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# Functional outcome of cemented hemiarthroplasty in elderly patients with fracture neck of femur

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## ABSTRACT

**Background:** Fracture of the neck of the femur in elderly patients is a major cause of morbidity, mortality, and functional dependency. Due to osteoporosis and poor bone quality, displaced intracapsular fractures are commonly managed with arthroplasty rather than internal fixation. Cemented hemiarthroplasty provides immediate stability, early mobilisation, and improved functional recovery in osteoporotic bone. This study aimed to evaluate the functional outcome of cemented hemiarthroplasty in elderly patients with fracture of the neck of the femur.
**Methods:** This descriptive observational study was conducted in two healthcare centres in Rangpur, Bangladesh, involving 40 elderly patients aged 60-80 years with displaced femoral neck fractures managed with cemented hemiarthroplasty. Patients with pathological fractures, multiple injuries, or medical unfitness for surgery were excluded. Data were collected through clinical evaluation, radiological confirmation, and postoperative follow-up. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25. Functional outcome was assessed using the Harris hip score and overall functional grading, classified as excellent, good, fair, or poor.
**Results:** The mean age was 71.4±6.2 years, with a female predominance. Most fractures were Garden type III and IV. The mean Harris Hip Score was 85.6±8.3. Functional outcome was excellent in 45%, good in 35%, fair in 12.5%, and poor in 7.5% of patients. Overall, 80% of patients achieved good to excellent results. Complications were observed in 15% of cases, and the mortality rate was 7.5% at follow-up. The mean hospital stay was 9.5±3.2 days.
**Conclusions:** Cemented hemiarthroplasty was associated with satisfactory short-term functional recovery and acceptable complication and mortality rates in elderly patients with displaced femoral neck fractures. It appears to be a reliable surgical option for carefully selected patients with osteoporotic hip fractures.

**Keywords:** Cemented hemiarthroplasty, Femoral neck fracture, Functional outcome, Harris hip score

## INTRODUCTION

The hip joint is an example of a ball-and-socket joint that consists of the femoral head and acetabulum. The joint provides stabilisation, motion ability, and body weight transfer while walking. The femoral neck is connected to both the femoral head and shaft. It represents one of the weak areas of the skeleton in terms of bone strength because of osteoporosis, lower bone density, and increased susceptibility to falling. An intracapsular fracture of the femoral neck can cause damage to the blood vessels providing circulation to the femoral head, which can result in a non-union or avascular necrosis. Therefore, arthroplasty has been established as a treatment choice for this condition.[1,2,16-19] The prevalence of hip fractures has been steadily rising across the globe due to ageing demographics. There are around 1.6 million hip fractures that take place per year globally, and the figure is estimated

to rise above 6 million by 2050.[3] The Asian continent is predicted to account for almost half of all hip fractures due to rapid demographic changes and extended longevity.[4] Similarly, osteoporosis and fracture risk are important concerns in Bangladesh, where community-based studies have reported a substantial burden of reduced bone health among adults.[5] Fracture neck of femur among the aged patients is linked with extreme pain, immobilisation, dependency, bed sores, infection of the lungs, venous thromboembolism, and a high mortality rate. Therefore, early surgical intervention followed by immediate mobilisation is critical. The most important goals of treatment include pain management, ambulation, bearing of weight, and recovery to the level of functioning before injury. Hemiarthroplasty is preferred in frail aged individuals due to its relative ease compared to total hip arthroplasty.[6,7,20] When considering prostheses, hemiarthroplasty cemented in place is often favoured due to the fact that the cemented prosthesis offers instant stability for the stem in osteoporotic bone, lessens the risk of thigh pain after surgery, and enables patients to walk soon after surgery. One study showed that hemiarthroplasty cemented in place offered an enhanced quality of life along with decreased periprosthetic fractures when compared to uncemented hemiarthroplasties.[8] Another study found that cemented stems offered improved survival of implants.[9] Meta-analyses further support superior functional outcomes and fewer implant-related complications with cemented hemiarthroplasty.[10,11] The functional outcomes after hemiarthroplasty are evaluated based on the alleviation of pain, ambulation, motion range, functional independence for activities of daily living, and standardised scoring tools like the Harris hip score. Some studies have shown good short-term and intermediate-term results following hemiarthroplasty with cement fixation. Nevertheless, functional outcomes can differ depending on patient-related factors such as age, comorbidity burden, and baseline functional status.[13] There have been very few studies done in Bangladesh about postoperative mobility, patterns of complications, length of hospital stay, and the ability to live post-surgery of cemented hemiarthroplasty independently. Hence, a study done in this setting is necessary in order to produce local evidence. Unlike many previous studies that focused mainly on implant comparison, mortality, or radiological outcomes, this study aimed to emphasise real-world functional recovery following cemented hemiarthroplasty in elderly Bangladeshi patients with fracture neck of femur.

## METHODS

This descriptive observational study was conducted from January 2024 to December 2025 at two tertiary healthcare centres in Rangpur, Bangladesh: Rangpur General Hospital and Rainbow Clinic and Nursing Home. A total of 40 patients with fracture neck of the femur were included using purposive sampling.

Inclusion criteria were patients aged 60 to 80 years presenting with displaced intracapsular fracture neck of femur, confirmed clinically and radiologically. Exclusion criteria included pathological fractures, multiple injuries, and patients medically unfit for surgery. All patients underwent preoperative evaluation including detailed history, clinical examination, routine laboratory investigations, and radiological assessment. Fractures were classified according to the Garden classification based on preoperative radiographs (Figure 1).

After pre-anesthetic assessment and optimization, all patients underwent cemented hemiarthroplasty using standard surgical techniques under appropriate anesthesia. A lateral approach to the hip joint was used in all cases. The surgical procedure involved incision over the lateral aspect of the hip, exposure of the joint, removal of the femoral head, preparation of the femoral canal, and insertion of a cemented prosthesis. The intraoperative surgical approach is demonstrated in Figure 2.




**Figure 1: Preoperative radiograph showing displaced fracture neck of femur.**



**Figure 2: Lateral surgical approach for hemiarthroplasty.**

Postoperatively, patients received standard care including analgesics, antibiotics, thromboprophylaxis, and early mobilization with physiotherapy. Patients were encouraged to begin assisted ambulation as early as possible depending on clinical condition. Postoperative radiological evaluation was performed to assess implant positioning using anteroposterior and lateral views (Figures 3 and 4).



**Figure 3: Exposure of musculotendinous part of gluteus medius during lateral approach.**



**Figure 4: Insertion of prosthesis after cementation.**

Patients were followed up regularly and functional outcome was assessed using the Harris hip score. Outcomes were categorized as excellent, good, fair, or poor. Data were collected using a structured data collection sheet and analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Continuous variables were expressed as mean±standard deviation, and categorical variables as frequency and percentage.

***Surgical procedure***

Surgical procedure is shown in the following figures.



**Figure 5: Seating of hemiarthroplasty prosthesis during cemented fixation.**




**Figure 6: Postoperative radiograph, lateral view.**

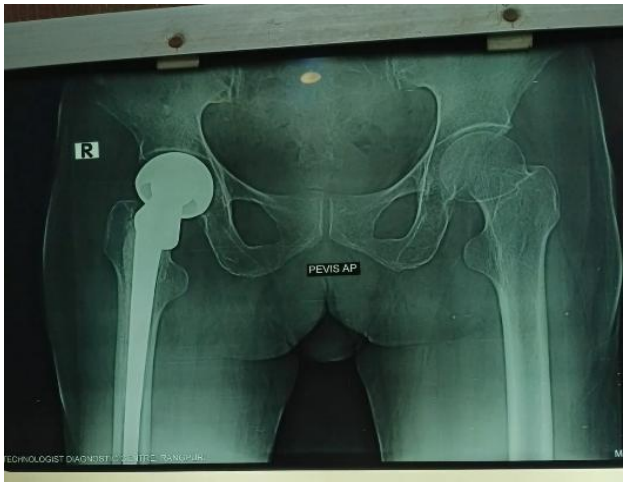



**Figure 7: Postoperative radiograph, anteroposterior view.**

## RESULTS

Table 1 shows that the mean age of patients was 71.4±6.2 years, with female predominance (24:16). Garden type III

and IV fractures were found in 24 and 16 cases, respectively. Mean time to surgery was 6.2±1.5 days. The average hospital stay was 9.5±3.2 days following cemented hemiarthroplasty.

**Table 1: Baseline and surgical data.**

| Variables | Value |
|---|---|
| **Age (years), mean±SD** | 71.4±6.2 |
| **Sex (F:M)** | 24:16 |
| **Garden type III/IV** | 24/16 |
| **Time to surgery (days), mean±SD** | 6.2±1.5 |
| **Hospital stay (days), mean±SD** | 9.5±3.2 |

**Table 2: Functional outcome and complications.**

| Outcomes | Value |
|---|---|
| **Follow-up (months), mean±SD** | 6.8±1.5 |
| **Harris Hip Score (final), mean±SD** | 85.6±8.3 |
| **Any complication, N (%)** | 6 (15) |
| **1-year mortality, N (%)** | 3 (7.5) |

Table 2 presents that the mean follow-up period was 6.8±1.5 months. The final mean Harris Hip Score was 85.6±8.3, indicating a good functional outcome. Complications occurred in 6 (15%) cases, while 1-year mortality was observed in 3 (7.5%) patients.

**Table 3: Distribution of functional outcome grading.**

| Functional Grade | N (%) |
|---|---|
| **Excellent** | 18 (45) |
| **Good** | 14 (35) |
| **Fair** | 5 (12.5) |
| **Poor** | 3 (7.5) |

Table 3 shows that functional outcome grading was excellent in 18 (45%) patients, good in 14 (35%), fair in 5 (12.5%), and poor in 3 (7.5%) patients.

## DISCUSSION

In this study, the mean age of the subjects in the study was found to be 71.4±6.2 years, consisting mostly of females, indicating that this kind of sample was common for displaced femoral neck fractures in the elderly population group. Fractures of the hip in older patients have strong associations with osteoporosis, low bone mass, a predisposition to falls, and elevated rates of complications during surgery and afterwards. Consequently, this demographic composition corresponds to the typical patient cohort in which hemiarthroplasty is viewed as an adequate treatment choice.[1-5] In all cases included in this study, the displacement was either type III or IV Garden fracture. Such types of fractures are well-known unstable intra-articular fractures with high chances of developing complications like non-union and avascular necrosis if subjected to internal fixation treatment, especially in aged osteoporotic patients. For this reason, arthroplasty is commonly recommended among older patients, where hemiarthroplasty remains one of the most practical options, especially among those who are frail and have lower physical demands. Compared to total hip replacement, hemiarthroplasty is relatively simpler in terms of surgical procedure and requires less operative time.[6,7] The main advantage of the study is that it emphasizes the use of cemented hemiarthroplasty. For osteoporotic bones, cemented fixation has been more common due to better implant stability in the beginning, allowing early weight-bearing, and fewer incidences of thigh pain and implant complications. Several studies have compared cemented and uncemented hemiarthroplasty and reported favourable results for the former in relation to implant fixation and functional recovery, along with fewer mechanical complications. Fernandez et al provided a relevant comparative analysis of cemented and uncemented hemiarthroplasty for intracapsular hip fracture, and so did other researchers, including Kristensen et al. and several meta-analyses thereafter.[8-12] This supports the basis for employing cemented hemiarthroplasty for this group of subjects. In this study, the mean duration from the date of injury until surgery was 6.2±1.5 days. This was slightly longer than commonly recommended timelines in hip-fracture care.[14,15,21] The mean hospital stays of 9.5±3.2 days are acceptable for elderly patients undergoing hip surgery. Length of stay after fracture of the neck of the femur depends not only on the surgical procedure itself but also on age, associated comorbidities, rehabilitation status, family support, and discharge logistics. In settings where rehabilitation resources are limited, the hospital stay can be longer. As for the functional results, the mean follow-up time was 6.8±1.5 months, which is sufficient to assess short-term recovery. The mean Harris hip score was 85.6±8.3. This is further supported by the functional grading, where 45% of patients had excellent results, and 35% had good results. Thus, a total of 80% of patients achieved excellent to good recovery. These findings suggest that cemented hemiarthroplasty was associated with satisfactory short-term functional outcome in elderly patients with displaced fracture neck of femur. The findings are consistent with previous reports showing favourable postoperative function after hemiarthroplasty in appropriately selected elderly patients.[10-13] The complication rate in this study was 15%, and the mortality rate was 7.5%. These findings should be interpreted cautiously because complications were recorded only as an aggregate count, without detailed categorization by type, timing, or severity. Even so, the observed short-term functional outcomes were generally favourable within the limits of this descriptive dataset. Elderly patients with hip fractures are particularly vulnerable to postoperative complications because of frailty, immobility, and associated medical illnesses. Generally, the results from this study suggest that cemented hemiarthroplasty was associated with acceptable short-term functional recovery in this patient group. However, because the study was descriptive and lacked a comparison group, the findings should be interpreted as

cohort outcomes rather than evidence of comparative effectiveness.

This study has several limitations, including a small sample size, which may limit the generalizability of the findings. The relatively short follow-up period restricts assessment of long-term outcomes and implant survival. The lack of a control or comparison group introduces potential selection bias and limits comparative evaluation with other treatment modalities. In addition, complications were recorded in aggregate rather than by type and severity, which limits detailed interpretation of the postoperative safety profile.

## CONCLUSION

Cemented hemiarthroplasty was associated with satisfactory short-term functional recovery and acceptable complication and mortality rates in elderly patients with displaced femoral neck fractures. These findings support its use as a reasonable treatment option in appropriately selected patients with osteoporotic displaced femoral neck fractures.

### *Recommendations*

Early surgical intervention should be prioritized where feasible to improve functional recovery and reduce complications. Structured multidisciplinary rehabilitation, including physiotherapy and occupational therapy, should be emphasized for all elderly patients. Cemented hemiarthroplasty is recommended in osteoporotic bone due to better implant stability and early mobilization benefits. Future research should focus on larger multicentre studies with longer follow-up to improve generalizability and strengthen evidence.

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