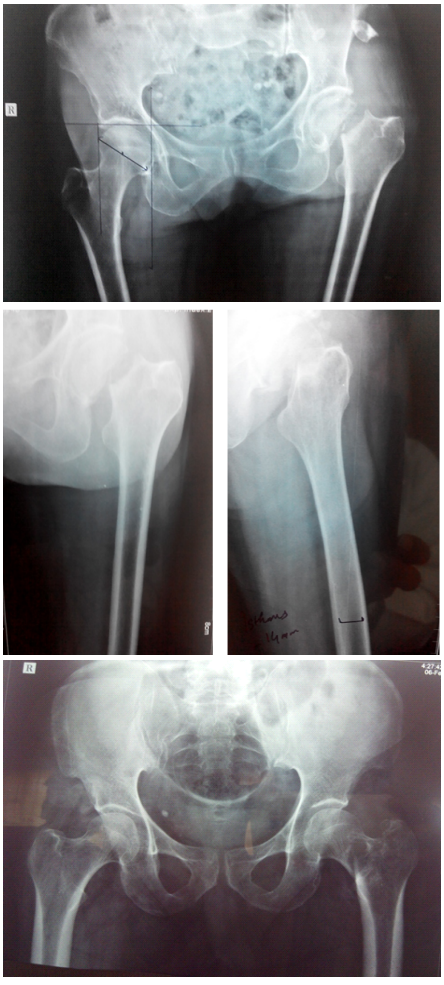
A classical picture is of an elderly female lying with

- The injured leg shortened and partially externally rotated .
- Extremely painful on the slightest movement and
- The patient complains of pain in the groin often referred to the inner side of the thigh and knee.
- Movement of the leg and weight bearing are restricted by pain and muscle spasms or almost impossible.
- Tenderness is present in the groin.
- Greater trochanter is migrated upwards , on moving the hip sometimes the crepitus is felt.
- The diagnosis in displaced fractures is easily confirmed by routine x-ray.39

ROENTGENOGRAPHY OF THE HIP REGION

The routine x-ray evaluation of a patient with a hip fracture should include

- A true AP view of the hip with the 15 degree of internal rotation possible
- AAP view of involved full femur , and
- A cross-table lateral x-ray of hip joint with femur .39



The appearance of the neck, greater trochanter and lesser trochanter of the femur are greatly altered by the rotation of the thigh.

- When the foot is directed slightly medially, the neck lies in the transverse plane of the body and its full length is shown.
- The angle between the neck and shaft is best seen when x-ray is taken with the foot directed slightly medially with an internal rotation of 150. The angle is usually 120-140 degrees .32
- When however, the foot is directed anteriorly, the greater trochanter of the femur lies in the plane somewhat posterior to the head of the femur.32
- If the foot is directed laterally the greater trochanter is still more posterior and its shadow may overlap that of the head and the neck of the femur then appears greatly shortened.

The continuity of this curve is unaffected by small difference in position of the hip joint. Shenton's line is broken in fracture neck of femur .32

INDICATIONS FOR BIPOLAR HEMIARTHROPLASTY .[41]

- In active elderly patients with displaced fresh femoral neck fractures
- Non-union of fracture neck of femur
- Failure of Internal fixation without arthritis of the hip.
- Avascular necrosis of femur in early stages .
- Communiteditertrochantericfractutre of femur .

CONTRAINDICATIONS

- Pre existing sepsis.
- Active young patient with fracture of the neck of femur
- Pre existing disease of acetabular cartilage - osteoarthritis, rheumatoidarthritis.
- Non-contained segmental deficiency of the acetabular rim.

COMPLICATIONS

Complications accompanying any major orthopaedic surgery are found in bipolar hemiarthroplasty too. Complications can be divided into early and late.

EARLY COMPLICATIONS

1. Embolic complications like – pulmonary embolism, cerebrovascular accident.

2.Cardio-pulmonary complications like cardiac arrest and respiratory failure.

3. Splintering of trochanter / proximal femur while hammering of prosthesis for insertion or during reduction.

4. Injury to sciatic nerve during surgery

5. Malposition - insertion of the prosthesis with too much retroversion, anteversion or seating the prosthesis high on the neck.

6. Dislocation of prosthesis - in the operating theatre, or immediately postoperatively.

LATE COMPLICATIONS

1. Dislocation of prosthesis – Frequently requiring open reduction
2. Infection
3. Limb length discrepancy
4. Broken prosthesis
5. Metallic erosion and tissue reaction
6. Trochanteric bursitis
7. Loosening of prosthesis with stem distal migration (femoral subsidence)
8. Protrusioacetabuli
9. Idiopathic pain
10. Heterotopic ossification
11. Fracture of femur at the lower third of stem (peri-prosthetic fractures).

Inclusion criteria for the study group:

1) Cases of fracture neck of femur – Gardens Classification both undisplaced and displaced fractures .
2) Patients with age 60 years and above of both sexes will be included .

Exclusion criteria for the study group:
1) Patients medically unfit for surgery.
2) Previous symptomatic hip pathology (such as arthritis).

METHODOLOGY :

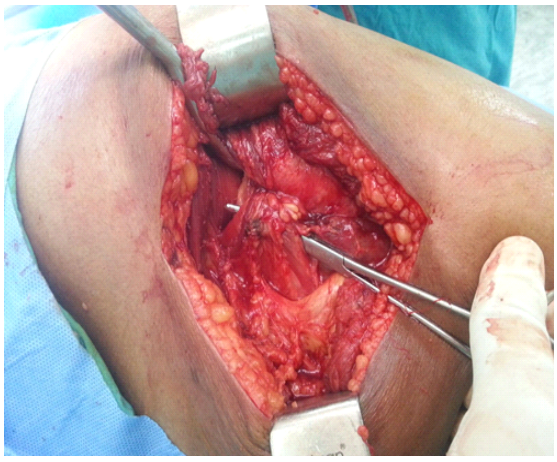
- Once the patient was admitted to the hospital, both clinical and radiological investigations were carried out and all essential information of those who fulfilled the inclusion criteria was recorded in the proforma prepared for this study.
- All the cases undergoing the procedure included in the study will be evaluated using proforma to read the following variables like weight bearing , hip range of movements , pain in the thigh after surgery, whether patients limps , walks with support after surgery , based on The harris hip score the outcome of hip function will be evaluated after surgery .
- Pre-operative and post-operative radiographs to see for the proper reduction .
- The patients will be asked to come for follow up at 2 weeks after discharge, 3 month and 6 months after the discharge .
- The contact details like postal address and personal mobile number will be taken to assure that no patient is lost in follow up . If patient is lost in follow up he/she will be excluded from analysis .

SURGICAL PROCEDURE :
All cases were done under regional anaesthesia which included spinal or epidural anaesthesia. The choice of the anaesthesia was according to the discretion of the anaesthetist.

Surgical Approach – Moore's posterior approach to the hip .[47]
After induction of either spinal or epidural anaesthesia the patient was placed on the lateral position on the operative table with the affected side facing up.

A curved incision is taken from 8 cm distal to the posterior superior iliac spine, extended distally and laterally, parallel with fibers of gluteus maximus muscle to the posterior margin of the greater trochanter.[47]

The incision is then directed distally 5-8 cms along the femoral shaft. The deep fascia is exposed and divided in line with the skin incision. By blunt dissection the fibers of the gluteus maximus are separated taking care not to disturb the superior gluteal vessels in the proximal part of the exposure .47 The gluteus maximum muscle is split and short external rotators are exposed. Stay sutures are applied to the short external rotators, and a tenotomy of the short external rotators is done close to their insertion on the inner surface of the greater trochanter.



The short external rotators are retracted to protect the sciatic nerve and expose the posterior hip capsule. The capsule is incised by a T-shaped incision, and the hip flexed, adducted and internally rotated to dislocate the hip joint .47 Using a head extractor and bone levers, head is delivered out of the acetabulum and the acetabulum is cleared of debris. The size of the extracted head is measured by using measuring gauze, and the size of prosthesis is selected .[47]

The neck is trimmed leaving 1.5cm of the medial calcar, on which the flare of the prosthesis would eventually sit. The proximal femur was over reamed with rasp, for the insertion of bone cement. The direction of the insertion of the rasp was ascertained by using the lesser trochanter as a guide to achieve correct seating of the prosthesis in 10-150anteversion .[48]

Adequate seating of the prosthesis on the calcar is visualized directly. The bone cement is allowed to set for a time period of 8-10 minutes starting from the mixing of the cement components .48

- Following which the hip joint is reduced by gentle traction with external rotation of the hip and simultaneous manipulation of the head of the prosthesis into the acetabulum.
- The range of movement in all directions is checked by taking the joint through the whole range of movements.
- The stability of the prosthesis and its tendency to dislocate is checked by flexing and adducting the hip.
- The limb is kept in slight abduction and external rotation for suturing the wound.
- Great care is taken to achieve adequate closure of the posterior capsule and anatomical reattachment of the short external rotators.

The rest of the wound is closed in layers over a suction drain placed beneath the gluteus maximus. Haemostasis is maintained throughout the procedure .[48]

RESULTS:
This is a one and a half year from december 1st 2013 to may 30th 2015 study of patients with fracture neck of femur admitted in Lalitha hospital , guntur Data was collected based on detailed patient evaluation with respect to history, clinical examination and radiological examination. The postoperative evaluation was done both clinically and radiologically. Out of the 30 cases, all patients were available for follow up till one year which was taken as a basic pre-requisite for inclusion in the study.

Table - 1 Sex distribution :

Sex	Frequency	Percentage
male	13	43.33%
female	17	56.67%
total	30	100%

Table - 1 shows the sex distribution pattern of the study patients. Most of the patients were found to be women (57%).

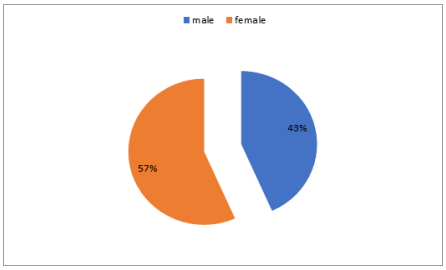


Table - 2 Laterality

Side	Frequency	Percentage
left	14	46.67%
right	16	53.33%
total	30	100%

Table – 2 shows the laterality pattern of all the study patients with left side being affected more with 53% .

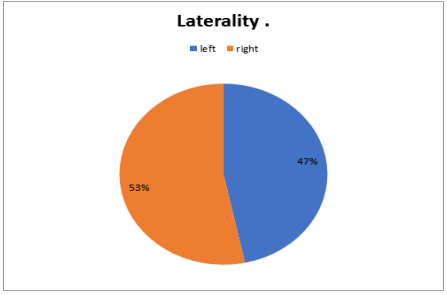


Table – 3 Mode of injury :

Mode of injury		Percentage
slipping	25	83.3%
fall from height	5	16.7%
total	30	100

Table 3 shows most of the patients sustained fracture just because of trivial trauma .i,e. Slipping 83.3%

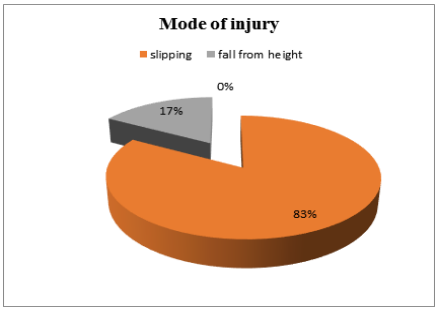


Table – 4 Dorr's type .

Dorr's type	Frequency	Percentage
B	17	56.67%
C	13	43.33%
Total	30	100%

In our study majority of femoral canal diameter described under Dorr's type has type Bi.e, 57% .

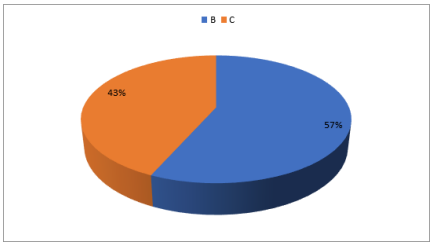
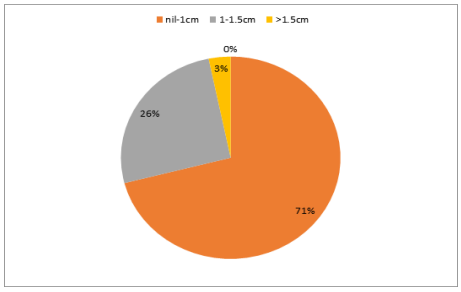


Table – 5 Complications of surgery : Limb length discrepancy

limb length discrepancy		
nil-1cm	22	73.33%
1-1.5cm	8	26.67%
>1.5cm	1	3.33%
total	30	100%

Most of the patients in our study has no limb length discripency other thanlengthing ranging from 1-1.5cm in 27% patients .



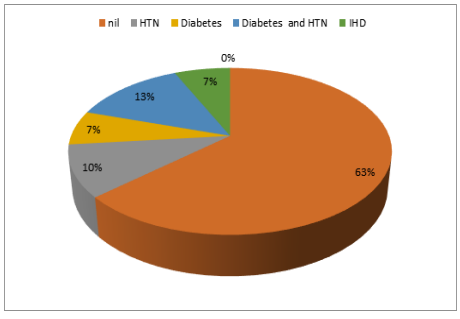
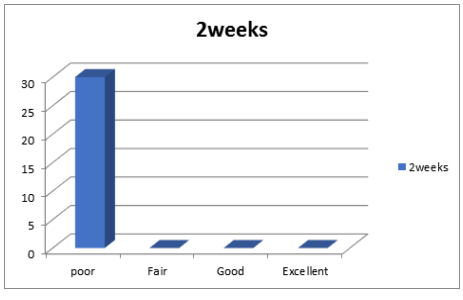


Table – 6 Harris hip score :

hhs	2weeks	%	3months	%	6months	%
poor	30	100%	7	23.33%	0	0
Fair	0	0	18	60.00%	0	0
Good	0	0	5	16.67%	7	23.33%
Excellent	0	0	0	0	23	76.66%
total	30	100%	30	100%	30	100%

Harris hip score:Clinical evaluation of all patients were done with 2 weeks , 3 months and 6 months after discharge with harris hip score (HHS) . All patients had poor functional outcome results after 2 weeks of surgery ,



After 3 months follow up patients functional outcome improved with 60 % fair results , 17 % good results and poor results decreased dramatically 100% to 23 % . No one had excellent results at 3 months follow up .

But at end of 6 months follow up functional outcome improved with HHS good for 23% and excellent for 77% among 30 patients .

DISCUSSION:

Intracapsular fractures of the proximal femur is one of common fractures in the elderly.50 Because of geriatric age and poor socio-economic condition of patients they may have Osteoporosis, co-morbidities like type 2 diabetes ,hypertension , ischemic heart disease , decreased vision and 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.[50]

The aim of replacement surgery in fracture neck femur is early return to daily activities and mobilization . This is particularly applicable to the elderly age group where complications due to long periods of bed ridden and immobilization have to be prevented.

The mean age of the patients in the present study was 68 years, the youngest being 60 years and the eldest being 82 years. Age distribution is an important factor in the management of hip fractures to plan for selection of prosthesis and use of cement .

As in most standard studies, the present study also had a higher number of females i.e, 57% who sustained a fracture neck of femur as compared to the male population of 43% . Elderly females are more prone to fracture neck of femur due to osteoporosis(post menopausal condition).[50]

Majority of our study patients 83% sustained the injury due to a trivial trauma like tripping or slipping. This is a very common occurrence in elderly population where poor vision and lack of neuro-muscular coordination is a problem. Most of such injuries can be classified as "indirect" trauma. 17%patients sustained the injury due to a fall from a height.

In our study most of the patients had a displaced fracture of the neck of femur. Majority of the patients (60%) had a Garden type IV fracture while ten patients (33%) had Garden type III fracture and two patients (7%) was diagnosed with Garden type 2Even in a comparision study by H. Krishnan, between the outcomes following Cemented and Uncemented bipolar prosthesis, 29 patients were of Garden type IV, while 5 patients sustained a Garden type III fracture type.51 However the type of fracture and the displacement have no significant changes in final outcomes .[51]

Among thirty patients in this study , cardio-respiratory condition , diabetic status and others were with in normal limits among 63 % of patients . 13 % patients had both hypertension and diabetes . 10% and 7 % had hypertension and diabetes respectively . 7 % of patients had ischemic heart disease .For two patients with diabetes whose sugar levels were not under control with oral hypoglycaemics hence , Inj insulin was started to control blood sugar level pre-operative . hence , operation was delayed for 7 days . Four patients with both hypertension and diabetes had high blood pressure their blood pressure were under control hence , operation was delayed for 4 days . Two patients with IHD were taking tab ecospirin , it was stopped for 5 days prior to surgery .

It was observed that the post-operative rehabilitation of patients was significantly affected by the presence of the above co-morbidities.52 patients had to wait for few days average of 6 days for surgery .This also had an effect on the final functional result of the procedure.120 Similar observations have been made by Koval et al52and Bath.[53]

Most of the surgeries were completed between 90-120 minutes of starting the procedure. Similar duration of the procedure has been reported by Haidukewych, et al55 and Drinker, et al. Duration of the procedure had any effect on final function. Most of our study patients were mobilized in bed on day one of surgery and with weight bearing as tolerated within the 72 hours postoperative period. Delay if at all was due to medical reasons.

One patient with hypertension and one patient with IHD developed hypotension while cementing and was management accordingly . Literature shows Intraoperative deaths (cardiac arrest) during hip arthroplasty occur infrequently and have been associated with bone cement (BCIS).56 Patients with severe underlying cardiovascular disease are more prone to this problem.7 The hemodynamic effects of medullary fat embolism during the process of cement pressurization — rather than the toxic effects of the cement itself — cause BCIS. [56]

Limb length discrepancies were observed in 9 patients (29%) post-operatively, of which 8 patients had a lengthening between 1-1.5 cm ,and 1 patient had 2 cm probably due to the less amount of calcar resection .

One patient had mild grade fever on 2ndpost operative day , wound was inspected and no signs of infection at surgical site .

No complications of Infection or Deep vein thrombosis was noticed in any patient due to the administration of I..V. Antibiotics for 5 days , dressing under all aseptic precautions , regular physiotherapy like static quadriceps exercises , ankle pump exercises , side sitting , knee range of motions and other supportive medications .

Patients were allowed to stand on second day and started walking with walker and full weight bearing on operated leg with 72 hours depending on patient pain tolerability . All patients were able to walk with walker and full weight bearing by the of discharge . Study done by Marya SKS et al , shows Postoperative protocol for patients with cemented implants (bipolar or total hips) involved full weight-bearing as soon as possible (as per patient ability to stand supported) and active hip and knee exercises gives good results and return of patients to pre-morbid condition . But, in case of uncemented bipolar prosthesis weight delayed and there post operative protocol varied i.e, Patients with cement less implants (bipolar or total hips) were mobilized to non-weight-bearing for three weeks, partial weight-bearing for the following nine weeks and then allowed full weight-bearing without support.[50]

In a study done by Marya SKS et al , with 84 patients few developed complications like one case of deep infection, two cases of DVT but no fatal PE, three dislocations (all managed by closed reduction and post-reduction hip abduction bracing for six to eight weeks), two instances of thigh pain (all in the cement less subgroup), five patients developed superficial bedsores (which healed without sequelae) and seven patients developed acute confusional states (dyselectrolytemia, encephalopathy).50There were no early and late postoperative complications like DVT , thigh pain , loosening, dislocation, erosion, secondary osteoarthritis, protrusioacetabuli or periprosthetic fracture. All patients were followed up regularly at 2weeks, 3 months, 6 months and the functional outcomes were assessed using the Harris Hip Scoring system .Pain following hemiarthroplasty is a major concern. Hinchey and Day57(1964) in their series of 294 patients found pain following hemiarthroplasty in 22 patients in the early post operative period. They could not find any definitive cause in them..Lance ford stated that the causes of pain could be due to infection, improper prosthetic seating, metallic corrosion and tissue reaction, improper sized femoral head, contractures and periarticular ossification.58 In our study, 4patients had complaints of pain on the final follow up. These patients were however advised exercises and were reassured about the condition, along with which medications were prescribed and advised to be consumed only when the pain was intolerable.

In our study, the final Harris Hip Score as evaluated at 2weeks after discharge all patients had poor functional outcome results. After 3 months follow up patients functional outcome improved with 60 % fair results , 17 % good results and poor results decreased dramatically from 100% at 2 weeks to 23 %at 3 months . No one had excellent results at 3 months follow up .

At six months after sugery final follow up done and assessed for clinical and radiological outcomes . Hence , among 30 patients averaged 92 with the maximum score being 97 and the minimum score

being 87 .Out off 30 patients, 23 patients (77%) achieved Excellent result, 7 patients (23 %) achieved Good result. Our results are comparable with standard studies of bipolar hemiarthroplasty performed for fracture neck femur.

Radiologically postoperative reduction of bipolar prosthesis assessed for conditions mentioned earlier . All bipolar heads are positioned in acetabulum properly . sinking of prosthesis not seen may be due adequate bone cement and holding capability . In one case prosthesis was placed in slight valgus but , its significance not present in final outcome . no signs of heteropic ossification . As the duration of follow up is less we didn't find any signs of acetabular erosions and sclerosis at tip of prosthesis . No one had periprosthetic fracture Our study is not without its own shortcomings. Firstly, our duration of follow-up of six months, is very less in assessing the longevity and functional endurance of the prosthesis used. Only 30 patients were included in the study. All surgeries are not done by single surgeon .

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