

Original Research Article

Functional outcome of intracapsular neck of femur fracture treated in elderly with bipolar hemiarthroplasty at tertiary health care center

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ABSTRACT

Background: Fractures of the neck of the femur are common in the elderly and are expected to rise significantly due to increased life expectancy. While conservative management has limited indications, surgical intervention remains the standard of care. Among surgical options, open reduction and internal fixation have shown high failure rates due to nonunion and avascular necrosis, leading to revision surgeries and increased morbidity. Aim of study was to evaluate the functional outcomes of intracapsular neck of femur fractures in elderly patients treated with cemented bipolar hemiarthroplasty.

Methods: This prospective observational study was conducted at a tertiary care hospital and included 60 patients aged 60 years and above with intracapsular femoral neck fractures. All patients underwent cemented bipolar hemiarthroplasty. Functional and clinical outcomes were assessed using the Harris hip score (HHS) during follow-up visits. Patient consent and comprehensive clinical evaluations were obtained on admission.

Results: The mean patient age was 69.88 years, with 55% females. According to Garden's classification, 11.7% had grade I/II, 53.3% grade III, and 35% grade IV fractures. At 3 months post-surgery, 45% had poor, 43.3% fair, and 11.7% good functional outcomes.

Conclusions: Cemented bipolar hemiarthroplasty for intracapsular femoral neck fractures in the elderly offers favorable functional outcomes, reduces complications associated with prolonged immobilization, and facilitates early rehabilitation and return to activity.

Keywords: Functional outcome, Femoral neck fracture, Bipolar hemiarthroplasty, Elderly, Harris hip score

INTRODUCTION

Neck of the femur fracture is one of the most frequently seen fractures by an orthopedic surgeon. The incidence of these fractures and the problems subsequent to them seems to be increasing; the cause of this is mainly the increase in the elderly population. Due to better healthcare and lifestyle, the lifespan of our population has increased. Statistics show that fracture of the proximal femur will rise from 1.66 million in 1990 to 6.26 million by 2050.¹

This percentage is due to the increasing rate of osteoporosis and high-velocity trauma. Individuals coming under this age group have many comorbidities, which will complicate the treatment of such fractures. The final result we look for is to get the patient to his/her premorbid status of functioning. Management of fracture of the femur neck in aged patients has been controversial. Neck of femur fractures have been considered 'unsolvable fractures' in orthopedics during the past era because of the high rate of associated complications, which include non-union and

avascular necrosis of the femoral head, among others.^{2,3} At present, there are many surgical options (dynamic hip screw systems, cannulated screws, blade plates, and hemi- and total hip arthroplasty) available. Fixation failure in intracapsular femoral neck fractures is often attributed to limited blood supply to the femoral head, the anatomical location of the fracture within the joint capsule, and the challenges in achieving and maintaining stable reduction.^{3,4} Despite advancements in treatment techniques, there is still no clear consensus on the optimal management approach. During the hemiarthroplasty procedure, the damaged femoral head and neck are removed and replaced with the modular bipolar prosthesis. The prosthesis was held in place with cement. Patients will need to undergo physical therapy after surgery to restore movement and function of the joint. Rehabilitation usually begins once the patient is stable and comfortable, often starting within the first day after surgery. The majority of patients experience successful, long-term outcomes from this procedure. The HHS is the most widely used scoring system for evaluating hip arthroplasty. This study is done to assess the clinical and functional outcome of bipolar hemiarthroplasty in an elderly population with a fractured neck of femur in a tertiary health care setup.

Aim

Aim of the study was to study functional outcome of intracapsular neck of femur fracture in elderly treated with bipolar hemiarthroplasty.

METHODS

This prospective observational study was conducted at a tertiary care hospital between August 2019 and December 2021. A total of 60 patients aged 60 years and above with post-traumatic intracapsular femoral neck fractures were included. All patients underwent cemented bipolar hemiarthroplasty using a standard posterior surgical approach performed by the experienced orthopedic surgeons.

Inclusion criteria

Patients with age group >60 years of either sex, patients with post-traumatic fracture neck of the femur, pre-fall ambulatory status of at least household functions, closed fractures and subject should not have any previous deformity in the lower limbs were included.

Exclusion criteria

Pathological fracture of the neck of femur, compound fracture, fracture of the neck of the femur associated with any other fracture, active infection of hip or anywhere systemically and dementia patients were excluded.

On admission, a detailed history and clinical examination were performed. Informed written consent was obtained from all participants. Preoperatively, patients received

intravenous ceftriaxone (1 g) the night before and immediately prior to surgery. Postoperative antibiotic prophylaxis continued for 5 days with IV ceftriaxone, followed by oral cefuroxime (200 mg) until suture removal on the 10th postoperative day.

Functional and clinical outcomes were evaluated during follow-up visits using the HHS. All patient data were recorded in a structured pro forma.

Sample size calculation

Based on prior data with an expected incidence of good/excellent HHS of 78% ($p=0.78$), a 95% confidence level ($Z=1.96$), and a 10% margin of error (me), the sample size was calculated as follows:

$$n=(me)^2Z^2 \times p \times q = (0.10)^2(1.96)^2 \times 0.78 \times 0.22 \approx 60$$

Statistical analysis

Quantitative data were expressed as mean \pm SD, and categorical data as percentages. Statistical analyses were performed using SPSS version 21.

The study was conducted after obtaining ethical clearance from the institutional ethics committee.

RESULTS

The mean age of the study cases was 69.88 years, with 45% of the cases over 70 years.

Table 1: Distribution of study cases as per age group.

Age group (in years)	N	Percentage (%)
61-70	33	55.0
71-80	22	36.7
>80	5	8.3
Total	60	100
Mean age-69.88 \pm 6.4 years		

A slight female predominance was seen in the present study, with 55% females to 45% males.

Table 2: Distribution of study cases as per type of fracture.

Type of fracture (Garden's classification)	N	Percentage (%)
I	4	6.7
II	3	5.0
III	32	53.3
IV	21	35.0
Total	60	100

As per Garden's classification, 11.7% of cases had grade I/II fractures, while 53.3% and 35% had grade III and IV fractures, respectively.

Table 3: Mean HHS at 6 weeks, 3 months and 6 months.

HHS	N	Mean	SD	P value
6 weeks	60	50.15	11.40	
3 months	60	70.13	6.70	<0.01
6 months	60	83.12	6.70	<0.01

The mean HHS was 50.15 at the end of 6 weeks, while it increased to 70.13 and 83.12 by the end of 3 months and 6 months, respectively.

DISCUSSION

In the present study, the mean age of the study cases was 69.88 years, with 45% of the cases over 70 years. The study showed a slight predominance of female patients, comprising 55% of the cases compared to 45% males. Krishnan et al in their study observed the commonest age group was 61-70 years in the case undergoing hemiarthroplasty, with a mean age of 60.8 years.⁵ The study found a higher prevalence in females, with a female-to-male ratio of about 2:1. A similar study conducted by Mishra et al on 40 patients reported a mean age of 67 years, with a gender distribution of 17 males and 23 females.⁶ In a comparable study by Somashekar et al the average patient age was 70 years, with females comprising 66% and males 34% of the study population.⁷ In our study, by the end of 6 months, 3.3% and 16.7% of cases had poor or fair outcomes (total-20%), while 53.3% and 26.7% had good and excellent outcomes (80%), respectively. The mean HHS was 33.98 at the end of 6 weeks, while it increased to 45.43 and 61.36 by the end of 3 months and 6 months, respectively. Limited studies have explored the use of primary hemiarthroplasty for managing unstable intertrochanteric fractures in the Indian context. Krishnan et al in their study observed that in the bipolar arthroplasty group, 41.67% showed excellent results and 58.33% showed good results.⁵ Somashekar et al in their study, observed excellent to good results in 47.1% and 41.1% of cases in the bipolar group, while the mean HHS at the end of the follow-up period of 1 year was 86.2.⁷ Rawate et al in a similar study, observed that by the end of the 1-year follow-up, 8 out of 34 patients (25%) achieved excellent outcomes, while 10 patients (31.25%) had good outcomes, 10 (31.25%) had fair outcomes, and 2 (6.25%) had poor outcomes.⁸ Marya et al in their retrospective, nonrandomized study of 80 patients older than 70 years operated on with bipolar replacement, observed good results in terms of activity level before sustaining the fracture, ambulation, and satisfaction with the procedure.² The average HHS was 81 (range 70-94), and patients more than 80 years old progressed well without any complications. Sharanprasad et al studied 33 cases of femur neck fracture with hemiarthroplasty using modular bipolar prosthesis.⁹ The modified HHS indicated that by the end of one year, 81.9% of patients achieved a good functional outcome. Clinically, 27.2% of patients achieved excellent outcomes, 45.5% had good outcomes, and 12.1% showed poor results.

Limitations

This study had a few limitations. The short follow-up period (6 months) may not reflect long-term outcomes or complications. The absence of a control group prevents comparison with other treatment methods. Additionally, functional outcomes were assessed using only the HHS, which includes subjective elements. Comorbidities and their impact on recovery were not separately evaluated.

CONCLUSION

The present study observed that treatment of intracapsular neck of femur fractures in the elderly with cemented bipolar hemiarthroplasty results in good functional outcomes, reduced complications of prolonged immobilisation, and quicker rehabilitation, allowing for a swift return to functional level.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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