

Original Research Article

Efficacy of bipolar hemiarthroplasty in the elderly people: a study in a tertiary care centre

G. Ramachandra Reddy*, P. N. Prasad

Department of Orthopaedics, Shadan Institute of Medical Sciences and Research, Hyderabad, Telangana, India

Received: 26 March 2017

Revised: 07 April 2017

Accepted: 11 April 2017

***Correspondence:**

Dr. G. Ramachandra Reddy,

E-mail: gatturahulreddy2001@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Intertrochanteric fractures are associated with severe displacement and comminution are very common among the elderly patients especially women. Hemiarthroplasty is a procedure, where the head of the femur is replaced with a prosthetic implant. This study was performed to evaluate the efficacy of the bipolar hemiarthroplasty among the elderly patients with intra capsular fractures.

Methods: Bipolar hemiarthroplasty with or without cement was performed on 77 patients above the age of 60 years with femoral neck fractures.

Results: Out of the 77 patients, 79.2% were females and 20.8% were males. The mean age of all the patients was 68.4 years. Type IV was found to be most common among the elderly. The outcome of the surgery was excellent in more than 75% of the cases. Only one patient had a poor outcome. The most common complication of the surgery was limb shortening in 5.2% patients followed by superficial infections in 2.6%.

Conclusions: Bipolar hemiarthroplasty for the unstable hip fractures in the elderly has good results with early mobilizations and minimal complications. This ultimately affects the general health of the patients and reduces morbidity and mortality.

Keywords: Bipolar hemiarthroplasty, Hip fractures, Elderly patients

INTRODUCTION

Intertrochanteric fractures are associated with severe displacement and comminution are very common among the elderly patients especially women. These patients have poor bone quality and thus are often associated with complications such as nonunion, device failure and femoral head perforation.^{1,2} The main aim of treatment of these fractures is the early restoration of the walking ability and the quality of life.³⁻⁵

It is estimated that the incidence of all the hip fractures is 80 per 100,000 persons and is expected to double over the next 50 years as the population ages. In 1990, the incidence was estimated to be 1.66 million with a likelihood of being 6.26 million in 2050, due to the increase of longevity of the elderly persons.⁸⁻¹¹ Intertrochanteric

fractures make up 45% of all hip fractures.⁶ More than two-thirds of all the hospital stay is due to this fracture.¹²⁻¹⁴

Stable fractures, is easy to fix with osteosynthesis. But, in the case of the elderly, the management of the unstable intertrochanteric fractures especially in the elderly patients is a problem as the anatomical reduction is difficult to attain, therefore resulting in a high rate of morbidity and mortality. Internal fixation, has resolved this problem to a large extent.⁶

Usually, a displaced or unstable fracture is an indication of a surgical intervention. The established surgical procedures are internal fixation, hemiarthroplasty and total hip replacement. The internal fixation may be performed by the dynamic hip screw or proximal femoral

nail, however, these methods are most often unsuccessful and result in high rates of failure and repeated surgical procedures.^{5,7} Hemiarthroplasty is a procedure, where the head of the femur is replaced with a prosthetic implant. Replacement of femoral head along with the acetabulum with a prosthetic implant is performed in the total hip replacement surgery.^{13,14} Whatever the treatment, it should be performed based on the age of the patient, degree of displacement, and the functional demands as well as the degree of physical fitness of the patient.¹⁵⁻¹⁷ Usually, for the elderly, unipolar or bipolar hemiarthroplasty is preferred treatment for the intra capsular fractures and displacements rather than total hip replacements.¹⁸

This study was performed to evaluate the efficacy of the bipolar hemiarthroplasty among the elderly patients with intra capsular fractures.

METHODS

This study was performed by the department of Department of Orthopaedics and Traumatology in Shadan Institute of Medical Sciences and Research from February 2013 to March 2016. 77 patients above the age of 60 years with femoral neck fractures who were admitted into our hospital between 2015 and 2017 were included into the study. The procedure was explained in detail to the patient and the relatives and informed consent was obtained as per the hospital protocol.

General demographic details were taken from all the patients, and details such as the type and the nature of fall was obtained. Symptoms such as nature of pain, aggravating and relieving factors, rest pain etc. were taken into consideration. Other co-morbidities such as smoking and alcohol use, usage of corticosteroids, presence of diabetes, hypertension or any other cardiac ailment were also noted.

All the patients with a previous history of fracture, women who had previously undergone hysterectomy were excluded from the study.

Prior to the surgery, all the patients underwent epidural or regional anesthesia. The patient was placed on the unaffected side in the lateral position. A curved incision was done 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, distally, the incision was directed 5-8 cm along the femoral shaft. Here, the deep fascia was exposed and separated to be in line with the incision. By blunt dissection, the gluteus maximus fibres were separated carefully so that the superior gluteal vessels are not disturbed in the proximal part of the exposure. The short external rotators were tenotomised close to their insertion into the inner surface of the greater trochanter. The posterior part of the joint capsule which was exposed was incised from distal to the proximal along the line of the femoral neck upto the rim of the

acetabulum. A T- shaped incision was done on the capsule and with the help of a head extractor and bone levers, the head was removed out of the acetabulum, which was cleaned of debris.

After trimming the neck, 1.5 cm of the medial calcar was left, so that the prosthesis would eventually sit on it. Appropriate sized prosthesis with or without cement was inserted into the medullary canal and placed in 10-15 degrees of anteversion and valgus position. This prosthesis was seated on the calcar in the medullary canal with gentle blows and reduced into the acetabulum.

The hip was checked for full range of movement in all directions by taking the joint through the whole range of moments. Great care was taken to close the posterior capsule and at the same time achieve anatomical reattachment of the short external rotators. A suction drain was used to maintain haemostasis throughout the procedure. The duration of surgery, blood loss, reduction of the prosthesis was noted. All the patients operated were kept in the supine position, postoperatively, with a pillow between the legs and the involved leg in 20-30° abduction. The foot end of the bed was elevated and for the initial 24 hours, temperature, pulse, respirator rate and blood pressure were continuously noted every half an hour.

For the first 48 hours, antibiotics were given intravenously and then shifted to oral. X-ray was taken to confirm the 10-15 degree of anteversion and any discrepancy. Isotonic quadriceps exercises were started from the second day itself and the weight bearing ability of the patient was analysed. If the patients were comfortably walking, they were discharged by the 6th or the 7th day. Suture removal was done on the 10th day.

The data was entered into Microsoft excel and the statistical method used was simple proportions.

RESULTS

This study was done on 77 patients, all of them being above 60 years of age. Out of them, 61 (79.2%) were females and 16 (20.8%) were males. The mean age of all the patients was 68.4 years.

Table 1: Type of fall among the different sexes.

| Type of fall | Males | Females | Total |
|-------------------------------|-----------|------------|------------|
| On slippery floor | 7 (43.8%) | 42 (68.9%) | 49 (63.6%) |
| From height | 4 (25%) | 8 (13.1%) | 12 (15.6%) |
| Giddiness | 2 (8%) | 9 (14.8%) | 11 (14.3%) |
| Road traffic accidents | 3 (18.8%) | 2 (3.3%) | 5 (6.5%) |
| Total | 16(20.8%) | 61 (79.2%) | 77 (100%) |

The most common cause of the intra capsular fracture was fall, whether from height or from a slippery floor. 49

(63.6%) fell on a slippery floor mostly inside the house or in some cases outside. Fall from a slightly elevated level was seen in 15.6% of the cases. Road traffic accidents involved only 6.5% of the total cases (Table 1).

The nature of the fracture was classified according to the Garden's classification and type IV was found to be most common as shown in Figure 1.

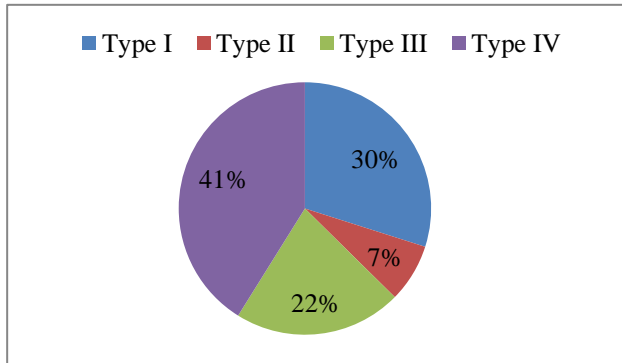


Figure 1: Type of fractures according to Garden's classification.

The common co-morbidities found in patients were anemia in 62 (80.5%), hypertension in (66.2%) and diabetes in 46 (59.7%). COPD was seen in 29 (37.7%) of the cases as depicted in Figure 2.

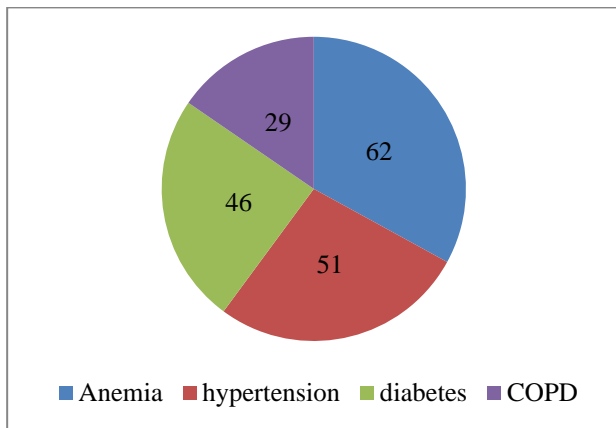


Figure 2: Co-morbidities in patients.

The duration of surgery on an average was 56 min with the average blood loss being 285 ml. The most commonly used prosthesis sizes were 41 mm and 43 mm sizes which ranged from 39 mm to 51 mm (Table 2).

Table 2: Type of prosthesis used.

| Head size | No of patients |
|-----------|----------------|
| 39 mm | 9 |
| 41 mm | 23 |
| 43 mm | 21 |
| 45 mm | 7 |
| 47 mm | 5 |

The outcome of the surgery was excellent in more than 75% of the cases. Only one patient had a poor outcome as seen in Figure 3.

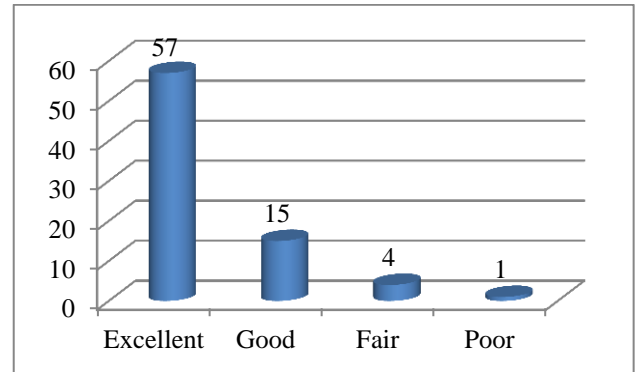


Figure 3: Outcome of the patients.

The most common complication of the surgery was limb shortening in 4 patients (5.2%) followed by superficial infections in 2 (2.6%) as presented in Figure 4.

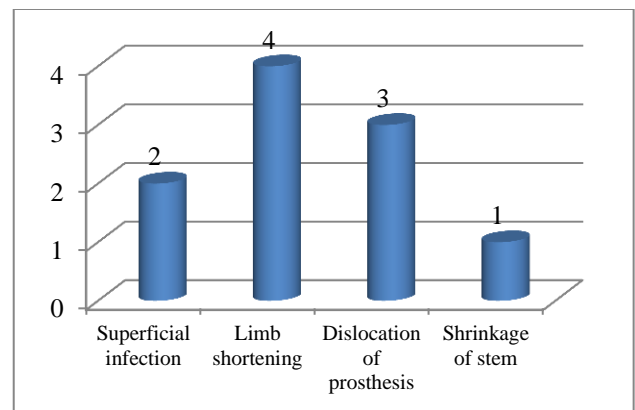


Figure 4: Postoperative complications in the patients.

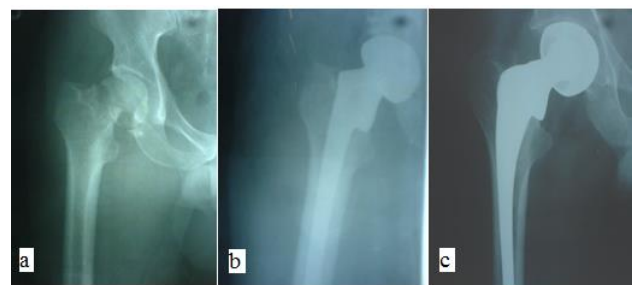


Figure 5: Pre and post surgery.

a. Pre surgery; b. Post surgery; c. After 4 months.

DISCUSSION

The major outcome of the hip replacement surgeries is the return to the regular activities of the individual, especially in the case of the elderly, where in many complications can arise in them if they are immobilized for too long periods. The treatment for the fracture of the femoral neck is usually internal fixation, unipolar or

bipolar arthroplasty or total hip replacement, each having advantage and disadvantage. However, the best method of treatment still remains controversial.¹⁹ Poor mechanical properties and osteoporosis in the bones in the elderly do not provide a good base for the attachment of screws which may eventually result in an early mechanical failure, leading to collapse. It may also lead to the migration of the femoral head into the varus and retroversion, thus causing shortening and a decrease abductor muscle lever arm, leading to limping.²⁰ Profound functional disabilities can also arise as a complication of the internal fixation resulting from the implant being cut out from the femoral head.

To overcome the complications of the internal fixation, hemiarthroplasty was a frequently employed technique. Unipolar hemiarthroplasty which was commonly employed came with a few disadvantages such as acetabular wear, protrusions, loosening and dislocation, which was avoided by performing bipolar hemiarthroplasty.²¹

In the present study, 77 patients above the age of 60 underwent bipolar hemiarthroplasty. The average age among the patients was 68.4 years, with the youngest being 60 years and the oldest being 83 years of age. Most of the patients were females. In a similar study by Raghavendra et al, the mean age was 75 years, and as in their study, the final functional outcome was better in the younger patients compared to the older ones.²² They also found females to be more prone to fractures than men. The mean age in another similar study by Elmorsy et al who found the mean age to be 72.51 years.²³ Other studies had showed a mean age between 80-85 years.²⁴⁻²⁶

The most common cause of the fracture was due to a fall on the slippery floor, especially in women who were involved in housework. In fact, in the bathroom and the kitchen were the most common places. This was followed from a fall from height. Road accidents were seen in 6.5% of the cases. Tripping and slipping also was a major cause of fracture in the elderly, whose bones are weak due to osteoporosis in the study by Raghavendra et al.²² Poor vision and lack of coordination was also attributed to the falls.

The outcome was excellent in 74% of the cases, while it was good in 19.5% of the cases. Only 1 person (1.3%) had a poor outcome. In the study by Raghavendra et al, 50% achieved excellent result while 30% had a good result, which was comparable to our study.²² Similar results with most patients showing excellent or good outcomes was observed in another study by Harsha Kumar et al.²⁷

10 (12.9%) of the patients had complications, with the most common being limb shortening and dislocation of prosthesis. However, in a study by Ramkumar et al, no dislocation or infection was observed, 23.3% of the patients had excellent results and 56.7 had good results.²⁸

Bipolar prosthesis is used successfully by Cameron et al for the treatment of acetabular defects, and no revisions were needed for 8 years postoperatively.²⁹

Bipolar hemiarthroplasty is a technique which provides reasonable fixation and early mobilization capacity for the patients, thereby preventing other postoperative complications such as bed sores, pneumonia, pseudo arthrosis etc. A delay in this surgery would lead to severe morbidity and eventual mortality among the patients

CONCLUSION

Bipolar hemiarthroplasty for the unstable hip fractures in the elderly has good results with early remobilizations and minimal complications. This ultimately affects the general health of the patients and reduces morbidity and mortality. With proper postoperative rehabilitation, the patients can get back to his or her normal life at the earliest. Therefore, bipolar hemiarthroplasty can be considered as one of the techniques for unstable hip fractures in the elderly.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

- Haidukewych GJ, Israel TA, Berry DJ. Reverse obliquity fractures of the intertrochanteric region of the femur. *J Bone Joint Surg Am.* 2001;83(5):643-50.
- Kang SY, Lee EW, Kang KS, Song KS, Lee SH, Park YU, et al. Mode of fixation failures of dynamic hip screw with TSP in the treatment of unstable proximal femur fracture: biomechanical analysis and a report of 3 cases. *J Korean Orthop Assoc.* 2006;41(1):176-80.
- Parker MJ, Gurusamy K. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. *Cochrane Database Syst Rev.* 2006;3:CD001706.
- Dorr LD, Glousman R, Hoy AL, Vanis R, Chandler R. Treatment of femoral neck fractures with total hip replacement versus cemented and noncemented hemiarthroplasty. *J Arthroplasty.* 1986;1:21-8.
- Leighton RK, Schmidt AH, Collier P, Trask K. Advances in the treatment of intracapsular hip fractures in the elderly. *Injury.* 2007;38:24-34.
- Parker M, Johansen A. Hip fracture. *BMJ.* 2006;333:27-30.
- Garden RS. Low-angle fixation in fractures of the femoral neck. *J Bone Joint Surg Br.* 1961;43:647-63.
- Kannus P, Parkkari J, Sievänen H, Heinonen A, Vuori I, Järvinen M. Epidemiology of hip fractures. *Bone.* 1996;18:57-63.

9. Koval KJ, Zuckerman JD. Hip fractures are an increasingly important public health problem. *Clin Orthop Relat Res*. 1998;348:2.
10. Maru N, Sayani K. Unstable Intertrochanteric Fractures In High Risk Elderly Patients Treated With Primary Bipolar Hemiarthroplasty: Retrospective Case Series. *Gujarat Med J*. 2013;68(2):68-72.
11. American Academy of Orthopaedic Surgeons. AAOS urges hip fracture care reform. *Am Acad Orthop Surg Bull*. 1999. Unknown online at: www2.aaos.org/aaos/archives/bulletin/aug99/acdnw11.htm.
12. Hedlund R, Lindgren U. Trauma type, age, and gender as determinants of hip fracture. *J Orthop Res*. 1987;5:242-6.
13. Bergström U, Björnstig U, Stenlund H, Jonsson H, Svensson O. Fracture mechanisms and fracture pattern in men and women aged 50 years and older: A study of a 12-year population-based injury register. *Osteoporos Int*. 2008;19:1267-73.
14. Geiger F, Zimmermann-Stenzel M, Heisel C, Lehner B, Daecke W. Trochanteric fractures in the elderly: The influence of primary hip arthroplasty on 1-year mortality. *Arch Orthop Trauma Surg*. 2007;127:959-66.
15. Tidermark J. Quality of life and femoral neck fractures. *Acta Orthop Scand Suppl*. 2003;74:1-42.
16. Bhandari M, Devereaux PJ, Swiontkowski MF, et al. Internal fixation compared with arthroplasty for displaced fractures of the femoral neck: a meta-analysis. *J Bone Joint Surg [Am]* 2003;85:1673-81.
17. Parker MJ, Gurusamy K. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. In: *The Cochrane Library*, 2006, Issue 3. CD001706. Chichester: John Wiley & Son; 2008.
18. Bhandari M, Devereaux PJ, Swiontkowski MF, Tornetta P, 3rd, Obremskey W, Koval KJ, et al. Operative management of displaced femoral neck fractures in elderly patients: an international survey. *J Bone Joint Surg [Am]*. 2005;87:2122-30.
19. Kenzora JE, Magaziner J, Hudson J, Hebel JR, Young Y, Hawkes W, et al. Outcome After Hemiarthroplasty for Femoral Neck Fractures in the Elderly. *Clinical Orthop Rel Res*. 1998;348(2):285.
20. Sinno K, Sakr M, Girard J, Khatib H. The effectiveness of primary bipolar arthroplasty in treatment of unstable intertrochanteric fractures in elderly patients. *N Am J Med Sci*. 2010;2(12):561-8.
21. Baumgaertner MR, Levy RN. Intertrochanteric hip fracture. In: Browner BD, Levine AM, Jupiter JB, editors. *Skeletal Trauma*. Volume 2. Philadelphia: W B Saunders; 1992: 1833-1881.
22. Raghvendra TS, Jayakrishna Reddy BS, Jayaram J. Management of Fracture Neck of Femur with Cemented Bipolar Prosthesis. *Indian J Clin Pract*. 2014;24(9):867-71.
23. Elmorsy A, Saied M, Allah AA, Zaied M, Hafez M. Primary Bipolar Arthroplasty in Unstable Intertrochanteric Fractures in Elderly. *Open J Orthop*. 2012;2:13-7.
24. Haentjens P, Casteleyn PP, De Boek H, Handelberg F, Opdecam P. Treatment of Unstable Intertrochanteric and Subtrochanteric Fractures in Elderly. Primary Bipolar Arthroplasty Compared with Internal Fixation. *J Bone Joint Surg*. 1989;71(8):1214-5.
25. Grimsrud C, Monzon RJ, Richman J, Ries MD. Cemented Hip Arthroplasty with a Novel Cerclage Cable Technique for Unstable Intertrochanteric Hip Fractures. *J Arthroplasty*. 2005;20(3):337-43.
26. Faldini C, Grandi G, Romagnoli M, Pagkrati S, Digennaro V, Faldini O, et al. Surgical Treatment of Unstable Intertrochanteric Fractures by Bipolar Hip Replacement or Total Hip Replacement in Elderly Osteoporotic Patients. *J Orthop Traumatol*. 2006;7(3):117-21.
27. Kumar KH, Paranjyothi J. Surgical and Functional Outcomes of Hemi Arthroplasty in Fracture Neck of Femur. *J Evidence based Med Healthcare*. 2015;2(7):859-64.
28. Ponraj RK, Arumugam S, Ramabadran P. Functional Outcome of Bipolar Hemiarthroplasty in Fracture Neck of Femur. *Sch J App Med Sci*. 2014;2(5):1785-90.
29. Cameron HU, Jung YB. Acetabular revision with a bipolar prosthesis. *Clin Orthop*. 1990;251:100-3.

Cite this article as: Reddy GR, Prasad PN. Efficacy of bipolar hemiarthroplasty in the elderly people: a study in a tertiary care centre. *Int J Res Orthop* 2017;3:396-400.