

Cemented Versus Uncemented Total Hip Arthroplasty in Elderly Patients: A Comparative Outcome Study

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ABSTRACT

Introduction: Total hip arthroplasty (THA) is a widely performed procedure for managing advanced hip pathology in elderly patients, including osteoarthritis, femoral neck fractures, and avascular necrosis. With increasing life expectancy, the choice between cemented and uncemented fixation has become crucial, as bone quality and comorbidities can influence outcomes. This study aimed to compare clinical, functional, and early postoperative outcomes of cemented versus uncemented THA in elderly patients. **Methods & Materials:** This prospective comparative study was conducted from January 2025 to December 2025 in the Department of Orthopedics, National Institute of Traumatology & Orthopaedic Rehabilitation. A total of 60 patients aged ≥ 65 years requiring primary THA were enrolled and equally divided into cemented ($n = 30$) and uncemented ($n = 30$) groups. Data were analysed using SPSS version 25.0. **Result:** Primary osteoarthritis was the most common indication. Cemented THA had longer operative time and greater blood loss but no intraoperative fractures, whereas uncemented THA had 10% intraoperative femoral fractures. Postoperative complications were higher in the uncemented group (26.7% vs 13.3%), with periprosthetic fractures occurring only in uncemented THA. At 6 months, cemented THA showed superior functional outcomes (Harris Hip Score 88.6 ± 6.4 vs 84.2 ± 7.1) and a shorter hospital stay (6.8 vs 7.9 days) with fewer early revisions (3.3% vs 13.3%). **Conclusion:** This study shows that in elderly patients, cemented total hip arthroplasty provides superior early functional outcomes, fewer postoperative complications, shorter hospital stays, and lower rates of early revision compared with uncemented procedures.

Keywords: Total Hip Arthroplasty, Femoral Fractures, Osteoarthritis

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INTRODUCTION

Total Hip Arthroplasty (THA) is considered one of the most successful orthopedic procedures, offering substantial relief of pain, functional improvement, and increased levels of function, comfort, and overall quality of life for patients who receive this procedure because of advanced degenerative disease of the hip joints [1]. The increasing average lifespan of individuals and a progressively aging population mean that an increasing number of older patients require THA because of conditions such as primary osteoarthritis, femoral neck fractures, and other types of inflammatory arthritis, an area where optimal fixation techniques, both surgical and implant-based, to address this group of patients have become a clinical imperative [2]. The fixation of the femoral replacement, cemented or uncemented, is arguably one of the hot topics concerning THA. In cemented fixation, polymethylmethacrylate bone cement is introduced to allow immediate implant fixation and function, although this is a crucial advantage to patients who are very old, have poor bone, or suffer from conditions of advanced osteoporosis [3]. The results of several observational studies examining cemented versus uncemented fixation in THA carried out within national arthroplasty registries across Europe have demonstrated a higher revisions risk of uncemented femoral stems within patients who undergo this procedure above 75 years of age, largely owing to a higher risk of periprosthetic fractures, although cemented stems demonstrate improved implant survival,

without any difference or difference at a lower risk of post-operative deaths [4,5]. In view of these studies, nearly all orthopedic professional bodies recommend cement fixation within this group of patients, especially where femoral neck fracture underwent THA fixation [6]. In addition, systematic reviews and meta-analysis studies support this line of thought. In a systematic review of a meta-analysis comparing cement fixation and other types of uncemented fixation within patients above 75 who had a cemented fixation of a hip fracture, improved functional status, without complications, and improved revision risk was achieved compared to uncemented arthroplasty [7]. There was a similar thought within studies focusing on subjects who are very aged because of conditions of severe osteoporosis, where patients who underwent cemented fixation of elective arthroplasty fixation because of better immediate stability without increasing risks of complications compared to uncemented fixation of both arthroses and other types of arthroses within elective arthroses within very aged people [8]. Despite this improved revised risk, there still exists a risk of developing cement complications, including bone cement implantation syndrome (BCIS), where immediate clinical manifestations may include intra-operative hypotension, hypoxemia, and very severe complications of cardiovascular instability leading to cardiovascular failure [9]. In a rapidly increasing pool of patients within this age group because of overall increasing lifespan and because of increasing ages of a progressively increasing number of individuals for optimal

arthroplasty techniques, a comparative study of cement fixation, cemented versus outstanding uncemented arthroplasties within very aged patients is still a need. To identify functional outcomes, rates of complications, and survival rates among the population in question, it is important to conduct this study. It is with this background that the current study seeks to assess the outcomes associated with cemented versus uncemented total hip arthroplasty in elderly patients.

METHODS & MATERIALS

This prospective comparative study was carried out from January 2025 to December 2025 at the Department of Orthopedics at National Institute of Traumatology & Orthopaedic Rehabilitation, to compare the outcomes of cemented and uncemented total hip replacement in patients aged 65 years and above. Sixty patients aged 65 years and above needing primary total hip replacement were taken onboard and divided equally into two groups: cement group (Group C) and uncemented group (Group U). Preoperative parameters such as demographic information and indication of surgical procedure were taken. Operative parameters such as operative time, blood loss, and

complications were recorded. Postoperative parameters such as complications, hospital stay, early revision rates, and functional recovery parameters using Harris Hip Score at 6 months follow-up were recorded. The collected data was analyzed using statistical analysis software 'SPSS version 25.' Continuous variables were represented in terms of mean and standard deviations and 't' test statistics. The results of Chi-squared test for categorical variables would be represented in terms of percentages and frequencies. The level of significance would be fixed at 'p=0.05.'

RESULTS

The mean age was 72.8 ± 5.6 years in the cemented group and 71.9 ± 6.1 years in the uncemented group. Male patients constituted 53.3% and 56.7% of the cemented and uncemented groups, respectively. Osteoporosis was present in 60.0% of cemented and 53.3% of uncemented patients. No statistically significant differences were observed for demographic or comorbidity variables ($p > 0.05$) (Table I).

Table I: Baseline Demographic and Clinical Characteristics of Study Participants (n = 60)

Variable	Cemented THA (n = 30)	Uncemented THA (n = 30)	p value
Mean age (years)	72.8 ± 5.6	71.9 ± 6.1	0.54
Male	16 (53.3%)	17 (56.7%)	0.80
Female	14 (46.7%)	13 (43.3%)	
Osteoporosis	18 (60.0%)	16 (53.3%)	0.59
Diabetes mellitus	11 (36.7%)	10 (33.3%)	0.79
Hypertension	14 (46.7%)	15 (50.0%)	0.80

Primary osteoarthritis was the most common indication, accounting for 56.7% of cemented and 63.3% of uncemented THA cases. Femoral neck fractures comprised 30.0% of cemented and 23.3% of

uncemented procedures. Avascular necrosis represented 13.3% of cases in both groups (Table II).

Table II: Indications for Total Hip Arthroplasty (n=60)

Indication	Cemented THA (n = 30)	Uncemented THA (n = 30)
Primary osteoarthritis	17 (56.7%)	19 (63.3%)
Femoral neck fracture	9 (30.0%)	7 (23.3%)
Avascular necrosis	4 (13.3%)	4 (13.3%)

The mean operative time was significantly longer in the cemented group (98.4 ± 12.6 minutes) compared to the uncemented group (90.2 ± 11.8 minutes; $p = 0.01$). Mean intraoperative blood loss was higher in cemented THA (410 ± 85 ml) than in uncemented THA (360 ± 78 ml; p

$= 0.03$). Intraoperative femoral fractures occurred in 10.0% of uncemented cases, while none were observed in the cemented group (Table III).

Table III: Intraoperative Parameters (n=60)

Parameter	Cemented THA (n = 30)	Uncemented THA (n = 30)	p value
Mean operative time (minutes)	98.4 ± 12.6	90.2 ± 11.8	0.01
Mean blood loss (ml)	410 ± 85	360 ± 78	0.03
Intraoperative fracture	0 (0.0%)	3 (10.0%)	0.07

Overall postoperative complications were observed in 13.3% of patients in the cemented group and 26.7% in the uncemented group. Periprosthetic fractures were exclusively seen in the uncemented

group (10.0%). Dislocation occurred in 3.3% of cemented and 6.7% of uncemented cases. The incidence of surgical site infection and deep vein thrombosis was similar between groups (Table IV).

Table IV: Postoperative Complications (n=60)

Complication	Cemented THA (n = 30)	Uncemented THA (n = 30)
Surgical site infection	2 (6.7%)	2 (6.7%)
Dislocation	1 (3.3%)	2 (6.7%)
Periprosthetic fracture	0 (0.0%)	3 (10.0%)
Deep vein thrombosis	1 (3.3%)	1 (3.3%)
Any complication	4 (13.3%)	8 (26.7%)

The mean Harris Hip Score at 6 months was significantly higher in the cemented group (88.6 ± 6.4) compared to the uncemented group (84.2 ± 7.1 ; $p = 0.02$). Excellent outcomes were achieved in 46.7% of

cemented versus 30.0% of uncemented patients. Poor functional outcomes were observed only in the uncemented group (6.7%) Table V.

Table V: Functional Outcome (Harris Hip Score at 6 Months) (n=60)

Harris Hip Score	Cemented THA (n = 30)	Uncemented THA (n = 30)
Mean score	88.6 ± 6.4	84.2 ± 7.1
Excellent (>90)	14 (46.7%)	9 (30.0%)
Good (80–89)	12 (40.0%)	13 (43.3%)
Fair (70–79)	4 (13.3%)	6 (20.0%)
Poor (<70)	0 (0.0%)	2 (6.7%)

The mean duration of hospital stay was shorter in the cemented group (6.8 ± 1.9 days) compared to the uncemented group (7.9 ± 2.3 days). Early revision surgery within 6 months was required in 3.3% of

cemented THA patients versus 13.3% of uncemented THA patients, primarily due to periprosthetic fractures and instability (Table VI).

Table VI: Hospital Stay and Early Revision (n=60)

Outcome	Cemented THA (n = 30)	Uncemented THA (n = 30)
Mean hospital stay (days)	6.8 ± 1.9	7.9 ± 2.3
Early revision (≤6 months)	1 (3.3%)	4 (13.3%)

DISCUSSION

In our cohort, the mean age was 72.8 ± 5.6 years in the cemented group and 71.9 ± 6.1 years in the uncemented group, with similar male predominance (53.3% vs 56.7%). Comorbidities such as osteoporosis (60.0% vs 53.3%) and diabetes (36.7% vs 33.3%) were also balanced. These baseline characteristics mirror findings in the Dutch Arthroplasty Register, where the mean age was 81.7 years for cemented THA and 81.1 years for uncemented THA in patients ≥80 years, with similar proportions of comorbidities between fixation groups [5]. Comparable baseline profiles indicate minimal confounding by demographic variables, allowing fixation type to be considered a primary driver of outcome differences. Primary osteoarthritis accounted for 56.7% of cases in the cemented group and 63.3% in the uncemented group, with femoral neck fractures seen in 30.0% and 23.3%, respectively. In contrast, a multicenter study by Balgovid et al. involving elderly femoral neck fracture patients undergoing THA reported that 100% (n = 1171) had fracture indications, since the cohort was specific to fracture cases [7]. While our study includes mixed indications, the distribution confirms that osteoarthritis remains a dominant indication for elective THA in the elderly, whereas fracture-specific cohorts understandably report higher proportions of fracture indications. We found a longer operative time for cemented THA (98.4 ± 12.6 min) compared with uncemented THA (90.2 ± 11.8 min; p = 0.01). Mean blood loss was also higher in the cemented group (410 ± 85 ml vs 360 ± 78 ml; p = 0.03). Similar trends were described by Bloemheuvel et al., where operative times averaged 101 min in cemented THA and 94 min in uncemented fixation [5]. They also noted higher estimated blood loss in cemented cases (~420 ml vs ~380 ml). Our study's choice of operative technique and cement handling likely contributed to these differences. Regarding intraoperative fractures, we observed none in the cemented group, whereas the uncemented group had 3 cases (10.0%). Thien et al. reported a periprosthetic fracture incidence of 1.5% within 2 years after THA, with uncemented stems contributing significantly more fractures than cemented ones [4]. Although absolute incidence in our study is higher (likely due to small sample size and elderly bone quality), the directional trend aligns with large registry evidence demonstrating fracture risk with press-fit stems. Overall complication rates were 13.3% in cemented THA versus 26.7% in uncemented THA. In particular, periprosthetic fractures occurred only in the uncemented group (10.0%). Bloemheuvel et al. found revision rates due to periprosthetic fracture were 3.2% for uncemented versus 1.1% for cemented THA in patients ≥80 years [5]. Although numeric rates differ, the directionality-higher fracture risk with uncemented fixation is consistent. Dislocation rates in our study were low (3.3% cemented vs 6.7% uncemented), similar to Balgovid et al., who reported dislocation rates of 4.5% in cemented and 7.2% in uncemented THA for femoral neck fracture patients [7]. The cemented group had a significantly higher mean Harris Hip Score (HHS) (88.6 ± 6.4) compared to the uncemented group (84.2 ± 7.1; p = 0.02). In Li et al.'s retrospective analysis of osteoporotic elderly patients, the 1-year HHS was 90.1 ± 7.2 for cemented THA versus 86.5 ± 8.0 for uncemented THA (p < 0.05) [10]. Our values are slightly lower but trend similarly, indicating superior functional recovery with cemented stems in elderly patients, likely due to early mechanical stability and ability to weight-bear promptly. In our study, hospital stay was shorter with cemented

THA (6.8 ± 1.9 days) than uncemented THA (7.9 ± 2.3 days), and early revision was lower (3.3% vs 13.3%). Yu et al. reported shorter hospital stay with cemented THA (2.2 vs 2.6 days) [11].

LIMITATIONS

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study demonstrates that cemented total hip arthroplasty in elderly patients is associated with better early functional outcomes, lower postoperative complications, shorter hospital stay, and reduced early revision rates compared with uncemented fixation.

RECOMMENDATION

It is recommended that cemented total hip arthroplasty be preferred in elderly patients, especially those with poor bone quality, to achieve better early functional recovery, minimise complications, and reduce the risk of early revision.

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CONFLICT OF INTEREST

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