

## Research Article



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## FUNCTIONAL OUTCOMES AFTER INTRACAPSULAR FRACTURE MANAGEMENT WITH CEMENT-BASED BONE MARROW TRANSPLANTATION BY HARRIS HIP SCORE- AN ANALYTICAL STUDY

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### ABSTRACT

**Background:** In the Department of Orthopaedics, intracapsular femur neck fractures are a frequently reported fracture. Good results have been seen in older participants using cemented bipolar hemiarthroplasty for the treatment of intracapsular femur neck fractures.

**Aim:** The purpose of this study was to assess functional results after cemented bipolar hemiarthroplasty for the treatment of an intracapsular femur neck fracture.

**Methods:** A total of twenty-eight individuals with an intracapsular femur neck fracture were included in this prospective clinical study. Following management, the Harris Hip Score was used to evaluate the findings and classify them as follows: poor, fair, good, and exceptional.

**Results:** When the Harris Hip scores of the study subjects were graded, it was observed that 10.71% (n=3) of the subjects had poor scores, 25% (n=7) had fair scores, 50% (n=14) had good scores, and 14.28% (n=4) had excellent scores. Regarding the radiological characteristics of the research participants, it was observed that 50% (n=14), 39.28% (n=11), and 10.71% (n=3) of the study subjects had radiological gradings of excellent, good, and bad, respectively. Out of the studied individuals, the ectopic eruption was observed in 17.85% (n=5) whereas it was missing in 88.14% (n=23) of the subjects. Of the research individuals, 46.42% (n = 13) had a neck shaft angle >140°, whereas 53.57% (n = 15) had a neck shaft angle between 110°-140°. Femoral anteversion was found to be 15±5° in 46.42% (n=13) of the research participants, <10° in 21.42% (n=6), and >20° in 32.14% (n=9) of the study participants.

**Conclusion:** The current study found that cemented bipolar arthroplasty, which has good clinical results in older individuals, is one of the best strategies to treat intracapsular femur neck fractures. It is essential to do ongoing radiological and clinical tests to evaluate the problems.

**Keywords:** Femoral neck, Femoral neck Fracture, Harris Hip Score, Hemiarthroplasty.

### INTRODUCTION

The replacement of the femoral head is a useful treatment option for elderly patients with fractures. The effectiveness and clinical results evaluated after treatment, however, remain debatable. Hip fractures are quite common worldwide; according to a 1990 survey, million fractures are recorded annually. This incidence is predicted to rise to 4.5 million by the end of 2050, with Africa and Asia likely to have the largest prevalence. Intracapsular fractures account for nearly half of all hip fractures recorded.<sup>1</sup> The treatment of this fracture has generated debate,

particularly when it comes to adult patients. The most widely used classification scheme for femoral neck fractures is the Garden classification of 1961, which is based on the degree of fracture migration.<sup>2</sup>

Based on anteroposterior radiographic images and degree of fracture displacement, Garden's categorization system addresses the difficulties associated with internal fixation therapy, including recurrence, dispersed arteries, sequelae, and comorbidity risk. Garden's categorization is subject to some constraints, one of which is the low integrity of the viewer. Internal fixation, or IF, is still a dependable and generally recognized treatment option for managing displaced femoral neck fractures in patients under the age of 65.<sup>3</sup> This is because younger patients experience fewer failures than older patients, who are more likely to require repeat surgery and face long-term implant risks. Moore and Bohlman performed the first hemiarthroplasty in 1943, and their prostheses are still routinely used today to treat femur neck fractures in many different parts of the world.<sup>4</sup>

In contrast to internal fixation, the prior research' encouraging findings indicated a first step. But a number of related issues continued to exist. Femoral stem loosening, prosthetic head protrusion into the pelvis, and acetabular erosion were the primary complications.<sup>5</sup>

Christiansen pioneered bipolar hemiarthroplasty in the late 1960s. This technique allowed for little movement between the prosthetic head and stem thanks to an integrated trunnion bearing. Although the clinical results were improved, acetabular erosion remained a related consequence. Then, in 1974, Bateman presented the bipolar prosthesis, which included a moveable head element and an extra head surface to accommodate acetabulum motions.<sup>6</sup>

Compared to a unipolar endoprosthesis, a bipolar prosthesis had several benefits such as a quicker return to independent activities, a higher proportion of good outcomes, a lower incidence of acetabular erosion, less stem loosening with cement usage, less postoperative discomfort, and a wider range of movement. Complete hip arthroplasty is not a commonly used treatment for these fractures since hemiarthroplasty yields better and more acceptable outcomes and is less expensive.<sup>7</sup>

Since Charnley began using PMMA (polymethylmethacrylate) in 1970, cement use has become more common. During total hip arthroplasties, the PMMA that had previously been utilised to fix dentures was employed to attach the femoral head prosthesis in the femur. Therefore, in older patients, cemented bipolar hemiarthroplasty is a promising therapeutic choice for controlling femur neck fracture.<sup>8</sup>

The data in the literature is sparse, and one research indicated higher mortality following cemented bipolar hemiarthroplasty.<sup>4</sup> Therefore, the goal of this study was to assess functional results after cemented bipolar hemiarthroplasty for the treatment of an intracapsular femur neck fracture.

## **MATERIALS AND METHODS**

The goal of the current prospective clinical trial was to assess functional results after cemented bipolar hemiarthroplasty for the treatment of an intracapsular femur neck fracture. The Orthopaedics Department conducted the study. The individuals who visited the Institute's Department of Orthopaedics made up the study population.

28 participants, of both sexes, with intracapsular femur neck fractures treated at the Institute's Department of Orthopaedics were included in the research.

Participants with a verified diagnosis of a displaced intracapsular femur neck fracture, participants 50 years of age or older, and subjects willing to engage in the study were the inclusion criteria for the research. Subjects with open fractures, patients for whom surgery or general anaesthesia was contraindicated, and those younger than fifty years of age were the study's exclusion criteria.

Following final inclusion, each participant had a thorough history taken, and then a clinical assessment. Following confirmation of the intracapsular femur neck fracture diagnosis, cemented bipolar hemiarthroplasty was used to treat the patients surgically. All of the patients had regular studys and pre-anesthetic evaluations done before surgery.

Following the anaesthetic clearance, all individuals underwent elective surgery, which was followed by a critical assessment lasting ten to twelve days. Following the removal of the sutures, the individuals were released, and at future recalls, they had routine radiological and clinical evaluations.

Following surgery, check-ups were conducted four, six, and six months following discharge. Based on the functional outcomes of the operation, the results were categorised as excellent, good, fair, and bad based on the Harris Hip Score.<sup>5</sup> Using SPSS software version 21 (Chicago, IL, USA) for statistical assessment and one-way

ANOVA and t-test for result formulation, the gathered data were examined. The data were presented as a mean, standard deviation, percentage, and number. At  $p < 0.05$ , the significance threshold was maintained.

## RESULTS

The goal of the current prospective clinical trial was to assess functional results after cemented bipolar hemiarthroplasty for the treatment of an intracapsular femur neck fracture. Study participants comprised 28 individuals with intracapsular femur neck fractures of both sexes. Table 1 contains a list of the research individuals' demographic details. The study included 39.28% (n=11) female participants and 60.71% (n=17) male participants. The bulk of research participants were between the ages of 61 and 70, including 39.28% (n=11) of the sample, 32.14% (n=9) of the sample in the >70 age range, and at least 28.57% (n=8) of the sample in the 51–60 age range. Hospital stays lasted 11–15 years for 50% (n = 14) of the cases, 6–10 days for 28.57% (n = 8), and 3-5 days for 21.42% (n = 6) of the research subjects. The left side was involved in 42.85% (n=12) study subjects and right side in 57.14% (n=16) study subjects (Table 1).

When the Harris Hip scores of the study subjects were graded, as indicated in Table 2, it was found that 10.71% (n=3) of the subjects had poor scores, 25% (n=7) had fair scores, 50% (n=14) had good scores, and 14.28% (n=4) had excellent scores.

Regarding the radiological characteristics of the research participants, it was observed that 50% (n=14), 39.28% (n=11), and 10.71% (n=3) of the study subjects had radiological gradings of excellent, good, and bad, respectively. 17.85% (n=5) of the research patients had ectopic eruption, whereas 88.14% (n=23) did not. Of the research individuals, 46.42% (n = 13) had a neck shaft angle >140°, whereas 53.57% (n = 15) had a neck shaft angle between 1100-140°.

According to Table 3, femoral anteversion was >20° in 32.14% (n=9) research participants, <100 in 21.42% (n=6) study subjects, and 15±50 in 46.42% (n=13) study subjects.

## DISCUSSION

The goal of the current prospective clinical trial was to assess functional results after cemented bipolar hemiarthroplasty for the treatment of an intracapsular femur neck fracture. Twenty-eight male and female participants with intracapsular femur neck fractures were included in the research. The study included 39.28% (n=11) female participants and 60.71% (n=17) male participants. Most of the research participants were between the ages of 61 and 70, including 39.28% (n = 11) of the sample, 32.14% (n = 9) of the sample in the >70 age range, and 28.57% (n = 8) of the sample in the 51-60 age range.

For 50% (n=14) of the participants, the length of their hospital visit was 11–15 years; 28.57% (n=8) of the subjects had a stay of 6–10 days, and 21.42% (n=6) of the study subjects had a stay of 3-5 days. Of the research individuals, 42.85% (n = 12) included the left side and 57.14% (n = 16) involved the right side. These characteristics were similar to those of the studies conducted by Bhandari M et al. (2006) and Damany DS et al. (2005), in which the authors evaluated participants with similar characteristics to those of the current study.

When the Harris Hip scores of the research participants were graded, it was seen that 10.71% (n=3) of the subjects had bad scores, and 25% (n=7) of the patients had fair scores, the good scores were noted in 50% (n=14) study subjects, and the excellent scores were seen in 14.28% (n=4) study subjects. These findings aligned with those of Yurdakul E et al. (2015) and Moore AT8 (2006), whose authors noted that the research subjects' Harris Hip scores were comparable to those of the current study.

Regarding the radiological characteristics of the research participants, it was observed that 50% (n=14), 39.28% (n=11), and 10.71% (n=3) of the study subjects had radiological gradings of excellent, good, and bad, respectively. Ectopic eruption was observed in 17.85% (n=5) of the research participants and did not occur in 88.14% (n=23) of the study participants. Of the research individuals, 46.42% (n = 13) had a neck shaft angle >140°, whereas 53.57% (n = 15) had a neck shaft angle between 1100-140°. Femoral anteversion was found to be 15±50 in 46.42% (n=13) of the research participants, <100 in 21.42% (n=6), and >20° in 32.14% (n=9) of the study participants. These results were consistent with the radiography data that the authors of YS Prashanth et al. (2017) and Peeters CM et al. (2016) published in their research, which were similar to the current study.

## CONCLUSION

Given its limitations, the current study suggests that cemented bipolar arthroplasty, which has good clinical results in senior individuals, is one of the best options to manage intracapsular femur neck fractures. It is essential to do

ongoing radiological and clinical tests to evaluate the problems. A few drawbacks of the current study included biases related to geographic areas, a limited sample size, and a short monitoring time. Therefore, further long-term research with bigger sample sizes and longer observation periods will aid in coming to a conclusive result.

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## TABLES

Characteristics	Percentage (%)	Number (n=28)
<b>Gender</b>		
Males	60.71	17
Females	39.28	11
<b>Age range (years)</b>		
51-60	28.57	8
61-70	39.28	11
>70	32.14	9
<b>Hospital stay duration</b>		
3-5	21.42	6
6-10	28.57	8
11-15	50	14
<b>Side involved</b>		
Left	42.85	12
Right	57.14	16

**Table 1: Demographic characteristics of the study subjects**

Grading	Percentage (%)	Number (n)
<b>Poor</b>	10.71	3
<b>Fair</b>	25	7
<b>Good</b>	50	14
<b>Excellent</b>	14.28	4
<b>Total</b>	100	28

**Table 2: Harris Hip scores grading in the study subjects**

<b>Parameter</b>	<b>Percentage (%)</b>	<b>Number (n)</b>
<b>Radiological Grading</b>		
Excellent	50	14
Good	39.28	11
Poor	10.71	3
<b>Ectopic orientation</b>		
Present	17.85	5
Absent	82.14	23
<b>Neck shaft angle</b>		
>140°	46.42	13
110°-140°	53.57	15
<b>Femoral anteversion</b>		
15±5°	46.42	13
<10°	21.42	6
>20°	32.14	9

**Table 3: Radiological parameters in the study subjects**