

ORIGINAL RESEARCH

Functional Outcome of Fracture Neck of Femur in Patients Above 60 Years Treated by Bipolar Hemiarthroplasty by Transgluteal Anterior Approach

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ABSTRACT

Background: Femoral neck fractures in the elderly are frequent, represent a great health care problem, and have a significant impact on life of the patient as well as the family. This study represents the results of displaced intracapsular femoral neck fracture managed with hemiarthroplasty by bipolar with transgluteal approach (direct lateral approach).

Methods: In this prospective observational study we included thirty patients of intracapsular neck of femur fracture treated with hemiarthroplasty using bipolar prosthesis by transgluteal approach (direct lateral approach). In this study we included patients age above 60 years with closed displaced intracapsular fracture neck of femur. We excluded patients with open extracapsular fracture neck of femur. We collected our data by interview and regular follow up. Our study design prospective and observational. Our study having maximum follow up of 1.5 years and minimum of 3 months. Patients from third decade of life onwards and both the sexes, presenting to the Orthopaedic Outpatient Department in casualty or regular OPD with history of household fall or minor or moderate trauma or sometimes with road traffic accident. Harris hip score was used for the outcome of the patients and their follow up.

Results: In our study of 30 patients with femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (direct lateral approach), we observed 6(20%) patients with Harris hip score between 90-100, 17(56.66%) patients with Harris hip score between 80-89, 5(16.67%) patients with Harris hip score between 70-79 and 2(06.66%) patients with Harris hip score between < 70. In our study we observed five (16.67%) patients with limb length discrepancy, one (3.33%) patient had prosthesis dislocation. We also observed 6(20%) patients with excellent result, 17(56.66%) with good result, 5(16.67%) with fair result and 2(06.66%) with poor result.

Conclusions: Our study involves observations of thirty cases of intracapsular femoral neck fracture treated with hemiarthroplasty using bipolar prosthesis by transgluteal approach (Direct Lateral Approach) has advantages in terms of early functional recovery, decrease residual pain, and decrease incidence of prosthetic dislocation as compare with posterior approach. Our study suggests that transgluteal approach (Direct Lateral Approach) required proper long learning curve and expertise of procedure and proper closure.

Keywords: Bipolar Hemiarthroplasty, Transgluteal Approach, Neck of Femur Fracture, Direct Lateral Approach.

INTRODUCTION

Femoral neck fractures occur predominantly in the elderly, typically result from low-energy falls, and may be associated with osteoporosis. Femoral neck fracture in the young age group very different injury and treated in very different ways. Femoral neck fractures in young patients typically are the result of a high-energy mechanism, and associated injuries are common.¹ The lifetime risk of sustaining femoral neck fracture high and lies within the range of 40% to 50% in women and 13% to 22% in men. Life expectancy increasing worldwide, and these demographic changes can be expected to cause the number of femoral neck fracture occurring worldwide to increase.¹

Epidemiologic studies have identified numerous risk factors associated with an increased risk of sustaining a femoral neck fracture. Most Femoral neck fractures intracapsular and may compromise the tenuous blood supply to the femoral head.² Most studies on fixation have therefore provided outcome data on fixation failure, non-union, and avascular necrosis.²

However, a question that particularly pertains to the super-elderly patient group is whether undisplaced intracapsular femoral neck fracture should be managed with osteosynthesis or with an arthroplasty. Approximately 50% of femoral neck fracture are intracapsular, of which 32% to 38% are undisplaced. The conventional management of an undisplaced intracapsular femoral neck fracture is by osteosynthesis.²

Recently, article of displaced intracapsular femoral neck fracture managed with a hemiarthroplasty was better than in patients with an undisplaced intracapsular hip fracture managed with osteosynthesis.²

Present studies of displaced intracapsular femoral neck fracture managed with hemiarthroplasty by bipolar with transgluteal approach (direct lateral approach) experienced greater patient satisfaction and pain relief and better functional results when compared with patients who had sustained undisplaced intracapsular femoral neck fracture managed with osteosynthesis.²

In our study we include total no of thirty patients having intracapsular femoral neck fracture managed with hemiarthroplasty with transgluteal approach (direct lateral approach). We collect and analyze our results from the study and compared results and outcome.

AIM

To study the results of displaced intracapsular femoral neck fracture managed with hemiarthroplasty by bipolar with transgluteal approach (direct lateral approach).

MATERIALS AND METHODS

In our study we included thirty patients of intracapsular neck of femur fracture treated with hemiarthroplasty using bipolar prosthesis by transgluteal approach (direct lateral approach) in our institute. In this study we included patients age above 60 years with closed displaced intracapsular fracture neck of femur. We excluded patients with open extracapsular fracture neck of femur. We collected our data by interview and regular follow up. Our study design was observational. Our study having maximum follow up of 18 months and minimum of 3 months. Patients from third decade of life & onwards and both the sexes, presenting to the Orthopaedic Outpatient Department in casualty or regular OPD with history of house hold fall or minor or moderate trauma or sometimes with road traffic accident.

METHODOLOGY

PRIMARY MANAGEMENT

Patients with fracture were primarily assess by ABC management, general condition, vitals (pulse, BP, RR, etc.), distal neurovascular status, distal pulsations and movements of patient was checked. Fracture assessment was done, and skin traction or de-rotation boot was applied. Other associated injury was rule out. i.v. analgesics for pain and i.v. antibiotics if chest or other infection, intravenous fluids if the patients were hemodynamically unstable. All patients were subjected to radiographic examination. This included standard radiographs, antero-posterior view of pelvis with both the hips in identical position.

After primary assessment and prepared for operation. Good quality radiographs to assess, after a complete examination of the patient are an essential pre-requisite, selection of the size of prosthesis looking at the normal side in unilateral involvement intraoperative in case of bilateral involvement). Adequate blood was arranged for surgery for any intraoperative transfusion, if required. The patient was fully explained about the nature of the disease process, its possible etiology, the anesthesia, the planned operation; its need, nature, & benefits, possible pre/ intra/ post-operative blood transfusion, the possible postoperative limitations necessitating a modification in his lifestyle and occupation, and the study involved; in his own language. After admission all the patients were fully investigated as per requirement for obtaining surgical fitness. An informed, valid, explained, documented, signed, and witnessed consent was taken from all the patients undergoing arthroplasty. The patient was shaved from the back down to the knees posteriorly as well as anteriorly including the private parts, after removing all the accessories and kept sedated and fasting from the previous night. Catheterization done as per requirement.

DEFINITIVE MANAGEMENT

ANAESTHESIA

General Anaesthesia / Spinal Anaesthesia / Epidural Anaesthesia.

POSITION

Simple table, true lateral (no tilt on either side) position with the affected limb upwards and the other limb in slight flexion from hip as well as knee.[Fig 1]

Fig 1: Position of the patient



APPROACH

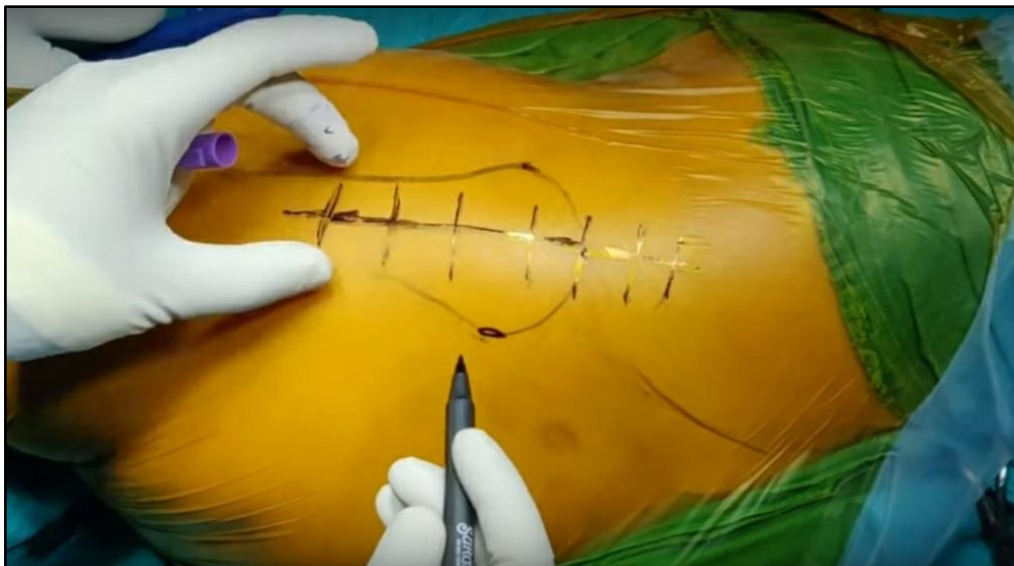
Transgluteal Approach (Direct Lateral Approach)

LANDMARKS

Tip of greater trochanter, Anterior and Posterior border of shaft of femur, Anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS).

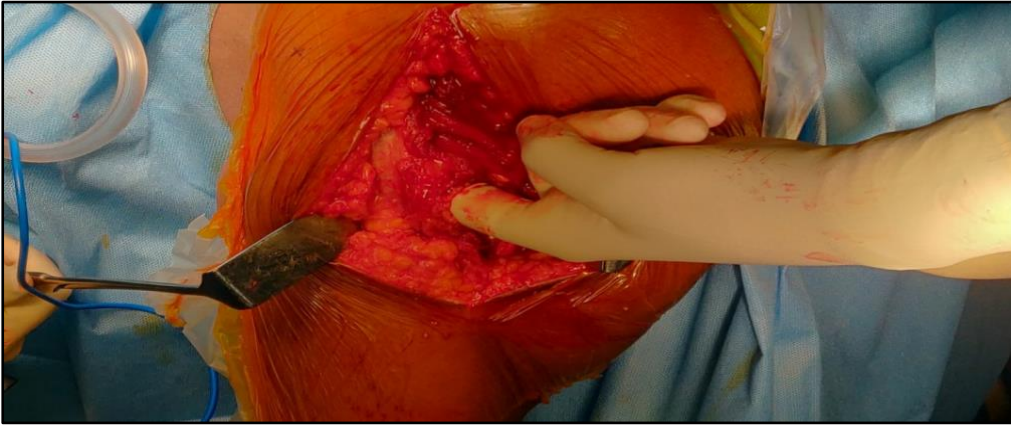
Incision: straight and centred over the middle of the projection of the greater trochanter.

Fig 2: Anatomical landmark marking



SURGICAL DISSECTION

Make a posteriorly directed lazy-J incision centered over the greater trochanter. Divide the fascia lata in line with the skin incision and centered over the greater trochanter. Retract the tensor fasciae latae anteriorly and the gluteus maximus posteriorly, exposing the origin of the vastus lateralis and the insertion of the gluteus medius.

Fig 3: Plane between Vastus lateralis and gluteus medius

Incise the tendon of the gluteus medius obliquely across the greater trochanter, leaving the posterior half still attached to the trochanter. Carry the incision proximally in line with the fibers of the gluteus medius at the junction of the middle and posterior thirds of the muscle. This gluteus medius split more anterior, directly over the femoral head and neck. The “split” must not extend more than 2 cm above the lateral lip of the acetabulum to avoid damage to the gluteal neurovascular bundle. Because the abductor “split” is more anterior, exposure of the femoral head and neck requires less retraction. Incision should be no farther than 4 to 5 cm from the tip of the greater trochanter to avoid damage to the superior gluteal nerve and artery. Distally, carry the incision anteriorly in line with the fibers of the vastus lateralis down to bone along the anterolateral surface of the femur.

Elevate the tendinous insertions of the anterior portions of the gluteus minimus and vastus lateralis muscles. Abduction of the thigh exposes the anterior capsule of the hip joint. Incise the capsule as desired.

During closure, repair the tendon of the gluteus medius with nonabsorbable braided sutures.

DISLOCATION OF THE HEAD

The femoral head is dislocated and removed, and the size is determined using the head measuring guaze. Neck osteotomy is made obliquely 1cm proximally from the lesser trochanter.

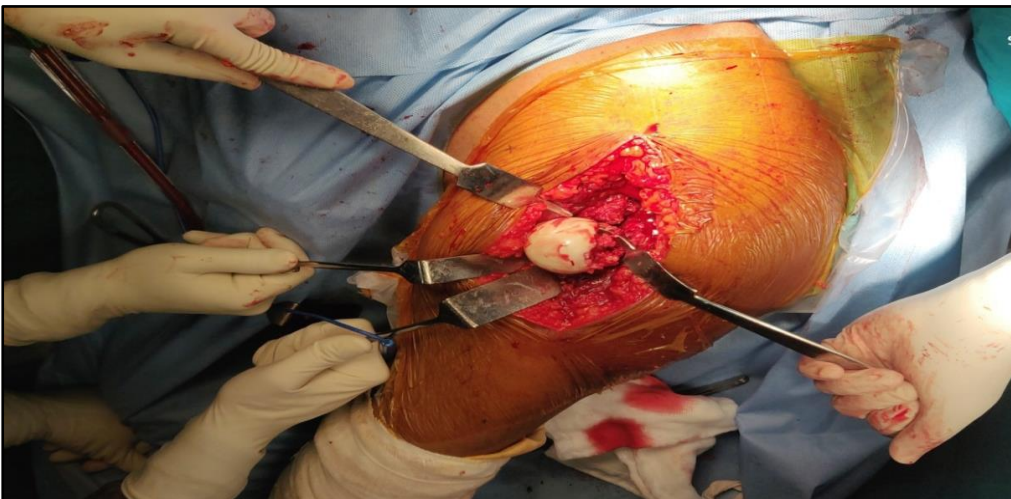
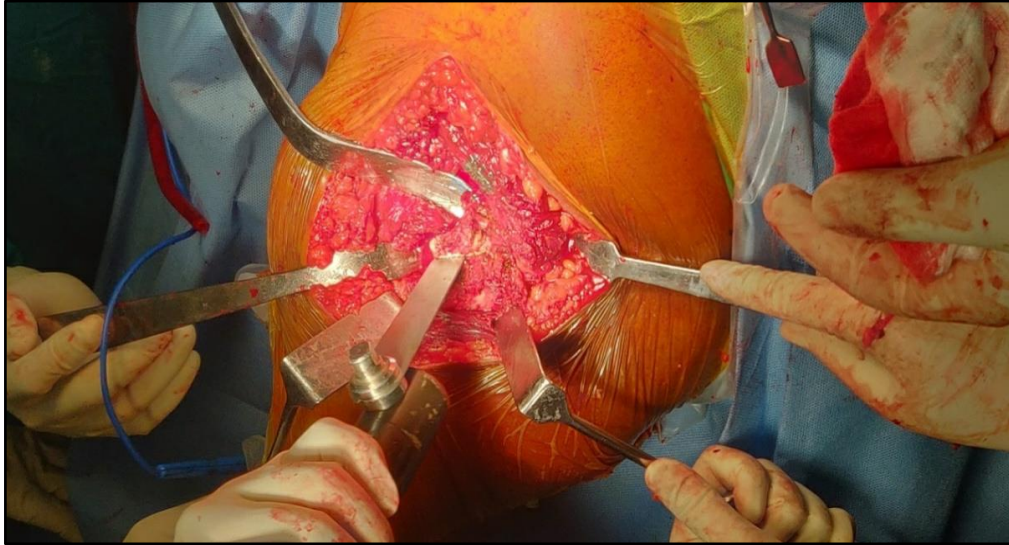
Figure 4: Head Delivered

Figure 5: Neck Cut**REAMING**

The next step is to ream the shaft according to the version of the future prosthesis. The version was decided according to the long axis of the leg. A virtual line was drawn perpendicular to its axis, and femoral rasping was done at 15-20° of ante-version. The femoral canal was broached with appropriate ante-version. The prosthesis was selected according to the level of the fracture.

TRIAL

A trial bipolar prosthesis was then inserted, and trial reduction was done. With the trial prosthesis in situ, the length of the affected limb was compared with the opposite leg. The stability of the implant was checked by assessing the hip movements such as flexion, extension, adduction, abduction, internal and external rotation. Based on these tests, the size of the original prosthesis was selected.

CEMENTING

The next step is cementing of the femoral canal. We have used the low viscosity bone cement. A cement restrictor is passed in the femoral canal upto the desired level and the canal is packed with a wet gauze. Third generation cementing technique used to achieve the desired pressure. The acetabular cavity is also packed with a gauze to prevent any cement from getting collected there. The cement is then inserted with the cement gun.

STEM INSERTION

The appropriate original stem is then inserted in the canal and held firmly till the cement is solidified. Excess cement is removed. The acetabulum gauze is also removed. The trial head is then mounted on to the stem and reduction is done and stability is confirmed. Shuck test is done to confirm the reduction and stability, where the relative amount of motion achieved when femur is distracted away from the acetabulum, which is usually about 5mm. Now based on this, the appropriate original neck and head size is selected and is press fitted over the

stem. Reduction is done and stability of the prosthesis is confirmed. At this stage the trochanter is lagged on to the shaft as described earlier.

CLOSURE

Anterior capsule and gluteus medius and minimus repaired. The iliotibial band and gluteal fascia are closed carefully in routine fashion. Skin suture done. Dressing done with sterile technique.

POST-OPERATIVE CARE

Patient is advised to rest in supine position. Patient is kept fasting for four hours, parenteral antibiotics for 5 days & parenteral analgesics for 48 hours are started postoperatively. The primary operative site is checked 48 to 72 hours after surgery and drain removed if applied, dressing the wound in strict aseptic precautions and the patient is ambulated using standard walking with walker. Static quadriceps exercises, ankle and toe mobilization, pelvic lift exercises and bowel-bladder-back care is given.

Anti-osteoporotic regimen is started for an elderly patients Suture removal is done on after 14th day and assessing the postoperative HHS, with an advice to follow-up 4 weeks after the surgery.

ADVICE ON DISCHARGE

Change of profession for athletes/ heavy manual workers, to avoid sitting in cross-legged/ squatting position, not to flex the operated hip excessively, quadriceps and pelvic lift exercises, ankle and toe mobilization, and ambulation next operative day. Antibiotics and analgesics were given orally for 14 days till suture removal. Patient was asked to follow-up after 4 weeks, 6weeks, every month till 18 months, or at any time in case of a problem and Harris Hip Score was assigned at each follow-up visit. Patient may or may not require a revision arthroplasty at a later date depending upon the wear and tear of the prosthesis

COMPLICATIONS

Complications like wound infection nerve injury bleeding, anesthetic complication can occur.

RESULTS

In this study of the thirty cases of femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (Direct lateral approach) in our series, in our study we had minimum of 3 months and maximum of 18 months follow up. In this study of thirty patients sixteen (53.33%) patients were male and fourteen (46.67%) patients were female.

Most common mode of injury observed was domestic fall with twenty-five (83.33%) patients and road traffic accident with five (16.67%) patients being second most common. In our study we use garden classification for femoral neck fracture, and we observed patients with garden type 3 classification were most common with fourteen (46.67%) patients and garden type 4 classification were second most common with eleven (36.66%) patients. (Table 1)

In our study of thirty patients with femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (direct lateral approach), we observed 6(20%)

patients with Harris hip score between 90-100, 17(56.66%) patients with Harris hip score between 80-89, 5(16.67%) patients with Harris hip score between 70-79 and 2(06.66%) patients with Harris hip score between < 70. (Table 2)

In our study we observed five (16.67%) patients with limb length discrepancy, one (3.33%) patient had prosthesis dislocation. (Table 4) In our study of thirty patients with femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (direct lateral approach), we observed 6(20%) patients with excellent result, 17(56.66%) with good result, 5(16.67%) with fair result and 2(06.66%) with poor result. (Table 3)

Table 1: Classification

Classification	No of patients	Percentage
Garden type 1	02	6.66%
Garden type 2	03	10%
Garden type 3	14	46.67%
Garden type 4	11	36.66%
TOTAL	30	100%

Table 2: Harris Hip Score

Harris Hip Score	No Of Patient	Percentage
90-100	06	20.00 %
80-89	17	56.66 %
70-79	05	16.66 %
<70	02	06.66 %

Table 3: Final Results

Grade	No Of Patient	Percentage
Excellent	06	20.00 %
Good	17	56.66 %
Fair	05	16.66 %
Poor	02	06.66 %

Table 4: Complications

Complication	No of patient
Infection	00
Abductor lurch	00
Limb length discrepancy	05
Dislocation	01
Periprosthetic fracture	00
Loosening of implants	00

CASES

1) 70-year-old male fracture neck of femur LEFT side

PREOP AND POST OP IMAGES



2) 60-year male fracture right neck of femur

PREOP, POSTOP, 6 MONTHS AND CLINICAL IMAGES



DISCUSSION

A. W. Hughes³ et Al., consider restoring capsular integrity to minimise rates of post-operative dislocation by hemiarthroplasty through a direct lateral approach similar to our study.

Stivan Stevoy et al⁴, compare early complications after the posterior and the direct lateral (transgluteal) approach, when using hemiarthroplasty in the treatment of displaced femoral neck fractures in the elderly. There was an 8-fold increased risk for prosthetic dislocations after the posterior approach compared to lateral approach.⁴

Sebastian Mukka et al⁵ had reduced revision rate and maintained function after hip arthroplasty for femoral neck fractures after transition from posterolateral to direct lateral approach.

The treatment of intracapsular femoral neck fracture treated with hemiarthroplasty using bipolar prosthesis by transgluteal approach (direct lateral approach), we observed 46.67% patients with garden classification type 3. Similar observation has been found in the study of Sivaprasad Kalyanasundaram et al.⁶ In our study majority of patients were male (16) compared to female (14). In our study of thirty patients, sixteen (53.33%) patients observed with left side femoral neck fracture and fourteen (46.67%) patients observed with right side femoral neck fracture. Similar observation has been found in the study of Sivaprasad Kalyanasundaram et al.⁶ There was not significant difference in male female ratio. Similar observation has been found by Dr Sabarisree M & Dr Anas M.⁷

The cause of fracture was mostly due to domestic fall like fall at home, fall down from bed and slipping in bathroom which were low energy injuries. It clearly supports the fact that trivial trauma like fall is the most common mode of injury of fracture neck of femur in elderly patients.

In our study most common mode of injury was domestic fall observed in 83.33% patients, Followed by road traffic accident 16.67%. Similar observation has been observed by Sivaprasad Kalyanasundaram et al. 75% patients were due to trivial fall at home, 20% of them were due to road traffic accidents.⁶ In our study we had five (16.67%) patients with limb length discrepancy and one (3.33%) patient had prosthesis dislocation, this result were similar to study conducted by Roland Biber et al.⁸ In our study of thirty patients with femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (direct lateral approach), we observed 17(56.66%) patients with good result similar observation found in study conducted by Kerstin Schneider et al.⁹

In our study of thirty patients with femoral neck fracture treated with bipolar hemiarthroplasty with transgluteal approach (direct lateral approach), we observed 17(56.66%) patients with Harris hip score between 80-89 similar observation found in study conducted by Kerstin Schneider et al.⁹

In our study we had one prosthetic dislocation which was posterior dislocation after one month of operation which was managed by closed reduction and ankle traction for four weeks then allowed to patient to walk with walker and followed regular follow up of the patient and no further complication occur. Our study had fifteen patients with cemented and fifteen patients with uncemented bipolar hemiarthroplasty in which two patients had fixed bipolar hemiarthroplasty done.

CONCLUSION

Our study involves observations of thirty cases of intracapsular femoral neck fracture treated with hemiarthroplasty using bipolar prosthesis by transgluteal approach (Direct Lateral Approach) have advantages in terms of early functional recovery, decrease residual pain, and decrease incidence of prosthetic dislocation as compare with posterior approach. Our study suggest that transgluteal approach (Direct Lateral Approach) required proper long learning curve and expertisation of procedure and proper closure.

LIMITATIONS

We need longer follow up for better results.

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