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Bipolar hemi-arthroplasty (uncemented) in the elderly: a study in a tertiary care hospital

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Abstract

Introduction: Femoral neck fractures moreover are more common among the female elderly patients, especially in those above 60 years of age. The aim of this study was to evaluate the efficiency of bipolar hip prosthesis (Uncemented) in intracapsular ractures of neck of femur in certain cases and various modalities to be followed and to assess the functional outcome of bipolar hemiarthroplasty in intracapsular fractures in elderly patients. The prosthesis was impacted with gentle blows in to the medullary canal and then finally the prosthesis was reduced in to the acetabulum.

Materials and Methods: A total of 65 patients with femoral neck fracture were included into the study. The surgery was performed by the extraction of the head of femur by the posterolateral approach.

Results: The outcome of the surgery was excellent in more than 75% of the cases. Among the complications post-surgery, there was superficial infection in 4.6% of the patients, 3.1% had dislocation of prosthesis without loosening of the stem and close reduction done Under C-Arm, Limb length discrepancy in 9 patients, in which shortening was noted in 6 patients and shrinking of stem in medulary cavity of femur in three patients for which total hip joint replacement was done.

Conclusion: In our study, Bipolar hemiarthroplasty (Uncemented) was a very effective mode of repair for intracapsular fracture of the neck of femur.

Keywords: Bipolar hemiarthroplasty (uncemented), Elderly, Intra capsular fracture of neck of femur, Prosthesis

Introduction

One of the most common causes of hospital admissions among the elderly is femur neck fracture. This is more so important today as there is a marked rise of the elderly population in the society. Femoral neck fractures moreover are more common among the female elderly patients, especially in those above 60 years of age rather than those below 60 years.(1) Other than the neck, the most common places of fractures in the femur can be intertrochanteric, and sub-trochanteric regions. This results in impairment of mobility, excessive morbidity and sometimes mortality and loss of independence. More than two-thirds of all the hospital day is due to the fracture.(2-4)

It was estimated in 1990, the incidence of hip fractures is 1.66 million worldwide.(5) This number is on the rise continuously with the increase to be 6.26 million by the year 2050.(6-8) The reason for this increased numbers could be due the increase in life expectance and osteoporosis.(7-9)

The reason of the injury is most often trivial trauma. Low energy trauma caused 53% of all fractures in persons of 50 years or older, while it caused fractures in more than 80% of the patients over 75 years of age.(10)

Generally, displaced or unstable fractures of the femoral neck, represent an indication for surgical intervention. Established treatment options include internal fixation, hemiarthroplasty, where the head of the femur is replaced with a prosthetic implant or total hip replacement, which includes, replacing the femoral head as well as the acetabulum with a prosthetic implant,(3,4) but the line of treatment should be decided based in the degree of fracture displacement, the patient's age, functional demands and risk profile such as level of cognitive function and degree of physical fitness.(11-14) In the young and in the very elderly which are not medically fit to undego prosthetic surgery, Internal fixation is recommended.(15) For elderly patients with low functional demands, unipolar or bipolar hemi-arthroscopy is the preferred treatment for displaced intracapsular fractures instead of total hip replacement.(16)

The aim of this study was to evaluate the efficiency of bipolar hip prosthesis in intracapsular ractures of neck of femur in certain cases and various modalities to be followed and to assess the functional outcome of bipolar hemi-arthroplasty in intracapsular fractures in elderly patients.

Materials and Methods

A total of 65 patients with femoral neck fracture were included into the study. General demographic details were taken in detail. Other details that were noted were the side of injury as well as associated injuries. Data such as smoking and alcohol history, use of cortisone, prevalent heart disease, diabetes as well as hypertension were also taken into consideration.

Clinical history such as the type of fall, presenting symptoms such as nature of pain, aggravating factors, relieving factors and rest pain were also noted.

Patients with a previous history of fracture and women who were hysterectomised were excluded from the study.

For the surgery, the patient was placed on the unaffected side. The incision was started approximately 10 cm distal to the posterosuperior iliac spine and extended distally and laterally parallel with the fibers of the gluteus maximus to the posterior margin of the greater trochanter. Then the incision was directed distally along the femoral shaft. The deep fascia was exposed and divided in line with the skin incision. By blunt dissection separate the fibers of the gluteus maximus; take care not to disturb the superior gluteal vessels in the proximal part of the exposure. The proximal fibers of the gluteus maximus were retract proximally and expose the greater trochanter (Fig. 1).

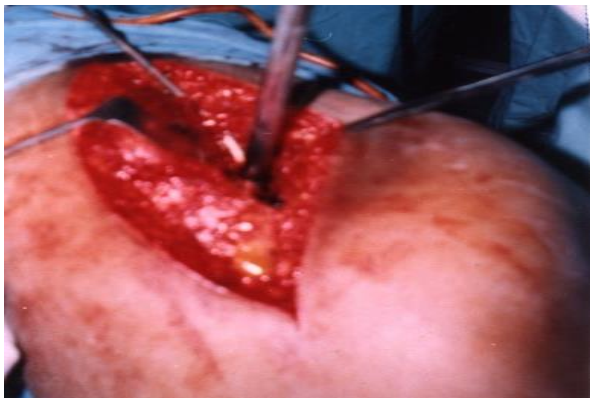

Fig. 1: Extraction of the head of femur by the posterolateral approach

A small branch of the sacral plexus were divide to the quadratus femoris and inferior gemellus, which contains sensory fibers to the joint capsule. Next, the gemelli and obturator internus were exposed and divided and, if desired, the tendon of the piriformis at their insertion on the femur and the muscles retracted medially. The posterior part of the joint capsule is now well exposed; incise it from distal to proximal along the line of the femoral neck to the rim of the acetabulum. Detach the distal part of the capsule from the femur. Flex the thigh and knee 90 degrees, internally rotate the thigh, and dislocate the hip posteriorly.

With an appropriate rasp medullary canal was rasped in Valgus and 10 – 15 degrees of anteversion relative to the plane in which the knee joint axis lies. Then the appropriate size of prosthesis with cement or without was seated in the prepared medullary canal with the 10 – 15 degrees of anteversion and Valgus position. The prosthesis was impacted with gentle blows in to the medullary canal and then finally the prosthesis was reduced in to the acetabulum (Fig. 2).

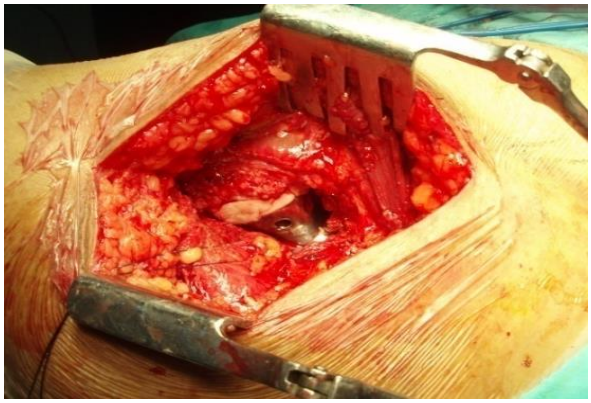

Fig. 2: Insertion of the bipolar

The hip was tested for full range of movements and stability intraoperatively. The wound was closed meticulously in layers over a suction drain maintaining haemostasis throughout the procedure and dressing was applied. We noted the duration of surgery from incision to closure, blood loss, whether prosthesis can be easily reduced and difficulty in reduction. Blood loss was assessed and blood transfusion carried out if required.

Post operatively, a pillow was kept in between both the legs so that the leg was in abduction. Foot end of the bed was elevated and regular half hourly Temperature, Pulse, respiratory rate, blood pressure charts were maintained for initial 24 hours.

Antibiotics – In the form of intravenous route twice a day given for the first 48 hours and later shifted to oral antibiotics.

A post op check X-ray was taken and the Valgus seating with 10 – 15 degree of anteversion was confirmed. Any limb length discrepancy was noted. Knee flexion isotonic quadriceps exercises were started from 2nd post op day and pts were mobilized with walker with partial weight bearing as tolerated and if patients are comfortably walking, we discharge them on 6th or 7th post-operative day and ask them to come for suture removal on 10th post-operative day, provided wound is healthy otherwise we will keep the patients till suture removal and then discharge**.**

The patient was advised to use a straight high chair with arms to facilitate getting out of the chair and avoid a sofa. The patient was advised not to sit cross-legged or squat on the floor or squat on Indian style of toilet and patient was advised not to adduct or flex the hip excessively or involve in activities that place heavy load or stresses on the hip joint. The patient was advised to carry out the isotonic and isometric exercises to strengthen the muscles around the hip.

Results

The present study included 65 patients above the age of 60 years, out of which 49 (75.38%) were females and 16 (24.62%) were males (Fig. 3).

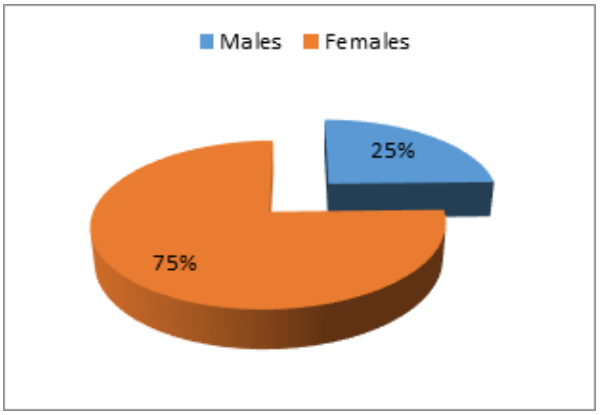

Fig. 3: Gender wise distribution of the patients

The mean age of the patients was 67.1%, and the left side fracture was more predominant than the right side. Fall was the commonest mode of injury for intracapsular fracture neck of the femur, while walking inside or outside the house (Fig. 4).

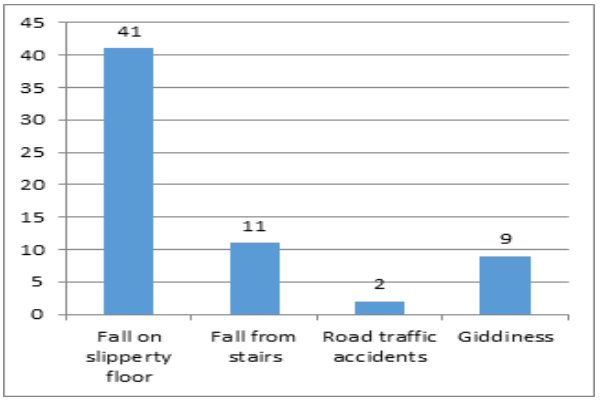

Fig. 4: Type of fall

The fractures were classified according to the Garden's classification and Type IV type fracture was found to b the predominant type of fracture followed by type III (Fig. 5).

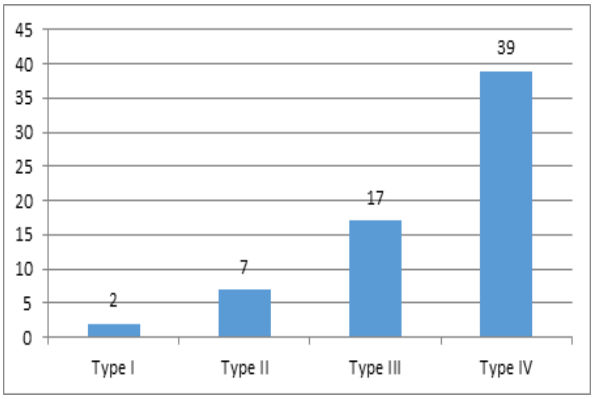

Fig. 5: Type of fractures according to Garden's classification

Co morbid conditions such as hypertension, diabetes anemia, ischemic heart disease and COPD were also evaluated for all the patients. Anemia was found to be the most common comorbidity among these patients (Fig. 6).

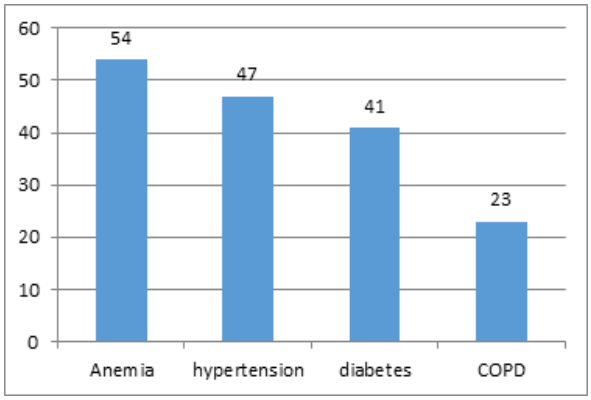

Fig. 6: Comorbidities in patients

The average duration of surgery was 54 min and the average blood loss in surgery was 300 ml.

The most commonly used prosthesis sizes were 41 mm and 43 mm sizes, ranging from 39 mm to 51 mm.

Table 1: Type of prosthesis used

Head Size	No of patients	Percentage
39MM	3	10%
41MM	10	33.3%
43MM	10	33.3%
45MM	4	13.3%
47MM	3	10%

The outcome of the surgery was excellent in more than 75% of the cases (Fig. 5). Only one patient had a poor outcome (Table 2).

Table 2: Outcome of the patients

Outcome	Number (%)
Excellent	49 (75.38%)
Good	12 (18.5%)
Fair	3 (4.62%)
Poor	1 (1.5%)

Fig. 7: Pre and Post surgery

Among the complications post-surgery, there was superficial infection in three patients (4.6%). One patients (3.1%) had dislocation of prosthesis without loosening of the stem on the 2th post-operative day due to fall from bed with limb in adduction and Internal rotation. The attitude of the limb, clinical examination and x ray was done and it was diagnosed posterior dislocation of the prosthesis The patient was taken for closed reduction under general anesthesia and C-arm guidance and reduced by closed method and was immobilized using skin traction for 3 weeks and then mobilized with walker support. Limb length discrepancy was seen in 9 patients, in which shortening was noted in 6 patients (9.2%) However, the limp was corrected with a shoe raise for the shorter limb. The shrinking of stem in medullary cavity of femur in 3 patients due to osteoporosis for which total hip joint replacement done. In our study, we have not used cement or and reimplantation done (Table 3).

Table 3: Post-operative complications in the patients

Complications	No of patients	Percentage
Dislocation of Prosthesis	1	3.1%
Superficial Infection	3	4.6%
Limb Shortening	6	9.2.%
Loosening of Stem	3	4.6%

Discussion

The increase of the femoral neck fractures due to the increase of life expectancy of the elderly has increased the socioeconomic importance of these fractures.[17,18] Hip fractures represent more than two thirds of all hospital days owing to fractures.[16] The main objective of the hemiarthroplasty is to achieve early mobilization, full weight bearing and early return to daily activities.[19]

Bipolar prostheses enable reduction of acetabular wear and increase in prosthesis life and function.[20]

In the present study, there was only one case of dislocation of the bipolar prosthesis without loosening of stem on the 2th post-operative day due to fall from bed with limb adduction and internal rotation and it was close reduced under C-Arm and three patients had loosening of stem for which total hip joint replacement done. Limb length discrepancy was seen in 9 patients, in which shortening was noted in 6 patients. However, the limp was corrected with a shoe raise for the shorter limb. In our study, we have not used cement and there was no case of reimplantation.

Hemiarthroplasty was the desired alternative to internal fixation or total hip replacement as it gives stability and weight bearing qualities immediately. This as a result avoids many of the complications. Bipolar hemiarthroplasty further overcomes the complications of the unipolar implants such as acetabular wear, protrusion, loosening and dislocation.[22] As there are dual bearing surfaces in the bipolar implants, there is lesser wear and tear as the weight bearing and the momentum are shared buy two surfaces in the prosthesis, reducing the erosion at the acetabular joint surface.

In our study, the females were more affected with fractures than men probably due to more osteoporotic nature of the bones. Low traumatic falls also in many resulted in the fractures.

The outcome of most of the cases was excellent or good. We had cases only 1.6% cases of dislocation of prosthesis. Krishnan et al observed no cases of dislocation of prosthesis in their study,[23] while Dorr et al reported a very high dislocation rates in THA[24] which was similar to a study by Ravikumar et al.[25] In a study by Tuteja et al, dislocation was observed in 4.16% of the cases.[26]

In many similar studies, there were either few or no cases of dislocations with bipolar hemiarthroplasty, while the dislocations were more with total hip replacement. This could be due to the fact that the patient is nor s accustomed to careful positioning of the hip, and hence may move the hip into risky positions, causing dislocations.[27-29]

One of the complications we faced with were superficial infections, none of which were ed sores, but surgical site infections, which were effectively treated with antibiotics. In a similar study be Tuteja et al, bed sore was the most common complication affecting 16.6% of the patients, all of which responded well to treatment and mobilization of the patient.[26]

The outcome of surgery in our surgery was excellent in more than 75% of the cases, which was in accordance to the study by Tuteja et al, where 78% of excellent or good outcome was observed.[26]

In many studies which compared total hip replacement and bipolar hemiarthroplasty, THR was found to be better in terms of the outcome and long term wear and tear.[30,31]

Conclusion

In our study, Bipolar Hemiarthroplasty (uncemented) was a very effective mode of repair for intracapsular fracture of the neck of femur. Most of the results were excellent or good. The post-operative complications were minimal and were treatable.

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