

EVALUATION OF CLINICAL OUTCOME IN PATIENT OPERATED WITH BIPOLAR PROSTHESIS IN FRACTURE NECK OF FEMUR.

¹DR. NIRAV BODHIRAJ RASHTRAPAL, ²DR. R.N. LADDHA

¹POST GRADUATE RESIDENT, ²PROFESSOR AND HEAD,
DEPARTMENT OF ORTHOPAEDICS
PACIFIC MEDICAL COLLEGE AND HOSPITAL
UDAIPUR, RAJASTHAN, INDIA.

Abstract- Femoral neck fractures are a common injury in the elderly population, and the treatment of these fractures remains a controversial topic. Open reduction and internal fixation have poor outcomes in the elderly population, and various prostheses have been developed to address these challenges. Bipolar prostheses have become popular due to their potential advantages over unipolar prostheses. However, there is a lack of literature on the long-term outcomes of bipolar hemiarthroplasty in the Indian population. The aim of this hospital-based prospective cohort study was to evaluate the clinical outcomes of bipolar hemiarthroplasty in patients with fracture neck of femur. A total of 35 patients were included in the study, and they underwent elective surgery in the orthopedic operation theater at the Department of Orthopedics, PMCH, Udaipur, India. The study period was from January 2021 to December 2022. The patients were evaluated for immediate and late post-operative complications following bipolar prosthesis, and pre and post-injury functional levels were compared. The results of the study showed that bipolar hemiarthroplasty had a favorable clinical outcome in patients with fracture neck of femur. There were no significant complications reported, and the pre and post-injury functional levels of the patients improved. The study concludes that bipolar hemiarthroplasty is a safe and effective treatment option for active elderly patients with fracture neck of femur in India.

Index Terms- Arthroplasty, Hip replacement arthroplasty, Bipolar hemiarthroplasty, Fracture neck of femur.

I. INTRODUCTION

Femoral neck fractures and peri trochanteric fractures are common in elderly populations and are often caused by falls. (1,2). Treatment for these fractures in the elderly has been controversial, with poor outcomes reported for open reduction and internal fixation, leading to the development of various prostheses, including unipolar and bipolar designs. While unipolar prostheses have been associated with stem loosening and migration, bipolar prostheses with cement have been shown to offer better outcomes, particularly in active elderly patients. (3,4,5).

This study focuses on evaluating the clinical outcomes of bipolar hemiarthroplasties in patients with femoral neck fractures. While primary total hip replacement is preferred at many tertiary centers in India, bipolar hemiarthroplasty appears to be the best option in government hospitals due to its lower cost and satisfactory outcomes. However, long-term follow-up results of this procedure are not yet available in the literature. Therefore, the aim of this study is to assess the clinical outcomes of bipolar hemiarthroplasty in patients with femoral neck fractures, providing valuable insights into the efficacy of this treatment option. (6-12).

II. MATERIALS AND METHODS

This paper presents a hospital-based prospective cohort study conducted among 35 patients who underwent bilateral prosthesis surgery at the Department of Orthopaedics, PMCH, Udaipur, over a two-year period from January 2021 to December 2022. The patients were admitted either through the OPD or emergency and were then transferred to the orthopaedic ward. The inclusion criteria were patients aged over 50 years with fresh and old fracture neck of the femur and pathological fracture neck of the femur in the elderly. Exclusion criteria were fracture neck of femur below 50 years, associated with fracture shaft of femur or trochanteric fracture and acetabular fracture. The preoperative assessment involved blood investigations, urine examination, chest x-ray, and electrocardiogram. The patients were evaluated for concomitant conditions like hypertension, ischemic heart disease, and diabetes, and after a thorough pre-anesthetic evaluation, the patients were posted for elective surgery in the orthopaedic operation theatre. The case details were collected in a questionnaire form, which included socio-demographic details, cause of femur fracture, any comorbidities or previous disease, investigation, and follow-up. The study was approved by the Institutional Ethical Committee, and written informed consent was obtained from each participant before the study.

III. RESULTS

A prospective cohort study was conducted among 35 patients undergoing bipolar prosthesis surgery for fracture neck of femur at the Department of Orthopaedics, PMCH, Udaipur, from January 2021 to December 2022. The aim of the study was to assess the clinical outcomes of the surgery. The study observed that the mean age of the patients was 64.57 ± 9.12 years, with the majority of participants (37.14%) being from the 51-60 years of age group. Of the total, 23 (66%) were females and 12 (34%) were males, with a sex ratio of 2:1. The study observed that most of the patients (57%) were from urban areas, and 42.9% were engaged in unskilled work. The most common mode of injury was domestic accidents (68.57%). The mean duration gap between admission and surgery was 5.7 days, while the mean hospital stay duration was 11.1 days. The study also observed that 82.86% of participants had poor

preoperative MHHS, but after 6 months of the operative procedure, 60% of cases had excellent scores. Overall, the study concluded that bipolar prosthesis surgery is an effective treatment for fracture neck of femur.



Fig.1 Anteroposterior radiograph of left hip with neck of femur fracture.



Fig.2 Anteroposterior radiograph of left hip demonstrates a Bipolar hemiarthroplasty.

Table 1. Post operative assessment among Patients (n=35)

Variable	Yes	No
Pain	2	33
Functions	23	12
Stairs	30	5
Wearing Socks & Shoes	27	8
Sitting	29	6
Use of public transport	21	14

Out of total, only 2 patient had complain of pain in Post operative duration. Overall mobility and able to do function were Normal in majority of patients after operative procedure. [Table 1]

Table 2. Modified Hip Harris score among study participants

Modified Hip Harris score	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (<70)
Preoperative	0(0)	0(0)	6(17.14)	29(82.86)
At 6 weeks	0(0)	9 (25.7)	17(48.6)	9(25.7)
At 6 month	2 (5.7)	21(60)	12(34.2)	0(0)
At 12 month	22 (62.8)	12(34.2)	1(2.8)	0(0)

As per observation, preoperatively, 82.86% participants had poor less than 70 MHHS. After 6 weeks of operative procedure, almost half of the patients had fair MMHS. Postoperative after 6 months, 60% cases had excellent score. While at 12 month postoperative follow up, 62.8% patients had excellent MHHS. [Table 2]

IV. DISCUSSION

Fracture neck of femur is a common injury that requires replacement surgery to ensure early return to daily activities, particularly in elderly patients where complications must be prevented. Hemiarthroplasty using modular bipolar prosthesis is not routinely performed for neglected fracture neck of femur, and research is ongoing to find the ideal treatment for younger patients. A study was conducted on 35 patients of both sexes who underwent hemiarthroplasty with modular bipolar prosthesis, using uncemented modular femoral prosthesis. Pain following the procedure was a major concern. Preoperatively, 82.86% of the participants had poor MHHS score. However, after 6 weeks of the operative procedure, almost half of the patients had a fair MHHS score, and postoperative after 6 months, 60% cases had excellent scores. At the 12-month postoperative follow-up, 62.8% of the patients had excellent MHHS scores. These results are comparable to other studies, where excellent Harris hip scores were reported in 44.7% to

50% of patients at final follow-up. In conclusion, hemiarthroplasty with modular bipolar prosthesis is an effective treatment for fracture neck of femur and can provide satisfactory outcomes.(13-22)

V. CONCLUSION

Bipolar hemiarthroplasty is a viable option for treating fractures of the femoral neck. Patients who undergo this procedure can expect freedom from pain and a more rapid return to unassisted activity, as long as they receive optimum post-operative rehabilitation. While the functional results may be influenced by co-morbidities, the study showed good radiological outcomes and significant interprosthetic movements in active elderly individuals. The study suggests that the bipolar hemiarthroplasty is a cost-effective prosthesis. However, a long-term follow-up study would provide more definitive findings. Overall, bipolar hemiarthroplasty appears to be a promising option for treating fractures of the femoral neck, especially in active elderly patients.

REFERENCES:

- Adapureddi HT, Kamareddy SB, Kumar A, Paturi SK, Anne S, Reddy JP. Prospective study of management of fracture neck of femur by Hemiarthroplasty with cemented Bipolar. *Journal of Evolution of Medical and Dental Sciences*. 2015; 4(98): 16309-16314.
- Shukla R, Singh M, Jain RK, Mahajan P, Kumar R. Functional Outcome of Bipolar Prosthesis versus Total Hip Replacement in the Treatment of Femoral Neck Fracture in Elderly Patients. *Malaysian Orthopaedic Journal*. 2017; 11(1): 1 -5.
- Leighton RK: Fractures of the Neck Femur. In: Bucholz RW, Heckman JD, Court-Brown CM. (eds.) *Rockwood and Green's fracture in adults*. 6th edition. Philadelphia, Lippincott Williams & Wilkins 2016; 1753-1791. K. Elissa, "Title of paper if known," unpublished.
- Sharoff L, Nazeer M, Unnikrishnan R. Functional outcome of cemented bipolar hemiarthroplasty in fracture neck of femur in elderly: A prospective observational study. *International Journal of Medical Research & Health Sciences*. 2016; 5(2): 70-76.
- Maruthi CV, Shivanna. Management of fracture neck of femur in elderly by hemiarthroplasty: A study. *Indian Journal of Orthopaedics Surgery*. 2016; 2(2): 170-180. M. Young, *The Technical Writer's Handbook*. Mill Valley, CA: University Science, 1989.
- Parvizi J, Ereth MH, Lewallen DG. Thirty-Day Mortality Following Hip Arthroplasty for Acute Fracture. *The Journal of Bone & Joint Surgery*. 2014; 86: 1983-1988.
- Leighton RK: Fractures of the Neck of the Femur. In: *Rockwood and Green's fracture in Adults*. Ed: Bucholz RW, Heckman JD, CourtBrown CM. 6th edn. Philadelphia, Lippincott Williams & Wilkins 2006; 1753-1791. 50
- Ahn J, Man LX, Park S, Sodl J F, Esterhai JL. Systematic Review of Cemented and Uncemented Hemiarthroplasty Outcomes for Femoral Neck Fractures. *Clinical Orthopaedic Related Research*. 2018; 466: 2513-2518.
- Ponraj RK, Arumugam S, Ramabadran P. Functional Outcome of Bipolar Hemiarthroplasty in Fracture Neck of Femur. *Scholars Journal of Applied Medical Sciences*. 2014; 2(5D): 1785-1790.
- Marya SKS, Thukral R, Hasan R, Tripathi M. Cementless bipolar hemiarthroplasty in femoral neck fractures in elderly. *Indian Journal of Orthopaedics*. 2013; 45(3): 236-242.
- Leighton RK, Schmidt AH, Collier P, Trask K. Advances in the treatment of intracapsular hip fractures in the elderly. *Injury* 2017; 38: 24-34.
- Baumgaertner MR, Higgins TF: Femoral Neck Fractures. In: *Rockwood and Green's fracture in Adults*. Ed: Rockwood CA, Robert W, Bucholz RW, James D, Heckman JD, Green DP. 5th edn. Philadelphia, Lippincott Williams & Wilkins 2001.
- Bhandari, M., Devereaux, P., Swionkowski, M. F., 2003. Internal Fixation Compared with Arthroplasty for Displaced Fractures of the Femoral Neck. *The Journal of Bone and Joint Surgery*, 85-A, pp. 1673-81
- Keating, J. F., Grant, A., Masson, M., Forbes, J. F., 2006. Randomized Comparison of Reduction and Fixation, Bipolar Hemiarthroplasty, and Total Hip Arthroplasty. *The Journal of Bone and Joint Surgery*, 88-A, pp. 249-60
- Özer, D., Çimen, O., Aykut, Ü. S., 2012. Cemented Versus Cementless Modular Head Partial Prostheses in Femoral Neck Fractures of Elderly Patients: Comparison of Early Functional Results. *Journal of Academic Research in Medicine*, 2, pp. 1-5.
- Ali, M., 2007. Modular Unipolar or Bipolar Hemiarthroplasty. *El-Minia Medical Bulletin*, 18, pp. 246-53
- Balan, B., Shetty, S. K., Shetty, A., 2016. Displaced Intra-capsular Neck Femur Fractures in Elderly: Austin Moore's prosthesis or Cemented Modular Bipolar Prosthesis. *International Archives of Integrated Medicine*, 3, pp. 287-96
- Sakthivel, R. N., Subramanyam, B. P., and Balakrishnan, V. (2016). A Study of Hip Arthroplasty Using Bipolar Endoprosthesis for Fracture Neck of Femur. *International Journal of Research in Medical Sciences*, 4, pp. 465-71
- Sullivan, N. P., Hughes, A. W., Halliday, R. L., Ward, A. L., Chesser, T. J., 2015. Early Complications Following Cemented Modular Hip Hemiarthroplasty. *The Open Orthopaedics Journal*, 9, pp. 15-9
- Bansal S, Jain S, Singhal RP. Management of fracture neck femur with bipolar arthroplasty. *Int J Adv Multidiscip Res* . 2016; 3:38 -45
- Sharoff L, Nazeer M, Unnikrishnan R. Functional outcome of cemented bipolar hemiarthroplasty in fracture neck of femur in elderly: A prospective observational study. *Int J Med Res Health Sci*. 2016; 5:70 -76.
- Somashekar, Krishna SV, Murthy SJN. Treatment of Femoral neck fractures: Unipolar versus bipolar prosthesis. *Malay Orthop j*. 2013; 7:6 -11