



## "FUNCTIONAL OUTCOME OF CEMENTED VERSUS UNCEMENTED HEMIARTHROPLASTY IN FRACTURE NECK OF FEMUR", A COMPARATIVE STUDY.

### Orthopaedics

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### ABSTRACT

**Aim:** To elucidate whether a specific type of hemiarthroplasty using an uncemented implant could yield the same clinical results as a hemiarthroplasty using a cemented implant for treatment of displaced femoral neck fractures in elderly people.

**Introduction:** A femoral neck fracture is a most common injury which can lead to increased morbidity and mortality in elderly patients. Hemiarthroplasty, as an effective treatment,<sup>1</sup> contributes to early ambulation and good functional recovery. However, there has been persistent controversy over whether cemented hemiarthroplasty (CH) or uncemented hemiarthroplasty (UCH) is preferable for elderly patients.

**Results:** Concerning Harris hip score, results were equivalent for both cemented and uncemented hemiarthroplasty. There were no differences in the inability to walk, use of analgesics, and range of movements.

**Discussion:** The primary functional outcome measure considering the factors like pain, range of movement at the hip joint, ambulatory status & limp, based on modified Harris hip score after 1 year of follow up was equivalent between the two groups. No significant statistical difference was noted.

**Conclusion:** Both methodologies of hemiarthroplasties may be used with good results for displaced femoral neck fractures.

### KEYWORDS

Cemented, uncemented hemiarthroplasty, Harris hip score

### INTRODUCTION

A femoral neck fracture is a most common injury which can lead to increased Post-operative morbidity and mortality in elderly patients. Hemiarthroplasty, as an effective treatment<sup>1</sup>, contributes to early ambulation and good functional recovery.

However, there has been persistent controversy over whether cemented hemiarthroplasty (CH) or uncemented hemiarthroplasty (UCH) is preferable for the patient population. Cemented hemiarthroplasty may bring low periprosthetic fractures and prosthetic loosening whereas it may lead to embolism and decreased cardiac output with the insertion of bone cement.<sup>2</sup> However, there is a higher rate of postoperative prosthesis loosening for uncemented hemiarthroplasty while it may achieve shorter operation time and less intraoperative blood loss.

Hemiarthroplasty is the most common treatment for displaced fractures of the femoral neck in the elderly<sup>1,3</sup> and is associated with better functional outcomes and fewer reoperations than internal fixation.<sup>3,4</sup> A large number of prostheses have been used, and no definite conclusions have been made regarding which type of arthroplasty is preferred.<sup>2,3</sup>

There is some evidence of inferior short-term results, with decreased mobility and more pain when using an uncemented implant, and concerns regarding fixation problems with uncemented stems in osteoporotic bone have been raised. This may be the result of the inferior method of fixation or the design of the prosthesis.<sup>2</sup> One randomized comparison of a hydroxyapatite (HA)-coated implant and a conventional uncemented implant showed better functional results with the coated prosthesis.<sup>5</sup> We are unaware of any randomized trials comparing hemiarthroplasties using uncemented HA-coated implants with cemented implants<sup>2</sup> for treatment of femoral neck fractures. An arthroplasty using a cemented implant may be associated with increased mortality compared with an arthroplasty using an uncemented implant.<sup>6,7</sup>

The mechanisms involved are not fully understood but involve cardiorespiratory disturbances caused by venous and pulmonary embolization of bone marrow contents and methylmethacrylate particles.<sup>8,9</sup> An uncemented implant may be associated with design-specific complications such as stress shielding, thigh pain, and a higher risk of periprosthetic fracture<sup>10</sup>

Whether a specific type of hemiarthroplasty using an uncemented implant could yield the same clinical results as a hemiarthroplasty using a cemented implant for the treatment of displaced femoral neck fractures is still unclear. It is therefore planned to compare the effectiveness and safety of cemented hemiarthroplasty and uncemented hemiarthroplasty in treating femoral neck fractures in elderly patients. This in-depth evaluation will provide valuable information and more accurate evidence for surgeons in making a clinical decision.

### AIM

To elucidate whether a specific type of hemiarthroplasty using an uncemented implant could yield the same clinical results as a hemiarthroplasty using a cemented implant for treatment of displaced femoral neck fractures in elderly people.

### OBJECTIVES

To evaluate any differences in functional outcome after

1 year in terms of-

1. Ambulation
2. Residual pain
3. Range of movements.

### METHODS

**Study Type:** The prospective observational was carried at the department of orthopedics, santhiram general hospital.

**Sampling Technique:** The sampling technique used for the study was a simple randomized single-blinded technique.

**Period Of Study-** November 2020 to April 2021.

**Sample Size:** the study was done on 44 patients in the department of orthopedics.

### Sampling Criteria

#### Inclusion Criteria:

1. Patients are willing to give informed consent.
2. Patients who are willing to participate in the study.
3. Patients 60 years or older who underwent hemiarthroplasty 1 year before the study period at Santhiram general hospital and general hospital for displaced intracapsular femoral neck fracture will include in the study.

**Exclusion Criteria:**

1. Patients who are not willing to give informed consent.
2. Patients who are not willing to participate in the study.
3. Patients presented with polytrauma.
4. Patients with a history of symptomatic hip disease such as osteoarthritis.
5. Patients who were unable to walk before the fracture
6. Pathological fractures.

**Statistical Analysis:**

The collected data were analyzed by percentages, proportions, two-tailed Fisher's exact test for dichotomous variables and t-tests for HHS.

**METHODOLOGY****Method Of Collection Of Data**

A randomized single-blinded study was taken up among 44 patients aged more than 60 years who underwent hemiarthroplasty for displaced femoral neck fractures in the department of orthopedics at Santhiram Medical College and the general hospital was followed after 12 months from November 2020 to April 2021 for assessment of functional outcome will form the study population.

The patients who satisfied the inclusion and exclusion criteria were divided into two groups of 22 patients each.

Group 1: 22 subjects who underwent uncemented hemiarthroplasty.  
Group 2: 22 subjects who underwent cemented hemiarthroplasty.

- By questionnaire and examination,
- By follow up at 12 months post-operative.
- All the surgeries were done with the same surgical approach MOORE'S SURGICAL APPROACH TO HIP.

**Assessment Of Functional Outcome:**

It is assessed based on modified Harris Hip Score – It has the following components:

1. Pain – (44 Points Maximum)
2. Gait (walking maximum distance) (33 points maximum)
3. Functional Activity (14 points maximum)
4. Absence of deformity (4 points maximum)
5. Range of motion (5 points maximum)
6. Total – 100 points.

The Harris Hip Score is graded as follows:

- Score < 70 – Poor
- 70-79 – fair
- 80 – 90 – good
- 90-100 – Excellent

**RESULTS****1. Functional Outcome****a. PAIN**

- At 12 month follow up

| Pain                                   | Hemiarthroplasty               |                              | P-Value |
|----------------------------------------|--------------------------------|------------------------------|---------|
|                                        | Uncemented<br>[no of patients] | Cemented<br>[no of patients] |         |
| Absent                                 | 2 [9%]                         | 7 [31%]                      | 0.132   |
| Slight                                 | 17 [77%]                       | 11 [50%]                     | 0.06    |
| Mild                                   | 3 [14%]                        | 2 [9%]                       | 1.00    |
| Moderate                               | -                              | 2 [9%]                       | N.A     |
| Severe                                 | -                              | -                            |         |
| Bedridden                              | -                              | -                            |         |
| TOTAL                                  | 22 [100%]                      | 22 [100%]                    |         |
| 2 tailed P-value by Fisher exact test* |                                |                              |         |

**b. LIMP**

At 12 month follow up

| LIMP                                   | Hemiarthroplasty               |                              | P-Value |
|----------------------------------------|--------------------------------|------------------------------|---------|
|                                        | Uncemented<br>[no of patients] | Cemented<br>[no of patients] |         |
| None                                   | 05 [23%]                       | 02 [9%]                      | 0.412   |
| Slight                                 | 17 [77%]                       | 19 [86%]                     | 0.698   |
| Moderate                               |                                | 01 [5%]                      | N.A     |
| Severe                                 |                                |                              |         |
| TOTAL                                  | 22 [100%]                      | 22 [100%]                    |         |
| 2 tailed P-value by Fisher exact test* |                                |                              |         |

**C. Support**

At 12 month follow up

| SUPPORT               | Hemiarthroplasty               |                              |
|-----------------------|--------------------------------|------------------------------|
|                       | Uncemented<br>[no of patients] | Cemented<br>[no of patients] |
| None                  | 05 [23%]                       | 02 [9%]                      |
| Cane for long walks   | 10 [45%]                       | 14 [64%]                     |
| Cane most of the time | 07 [32%]                       | 06 [27%]                     |
| One crutch            |                                |                              |
| 2 Canes               |                                |                              |
| Not able to walk      |                                |                              |
| TOTAL                 | 22 [100%]                      | 22 [100%]                    |

**D. Range Of Movement**

At 12 month follow up

| MOVEMENTS | Hemiarthroplasty      |                     |
|-----------|-----------------------|---------------------|
|           | Uncemented [no of pt] | Cemented [no of pt] |
| Flexion   | <60 03 [14%]          | 03 [14%]            |
|           | >60 19 [86%]          | 19 [86%]            |
| Abduction | <200 01 [5%]          | 0                   |
|           | >200 21 [95%]         | 22 [100%]           |
| Rotation  | <150 03 [14%]         | 03 [14%]            |
|           | >150 19 [96%]         | 19 [86%]            |

**E. Total Functional Recovery Based On Harris Hip Score:**

| Hemiarthroplasty | Harris hip score |           |
|------------------|------------------|-----------|
|                  | Baseline         | 12 months |
| Uncemented       | 83.2             | 79.4      |
| Cemented         | 80.5             | 78.5      |

For HHS, the results were equivalent. There were no differences in the ability to walk, use of analgesics, and range of movements.

**DISCUSSION**

The 12-month follow-up results were comparable in both groups. If we consider pain as one of the confounding factors, we noticed that in cemented group immediate post-op pain relief was better. But on long-term follow up we did not observe any difference concerning pain in both groups. The primary functional outcome measure, considering the factors like pain, range of movement at the hip joint, ambulatory status & limp, based on modified Harris hip score after 1 year of follow-up, was equivalent between the two groups. No significant statistical difference was noted.

**Harris Hip Score**

The strength of our study was that it was a prospective study with reasonably good patient size and patient selection for cemented and uncemented hemiarthroplasties were randomly assigned. All the surgeries were done with the same kind of surgical approach.

**CONCLUSION**

The functional outcome of uncemented hemiarthroplasty can be comparable to cemented hemiarthroplasty by using Harris hip score. This study recommends performing hemiarthroplasties with both cemented and uncemented techniques in elderly patients for displaced fracture neck of the femur with good functional outcome.

- The advantage of a shorter duration of surgery and less blood loss with an uncemented prosthesis can be of little importance if weighed against the important finding of equivalent functional results.

- Both methodologies of hemiarthroplasties may be used with good results after displaced femoral neck fractures.

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