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Original Research Article

Outcome of Bipolar Hemiarthroplasty for Proximal Femoral [Neck & I/T] Fractures among Geriatrics: A Prospective Study

Sandeep Garg[1], Subhash Jain[2]

[1]Associate Professor, Dept of Orthopaedics, National Institute of Medical Science and Research, Jaipur Rajasthan

[2]Associate Professor, Dept of Orthopaedics, National Institute of Medical Science and Research, Jaipur Rajasthan

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Corresponding Author: Subhash Jain

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Abstract

Overview: Hip fractures are among the most frequently seen injuries by orthopaedic surgeons and are particularly prevailing in the geriatric community. This study was performed to evaluate the efficacy of the bipolar hemiarthroplasty among elderly patients with a proximal femoral [neck & I/T] fracture.

Materials and Methods: This was a prospective study undertaken at the Department of Orthopaedics at a NIMS, Jaipur from January 2023 to June 2024. The patients were selected based on the convenience sampling (Judgment sampling) method. Bipolar hemiarthroplasty was performed. All had cemented implants. Functional outcome was assessed periodically at 6 weeks, 3 months, 6 months, and 1 year using modified Harris hip scoring system using guide for statistical analysis and *p* value set at 0.05.

Observations: A total of 40 patients >50 years of age with 22 (55%) males and 18 (45%) females, among which 36 (90 %) with fractured neck of femur and 4 (10%) with Inter- trochanteric fracture were studied. Harris hips ROM score 5 was noted in 50% of the participants, scores 4 and3 in 42.5 and 7.5%, respectively. Excellent functional score was noted in 16 (40%), good in 18 (45%), satisfactory in 3 (7.5%), and 3 (7.5%) had poor score. Only two (5%) participants had radiolucent zone >2 mm and one (2.5%)had subsidence of prosthesis >5 mm.

Conclusion: Cemented bipolar hemiarthroplasty is a option of treatment in mobile geriatric patients above 50 years of age with a proximal femoral [Neck/ I/T] fracture. A bipolar hemiarthroplasty is a reliable option in treating fracture neck/ I/T femur in the elderly with several comorbidities. All the participants had a satisfactory functional outcome in form of regular daily activity, less hospital stay, less residual pain, good post-operative functionality and fewer post-operative complications. It can be used in day-to-day clinical practice as a effective treatment modality.

Keywords: Bipolar hemiarthroplasty, Proximal femoral [Neck & I/T] fractures.

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Introduction

Hip fractures are the most frequently seen injuries by orthopedic surgeons and are particularly prevailing in the geriatric community. Over one- third of the adult population of age 65 and above experience a fall each year.[1] Among all types of hip fractures, intertrochanteric hip fractures make up45% making it majorly observed hip fractures.[2] Ingeriatric patients, displaced femoral neck fractures are considered fatal injuries. They not only decreasethe quality of life but also are related to morbidity and cause an increase in the risk of death.[3] In the year 1990, the incidence was estimated to be 1.66 million with a probability of increasing up to 6.26 million in 2050, because of the increasing longer duration of life of the geriatric population.[4] For thetreatment of these fractures, there are various options available which include hemiarthroplasty, total hip arthroplasty, and internal fixation.[5] As per surveys conducted in the past, hemiarthroplasty is considered to be the most accepted treatment option by surgeons.[5,6] Professionals supporting hemiarthroplasty consider that the rate of nonunion is increased with age. This higher need for early reoperation is associated with fixation making replacement a more dependable and proven choice of treatment for the geriatric population. Hemiarthroplasty causes speedy recovery of mobility and delayed issues of loosening and wear are of lower concern in patients with a short lifespan. The treatment targets for femoral neck / I/T fractures timely return to an adequate functional status along with the decline in morbidity, mortality, and the need for reoperation.[6] Bipolar hemiarthroplasty has an extra inner bearing between the end prosthetic head component and the stem. Theoretically, this

design would decrease protrusion, dislocation, and acetabular erosion. It also maintains the stability of the joint and increases hip function.[7,8] Cemented fixation has an advantage as it enhances the initial fixation strength among geriatric with poor bone quality, on the other hand, cementless fixation encourages biological fixation and can reduce cardiovascular toxicity.[9] It can be said that for unstable intertrochanteric fractures in the older population bipolar hemiarthroplasty is an enduring and adaptable solution.[10]

Fixation loss, excessive collapse, and cut-out of the lag screw causing poor function to remain an issue related to internal fixation of unstable intertrochanteric fracture in the geriatric patientshaving osteoporotic bones. Studies show that severalsurgeons recommend a prosthetic replacement for the treatment of unstable intertrochanteric fractures to enable the earlier postoperative weight-bearing as well as to prevent excessive collapse at the site of fracture. Lehtonen et al., in their study, found that cemented bipolar arthroplasty is an alternative in freely mobile geriatric patients above 70 years of age with an intertrochanteric femoral fracture as it permits postoperative full weight-bearing, thus sparing the patients from the postoperative impediments of non-weight bearing post internal fixation. In the current study, elderly patients undergoing bipolar hemiarthroplasty for osteoporotic proximal femoral fractures were reviewed regularly at 6 weeks, 3 months, 6 months, and 1-year post-surgery to evaluate the functional outcome using Harris hip score.

The purpose of this prospective study is to evaluate the short- term functional outcome of bipolar hemiarthroplasty for the management of proximal femoral fractures in patients of 50 years and above.

Aims and Objectives

To study the short-term functional outcome of bipolar hemiarthroplasty for the management of proximal femoral fractures in patients of 50 years and above.

Materials and Methods

This was a prospective experimental study carried out at the Department of Orthopedics at National Institute of Medical Science and Research, Jaipur Rajasthan from January 2023 to June 2024. This study includes 40 cases of hip fractures (displaced fracture neck of femur and Inter- trochanteric fractures) inelderly above 50 years of age of both sexes treated by bipolar hemiarthroplasty. The participants were allocated based on the convenience sampling (Judgment sampling) method. The study included 22males and 18 females. The age ranged from 50 to 90 years, the average being 70.1 years. Patients with preexisting sepsis, active young patients withfractured neck of femur, neuropathic arthropathy, and individuals bedridden before injury were excluded from the study. Under regional anesthesia, the prophylactic antibiotic was given. The patient was positioned lateral, and through a posterior approach, the hip joint was reached, and posterior capsulotomy was done. The femoral head was dislocated and removed. Head size was measured. The neck was trimmed to the appropriate length. Femoral canal prepared. Serial broaching done. Trial implant inserted. For cementation, thorough saline lavage was given, and debris was removed and dried. Using methyl methacrylate cement, a femoral prosthesis was inserted. The offset, which gives adequate motion and stability, was fixed and hip reduced, and stability and range of movements checked.

Postoperative Protocol

The patients were admitted to a postoperative ward. Positioning of the hip was placed in approximately 15°of abduction using an abduction pillow in the immediate postoperative period. On the first postoperative day, bed exercises and limited mobilization were initiated. Quadriceps, deep breathing, and gluteal isometrics, and gentle rotation exercises were started. Parenteral antibiotics were given for the first 3 days. Suture removal was done postoperative 15 days. The patient was motivated to do full weight-bearing walking in the first or second post-operative days.

Once the patient was admitted to the hospital, all the required information was recorded in the proforma prepared for the current study. The follow-up was carried out at an interval of 6 weeks, 3 months, 6 months, and 1 year. The follow-up chart of the proforma was maintained to keep a record of the follow-ups. At the end of the study, the patients were called back for final review through telephone and WhatsApp. Patients were re-assessed clinically using the Harris hip score during the follow-up period and on final review. A comparison was done of initial X- rays of the hip and the newly taken for signs of migration, loosening, X-rays of the hip were taken and were compared with the initial X-rays for signs of wear, and implant failure. The duration of follow-up, at the end of this study, ranged from 6 to 18 months, with an average of 14.2 months. Functional outcome scores were the primary outcome variable.

Results

A total of 40 subjects were included in the final analysis. The majority of 15 (37.5%) study participants were aged between 71 years and 80 years, followed by 61–70 and 50–60 years age group was 32.5% and 30 %, respectively. In the study participants, 22 (55%) were males, and the remaining 18 (45%) participants were females. Among the people with indication, 36 (90%) participants had the fractured neck of femur, and 4 (10 %) participants had a Inter-trochanteric fracture. Among the study population, all 40 participants had cemented implants.

In our study, there were 36 patients with fractured neck of femur and 4 patients with trochanteric fractures. Displaced femoral neck fractures predominated our study. The majority of patients (92.5%) had a good to an excellent range of movements on final follow-up (Table 1).

Among the people with a functional score, 16 (40%) participants had excellent, 18 (45%) participants had good, and 3 (7.5%) participants each had satisfactory andpoor respectively (Table 2). Among the study population, two (5%) participants had radiolucent zone >2 mm, and only one (2.5%) participant had subsidence of prosthesis >5 mm.

Table 1: Range of Movement Distribution

ROM	Score	Frequency (n = 40)	Percentage
211–300°	5	20	50
161–210°	4	17	42.5
101–160°	3	3	7.5
61–100°	2	0	0
31–60°	1	0	0
0–30°	0	0	0

Table 2: Functional outcome

Functional results	Frequency *(n* = 40*)*	Percentage
Excellent (91–100)	16	40
Good (81–90)	18	45
Satisfactory (71–80)	3	7.5
Poor (≤70)	3	7.5

Discussion

As per the literature and theories from the past, bipolar hemiarthroplasties were found to tackle the complications of unipolar implants such as protrusion, acetabular wear, dislocation, and loosening. Stems were reorganized, more in linewith total hip replacement designs, to decrease component loosening. To initiate the reduction of acetabular wear and dislocation rates, the inner bearing motion was introduced.[12] With the reference to past studies, the present study was carried out to evaluate functional outcomes in bipolar hemiarthroplasty as the primary treatment ofchoice among elderly patients with a proximal femoral [Neck/ I/T]fracture.

In our study population, the maximuml age was 90 years in the case of males and 87 years in the case of females. The majority of the patients were in the age group of 71–80 years, with a mean age of 70.1 years. There were 18 female patients and 22 male patients showing preponderance of males over females. In a similar study by Saoudy and Salama, there were 22 men and 8 women with a mean age of 60 years (range: 55–70 years).[13] Displaced femoral neck fractures predominated our study, and all underwent bipolar hemiarthroplasty, of which all 40 were cemented. Harris hip ROM scoreof 5 was noted in 50% of the participants, score 4 in 42.5%, and score 3 in 7.5%. The total Harris hip score at the end of the final assessment ranged from55 to 97. Among the study population, 40% had excellent Harris hip scores, 45% good, 7.5% satisfactory, and 7.5% poor. Thus, 92.5% of the patients were classified as having a satisfactory to excellent result, and 7.5% of the patients had a poor esult. We compared the results of this study with the results obtained by other studies, in the Vala et al.'s[10] study group at the end of 9 months, 24% had excellent results, 60% had good results, 12% had fair results, and 4% had poor result. In Patil et al.'s study, the functional outcome was reported to be excellent among 29.0% of the study group, fair in25.8%, good in 32.3%, and poor in 9.7%.[14]

There were two cases with a radiolucent zone >2 mm around the stem of the prosthesis. Subsidence of the prosthesis was found in one case. 22.5% ofpatients had limb length shortening. In Saoudy and Salama's study, complications were reported in four cases, two of them being a superficial infection, loosening in one patient, and acetabular wear in one patient.[13]

The present study provided good results, with the achievement of remarkable functional ability and pain control. The majority of patients had regained good walking distance, were able to climb stairs, sit comfortably in an ordinary chair. According to our results, it can be suggested that cemented bipolar hemiarthroplasty is a better option in freely mobile elderly patients above 50 years of age with a proximal femoral [neck & I/T] fracture.

Conclusion

Most of the participants in the study with proximal femoral fracture treated with bipolar hemiarthroplasty had a short hospital stay, less pain,no lasting limp, early mobilization, early return to preinjury level, and a superior quality of life. It canbe concluded from the current research that bipolar hemiarthroplasty is a successful treatment for the proximal femoral [Neck & I / T] fractures in the geriatric population. Limitations include small

sample size and relatively short-term follow-up as for assessment of implant- related complications, studies with a longer duration of follow-up are recommended in the future.

References

1. Lehtonen EJI, Stibolt Jr RD, Smith W, et al. Trends in the surgical treatment of femoral neck fractures in the elderly. Einstein 2018;16(3): eAO4351. DOI: 10.1590/s1679–45082018ao4351.
2. Parker M, Johansen A. Hip fracture. BMJ 2006;333((7557)):27–30.
3. Kristensen TB, Dybvik E, Kristoffersen M, et al. Cemented or uncemented hemiarthroplasty for femoral neck fracture? data from the norwegian hip fracture register. Clin Orthop Relat Res 2020;478(1):90–100. DOI: 10.1097/corr.0000000000000826
4. 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(3):396. DOI: 10.18203/issn.2455–4510.IntJResOrthop20171573
5. Iorio R, Schwartz B, Macaulay W, et al. Surgical treatment of displaced femoral neck fractures in the elderly: a survey of the American Association of Hip and Knee Surgeons.J Arthroplast 2006;21(8):1124– 1133. DOI: 10.1016/j.arth.2005.12.008
6. Bhandari M, Devereaux PJ, Tornetta P, et al. Operative management of displaced femoral neck fractures in elderly patients. An international survey. J Bone Jt Surg Am 2005;87(9):2122–2130.DOI: 10.2106/jbjs.e.00535
7. Bhattacharyya T, Koval KJ. Unipolar versus bipolar hemiarthroplasty for femoral neck fractures: is there a difference?J Orthop Trauma 2009;23(6):426–427.DOI: 10.1097/BOT.0b013e3181adb057
8. Gilbert MS, Capozzi J. Unipolar or bipolar prosthesis for the displaced intracapsular hip fracture? an unanswered question. Clin Orthop Relat Res 1998 (353) : 81 – 85 . DOI: 10.1097/00003086-199808000-00010
9. Choy WS, Ahn JH, Ko JH, et al. Cementless bipolar hemiarthroplasty for unstable intertrochanteric fractures in elderly patients. Clin Orthop Surg 2010;2(4):221–226. DOI: 10.4055/cios.2010.2.4.221
10. Vala P, Shah R, Gandhi T, et al. Outcomes of primary bipolar hemiarthroplasty in the management of unstable inter-trochanteric fracture of femur among elderly. IntJ Orthop 2019;5(2):739–743.DOI:10.22271/ortho.2019.v5.i2k.81
11. BDSS Corp. Released 2020. coGuide Statistics software, Version 1.0, India: BDSS corp.
12. Wathne RA, Koval KJ, Aharonoff GB, et al. Modular unipolar versus bipolar prosthesis: a prospective evaluation of functional outcome after femoral neck fracture. J Orthop Trauma 1995;9(4):298–302. DOI: 10.1097/00005131-199509040-00005
13. Saoudy EE, Salama AM. Bipolar hemiarthroplasty for the treatment of unstable trochanteric fracture femur in the elderly. Egypt Orthop J 2016;51(4):313
14. Patil V, Nandi SS, Naik S, et al. Functional outcome of unstable comminuted intertrochanteric fractures in elderly treated with primary bipolar hemiarthroplasty. IntJ Orthop 2019;5(1):59–62.DOI:10.22271/ortho.2019.v5.i1b.13