STUDY OF OUTCOME IN UNCEMENTED MODULAR HEMIARTHROPLASTY/ CEMENTED HEMIARTHROPLASTY IN GERIATRIC POPULATION

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BACKGROUND: As healthcare costs rise, evaluating femoral neck fracture treatments to find the most effective method is crucial. The management of displaced intracapsular hip fractures in the elderly is controversial, with options including hemiarthroplasty and total hip arthroplasty. While total hip arthroplasty offers better pain relief and clinical outcomes, it has high mortality rates in the frail elderly population. Hemiarthroplasty provides good pain relief and predictable results with lower reoperation rates, though with higher morbidity. Cemented implants offer good initial fixation in osteoporotic bone but have increased mortality risks due to bone marrow and fat embolization, leading to intraoperative hypotension and higher deep vein thrombosis incidence. Uncemented implants avoid these risks but may cause stress shielding, thigh pain, and higher periprosthetic fracture risks. Despite their importance, current literature lacks clear guidelines for choosing the implant fixation method. This study aims to clarify the most effective treatment for elderly patients with femoral neck fractures by comparing cemented and uncemented hemiarthroplasty.

Aim:

To compare the quality of life in the elderly population undergoing cemented versus uncemented bipolar prosthesis.

Objectives:

To assess differences in intraoperative events, advantages, complications, morbidity, and mortality rates, and recovery to physical independence, to determine the better implant and fixation method for managing femoral neck fractures in the elderly.

Settings & Design: A Prospective Longitudinal comparative study

Materials & Methods: The study commenced after obtaining institutional ethical committee clearance and written informed consent from the patients. Two groups of 30 patients each, meeting the inclusion criteria & exclusion criteria, were formed: Group I underwent cemented hemiarthroplasty, and Group II underwent uncemented hemiarthroplasty, allowing for a comparison of outcomes between the two groups. The patients were categorized by the type of hemiarthroplasty and gender, with 10 males and 12 females in the cemented group, and 20 males and 18 females in the uncemented group. All groups were assessed for various variables, including intraoperative, postoperative, and delayed complications, as well as other comorbidities, using specified measurement methods, scales, and statistical analyses.

Results: The study found that the mean age among the cemented group was 73.8 ± 8.2 years and 73.5 ± 7.6 years in the uncemented group (p-value 0.8). Both groups had a female preponderance, with 20 females in the cemented group and 18 in the uncemented group (p-value 0.2). Most patients in both groups were classified as ASA grade II or higher (p-value 0.3). The mean duration of surgery was significantly shorter in the uncemented group (76.06 ± 7.1 minutes) compared to the cemented group (88.7 ± 11.5 minutes, p-value < 0.0001). The uncemented group also required a smaller incision (13.5 ± 1.9 cm) than the cemented group (14.6 ± 1.8 cm, p-value 0.02). Although the mean total blood loss was lower in the uncemented group (519 ± 148 mL) compared to the cemented group (589.3 ± 138.5 mL), this difference was not significant (p-value 0.06). The mean hospital stay was slightly longer for the uncemented group (8.4 ± 2.2 days) compared to the cemented group (7.2 ± 2.3 days, p-value 0.4).

Complications were more frequent in the cemented group (10 cases) than in the uncemented group (6 cases, p-value 0.1). The uncemented group had more patients achieving full range of motion (22 cases) compared to the cemented group (18 cases, p-value 0.1) and more patients able to walk (28 cases vs. 24 cases, p-value 0.06). Both groups had a similar number of patients able to sit on a chair (21 in the cemented group and 22 in the uncemented group, p-value 0.3). Full weight-bearing was more common in the uncemented group (27 cases) than in the cemented group (24 cases, p-value 0.1). Adverse events, mainly pain and swelling, were more frequent in the cemented group. Valgus deformity was observed in 3 cases in the cemented group, while varus deformity was more common in the cemented group (6 cases) compared to the uncemented group (5 cases). The mean Harris hip score was higher in the uncemented group both preoperatively and postoperatively. Finally, patient satisfaction was higher in the uncemented group (28 cases) compared to the cemented group (26 cases, p-value 0.1).

DISCUSSION: Femoral neck fractures are common among the elderly, with hemiarthroplasty being the primary treatment for displaced fractures. This procedure can be performed using either a cemented or an uncemented press-fit technique, a topic of ongoing debate due to the advantages and disadvantages of each method. Cemented hemiarthroplasty often involves a longer surgery duration, greater blood loss, and risks such as sudden death during cementing. Conversely, uncemented hemiarthroplasty typically requires less time, smaller incisions, and reduced intraoperative risks. This study aimed to evaluate the immediate outcomes of uncemented versus cemented hemiarthroplasty in a geriatric population and compare the findings with other similar studies.

The study included patients over 65 years old, with a slight female preponderance in both groups. The mean duration of surgery was significantly shorter in the uncemented group (76.06 minutes) compared to the cemented group (88.7 minutes). This is consistent with findings by **Wender Figved et al.,** who reported mean durations of 70.2 minutes for uncemented and 82.6 minutes for cemented procedures. [(1)] The uncemented group also had a smaller mean incision length and less mean blood loss, though the latter difference was not statistically significant. Similar results were reported by **Figved et al.,** with mean blood loss of 521 ml for uncemented and 598 ml for cemented procedures. [(1)] The mean hospital stay was slightly longer for the uncemented group (8.4 days) compared to the cemented group (7.2 days), but this difference was also not significant. These results align with studies by **Liu B et al.,** which showed no significant difference between groups in hospital stay duration. [(2)]

Complications were more frequent in the cemented group, and although not statistically significant, the uncemented group had a higher number of patients achieving full range of motion and walking ability postoperatively. This is in line with findings by **Zahid Bashir et al.,** who reported better full range of motion and earlier walking ability in uncemented cases. [(3)] Additionally, **Liu B et al.** found fewer implant-related complications in the cemented group, whereas our study observed more complications in the cemented group. [(4)] The mean Harris hip score was higher in the uncemented group both preoperatively and postoperatively, consistent with **Langslet et al.,** who found lower Harris hip scores in the cemented group. Patient satisfaction was greater in the uncemented group, supporting the conclusion that uncemented hemiarthroplasty may be a preferable option for managing femoral neck fractures in the elderly, offering advantages in surgical and recovery metrics. [(4)]

Conclusion

The present study indicates that post-operative pain relief, ability to walk, and full range of movement are superior in patients undergoing uncemented hemiarthroplasty compared to those receiving cemented hemiarthroplasty. Additionally, the uncemented procedure is associated with shorter surgery duration, smaller incisions, and reduced hospital stays.

These findings suggest that uncemented hemiarthroplasty is a preferable option for elderly patients with osteoporotic bone conditions. It offers better pain relief, greater range of motion, and facilitates an earlier return to unassisted daily activities. While the cemented technique has been the conventional approach, uncemented modular hemiarthroplasty provides excellent primary anchorage and yields equally promising outcomes. Thus, adopting the uncemented procedure may enhance patient recovery and overall quality of life.

References:

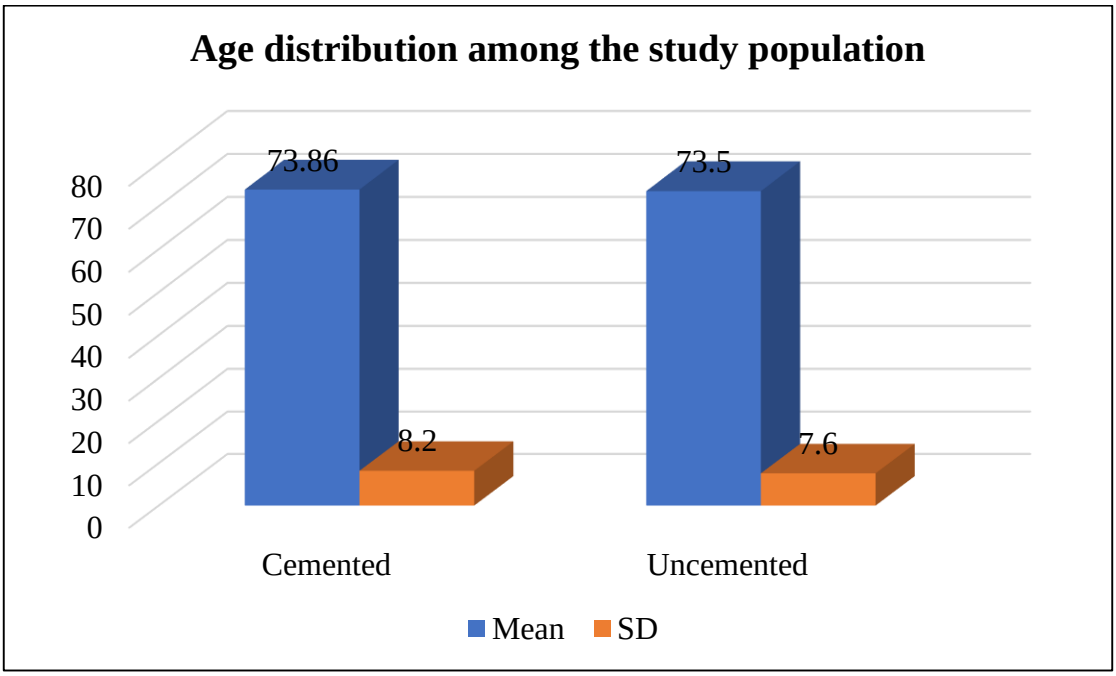
1) Figved W, Opland V, Frihagen F, Jervidalo T, Madsen JE, Nordsletten L. Clin Orthop Relat Res. 2009;467:2426-2435.

2) Liu B, Li A, Wang J, Wang H, Zhai G, Ma H, Lian X, Zhang B, Liu L, Gao Y. Cemented versus uncemented hemiarthroplasty for elderly patients with displaced fracture of the femoral neck: A PRISMA-compliant meta-analysis of randomized controlled trial. Medicine (Baltimore). 2020 Aug 14;99(33)
3) Bashir Z, Ringshawl ZY, Bashir A, Farooq M, Wani MM. Functional Outcome of Uncemented Modular Bipolar Hemiarthroplasty Using Modified Harris Hip Score for Fractures of Femoral Neck in Elderly Patients. JMSCR. 2020;8(9).
4) Langslet E, Frihagen F, Opland V, et al. Cemented versus uncemented hemiarthroplasty for displaced femoral neck fractures: 5-year follow-up of a randomized trial. Clin Orthop Relat Res. 2014; 472:1291-1299.

Table and Graphs

Table No. 1 Age distribution among the study population

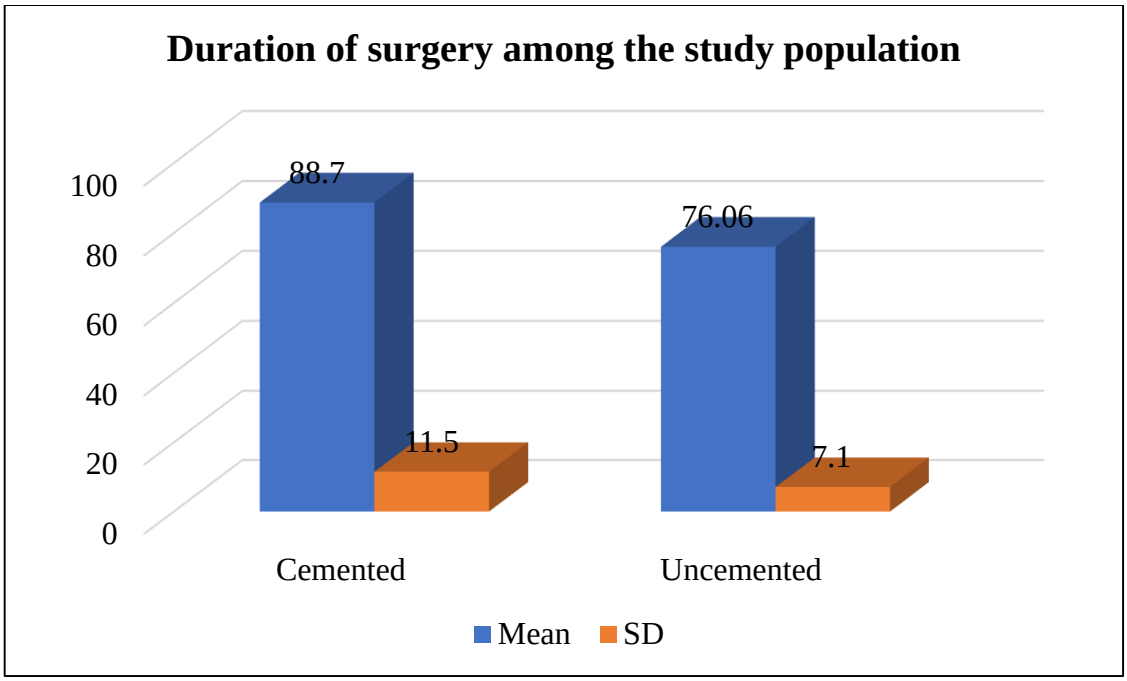
Age in years	Cemented	Uncemented
Mean	73.86	73.5
SD	8.2	7.6



Mean age among cemented group was 73.8+8.2 and Uncemented group 73.5+7.6 years. P value 0.8.

Table No. 02; Duration of surgery among the study population

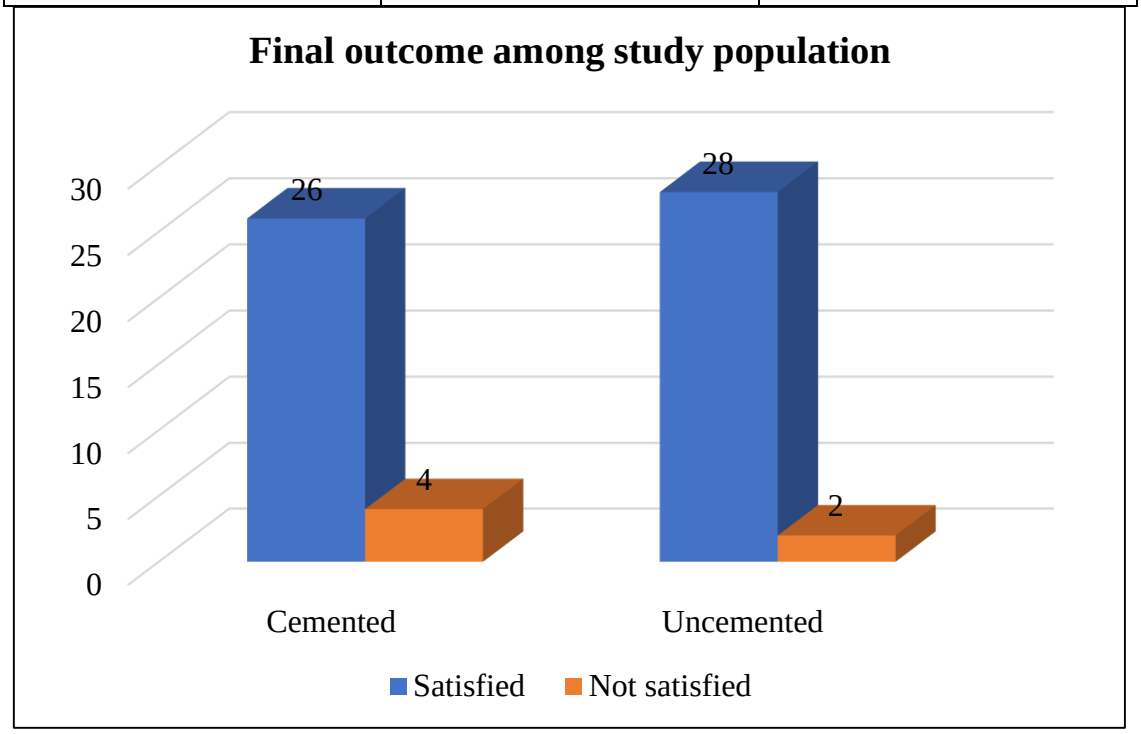
Time in minutes	Cemented	Uncemented
Mean	88.7	76.06
SD	11.5	7.1



Mean duration of surgery among cemented group was 88.7+11.5 and Uncemented group 76.06+7.1 minutes. It can be seen that Uncemented surgery needed less time for surgery than cemented one. P value -<0.0001, shows significance.

Table No. 3: Final outcome among study population

Outcome	Cemented	Uncemented
Satisfied	26	28
Not satisfied	4	2
Total	30	30



On final outcome, cases among uncemented group (28 cases) were more satisfied than cemented group (26 cases). P value 0.1, shows no significance.