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Evaluation and Outcome Cemented Versus Uncemented Hemiarthroplasty of Femoral Neck Fractures: A Prospective Study Tertiary Level Hospital in Bangladesh

Dr. Md. Abdur Rashid[1*] and Dr. Sayed Ahmed[2]

[1]Associate Professor, Department of Orthopaedic Surgery, Islami Bank Medical College, Rajshahi, Bangladesh
[2]Professor & Head, Department of Orthopaedic Surgery, Islami Bank Medical College, Rajshahi, Bangladesh

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***Corresponding author:** Dr. Md. Abdur Rashid

Abstract

There is a lot of disagreement surrounding the management of femoral fractures in the elderly. Currently, the alternatives accessible to an orthopedic surgeon include cannulated cancellous screw fixation, unipolar hemiarthroplasty, bipolar hemiarthroplasty, and complete hip arthroplasty for treating such fractures in the elderly. Bipolar hemiarthroplasty is one of the most popular treatments for Garden type II & III femoral neck fractures in the elderly in developing countries. This study was carried out to assess the functional results of cemented versus uncemented femoral neck fracture hemiarthroplasty. Compare the practical results of cemented and uncemented hemiarthroplasty in the future. ***Materials and Methods:*** Multicentered non-randomized quasi-experimental prospective study has been conducted in Islami Bank Medical College in Rajshahi, Bangladesh, and tertiary-level hospitals. From July 2016 until July 2018. Cemented bipolar femoral prostheses were used to treat 269 patients with 274 displaced femoral neck fractures. ***Results***: At the end of the three-year post-surgery period, all data was collected in an ACCESS (Microsoft Co) database and exported for analysis into SPSS-14 vs. (SPSS, Inc.) All patients were aged 50-85 years. Males and females averaged 62.09 years, and women 69.42 years. 48 percent of patients had radiological sub-capital fractures, whereas 52 percent had transcervical. In 68% of instances, the manner of injury was minor. The complications noted were surface surgery site infection (1%), moderate side-hip discomfort (15%), L.L.D. < 1.25%, and postoperative dislocation in another patient within 3 months. There were outstanding outcomes of 64%, decent results of 28%, and fair results of 8%. There have been no abnormal findings in our investigation. Anesthesiologists' grade, operating time, anesthetic duration, use of peri-operative b-blockers, blood loss estimations, and intraoperative fracture ratios are all examples of preoperative or intraoperative characteristics. Hemoglobin level, transfusion rate, discharge, and acute complication rate did not change post-operatively. There were no clinically or statistically significant changes with 30-day, 60-day, and 1-year follow-up in mortality, disposal, ambulatory relief needs, older resources, and daily living service activities subscales. ***Conclusions*:** Cemented and uncemented femoral components are also used and linked with equivalent working results for 1 year when no pathologic femoral neck fractures are treated. Practitioners can use these similarly good results to inform their clinical selection.

Keywords: Femoral neck fracture, Islami Bank Medical College, Uncemented, Cemented, Hemiarthroplasty.

INTRODUCTION

Hemiarthroplasty is the most frequent treatment in the elderly for displaced femoral neck fractures. Although some authors support open reduction/internal fixation, hip arthroplasty may be linked with improved functionality and fewer reactions [1-4]. Recent research has looked at the role of hip arthroplasty in femoral neck fractures and has shown excellent functional effects, albeit with high dislocation rates [5,6]. Using hemiarthroplasty in moving femoral neck fractures now favors the use of cemented stalks [7, 8]. This method is recommended for osteoporosis patients as it carries a reduced risk of intraoperative fracture and immediate postoperative weight problems. However, the use of bone cement is linked to a rapid cardiovascular breakdown risk [9]. Unceptional femoral stalks thus give doctors a means of reducing the likelihood of this potentially fatal condition. There is little data for selecting between those methods that contrast functional results, morbidity, and mortality with cemented or uncemented stems [7, 10-18]. In 2006, a meta-analysis showed insufficient evidence to

recommend cemented or uncemented hemiarthroplasty [8]. A recent randomized research compared the two methods' functional outcomes, complication rates, and death rates [19]. This research compares the morbidity, mortality, and functional outcomes of cemented and cemented hemiarthroplasty. We anticipated that displaced femoral neck uncemented hemiarthroplasty subcapital fractures would be related to a reduced risk of poor peri-operative outcomes and the functional results of cemented and un-cemented hemiarthroplasty would be comparable after 1 year.

METHODS AND MATERIALS

The multicentric non-randomized quasi-experimental prospective research was conducted at Islami Bank Medical College in Rajshahi, Bangladesh. Hospital of Tertiary Level. From July 2016 to March 2018, all people over 55 years presenting with a displaced femoral neck fracture in the emergency department were examined. Patients with fractures planned for hemiarthroplasty were attracted to this case because of possible involvement by the attending orthopaedic surgeon. Patients who complied with the inclusion criteria and agreed to a cemented or uncemented hemiarthroplasty were randomized. In July 2016 and March 2018, a temporary analysis was conducted. For the first time, recruiting proceeded without a modification to the research protocol being suggested. The number of participants was expanded on the second occasion to deal with breaches of the protocol.

Inclusion Criteria

Eligible patients were those with a non-pathologically displaced femoral subcapital neck fracture, planned to be surgically reconstructed by a surgeon undergoing hemiarthroplasty, older than 55 years. Before the presentation, the patients had to be able to ambulate 10 feet. Exclusion Criteria Multi-sclerosis patients were involved as extremely injured, with hip-pathological fracture (including malignancy), clinically diagnosed acute MI, or with symptoms associated with anemia or existing metabolic disorder that ensured that treatment results were consistent for all the hip fracture patients. Patients were not x-ray patients (e.g. Dorr classification).

Technical Operations

The attending orthopaedic surgeon conducted all surgical procedures with the help of the home staff. Regardless of the hemiarthroplasty's randomization, the participating anesthesiologist chose the anaesthesia (spinal or general). The anaesthetic staff knew the patient's randomization assignment (cemented or uncemented) before induction. With a conventional anterolateral/posterolateral technique, the patient was anesthetized and put in a lateral posture of decubitus. Individual surgeons were urged to do the same. throughout the study, although they were free to use their chosen surgical method. Following the standard procedure, the hemiarthroplasty was performed using the allocated component (cemented or uncemented). All of the patients had a unipolar head. The neck length of the cemented femoral prosthesis (Versys L.D./Fx) may be adjusted to the implant size. The standard or large metaphysical size, standard or extended offset, and length modifications are all possible with an uncemented prosthesis (Beaded FullCoat). The hip capsule was repositioned wherever feasible. Following surgery, all patients were permitted to weight bear on the operative extremity to their comfort level.

Outcome Measures

The 1-year functional outcome was the study's primary goal. Information on Everyday Living Instrumental Activities of Everyday Living Activities was gathered using a modified version of the Older Resources and Services Tool, which asks about how daily living tasks were carried out during the preceding two weeks [20, 21]. Traveling to other places, strolling, purchasing food or clothes, preparing meals, and cleaning are some of these activities. Patients were also asked about their weariness, energy, and self-efficacy using the energy/fatigue scale [24]. This research looked at all-cause mortality (in hospital, 30 days, 60 days, and a year), as well as postoperative angina instability and MI. On postoperative days 3 or 4, all patients were admitted to the E.C.G. and serum troponin. During hospitalization and every morning until discharge, serial hemoglobin levels were checked. An additional episode of persistent chest pain (greater than or equal to 30 minutes) or two episodes of chest pain thought to be of cardiac origin, or an E.C.G. showing a new T-wave inverse, S.T., or elevation with myocardial ischemia non-diagnostic enzymes, have been defined as unstable angina. After a definite infarction, a positive troponin or electrocardiogram was required. The results of the simultaneous medical examination, which determined the length of the hospital stay, included pneumonia, wound infection, thromboembolism, and stroke. Patients' cellphones were analyzed for post-randomization survival up to 60 days and 1 year after hospital release; missing people were followed using the National Death Index (N.D.I.). The National Death Index (N.D.I.) is a computerized death record index file that state vital statistics departments use. The N.D.I. was created by the National Center for Health Statistics to assist epidemiologists and other health and medical investigators in their mortality assessment activities [25]. All patients were contacted 30 days, 60 days, and a year after randomization to assess their ability to walk independently. Homes, pensions, nursing homes, rehabilitation hospitals, and acute health care facilities were all classified. The Hospital Outcome Form was completed at the time of discharge, death, and 30 days following the original randomization; a functional Outcome Questionnaire was performed by telephone at 30 days, 60 days, and 1 year. At each step, three follow-up attempts were made to contact the patient. At 30 days, 60 days, and a year,

the capture rates were 82 percent, 90 percent, and 83 percent, respectively.

Analysis of data

All independent variables [mortality (30 days, 60 days, and 1 year), instability of angina, MI diagnosis or high troponin, disposition of discharge and living conditions, and functional walking without assistance were cross-tabulated for cemented and non-sectioned groups and analyzed in an x^2 proportion test. Repeated generic measurement linear model analysis for the functional scales was carried out. Hemoglobin changes were also examined using the general linear model with a repeated measure, including transfusion receipt as a covariate. All data was assembled and exported to SPSS-14 (SPSS, Inc) to be analyzed in ACCESS (Microsoft Co, Redmond, WA).

RESULTS

Between July 2016 until March 2018, a total number of 264 displaced femoral neck fractures, 269 people underwent IBMCH hemiarthroplasty. Non-participating physicians treated thirty-eight (14.1%) patients. Hip arthroplasty was performed on a total of six patients (2.2%). A contralateral hip fracture occurred in 5 people (1.9%) during the trial. The study included 130 (57.5%) of the remaining 226 patients who could outpatient treat 10 feet at baseline (Fig 1). Five patients (3.8%) dropped out of the treatment (3 uncemented and 2 cemented), and six protocol violations (4.5%) were discovered. Intent-to-treat analysis was performed on all protocol violations. The average age of enrolled participants was 82.3 years (55-100 years; SD, 8.3 years), with 93.8 percent of Whites, 76.9% of women, and a B.M.I. of 23.8. (15.9-37.6; SD, 4.1). 78.5 percent of students lived at home before being admitted. The two therapy groups had no significant differences in demographic or baseline characteristics (Table 1). Sixty-four patients underwent a hemiarthroplasty without cementation, whereas 66 patients were randomly assigned to the Cemented Arm. In 59.8% of cases, a general anesthetic was administered, with A.S.A. 1-3 accounting for 84.6 percent of participants. 130 different operations Employed. The mean anaesthetic and operating durations were 151 minutes and 106 minutes. On average, blood losses were 268 ml; 100% of patients got peri-operative antibiotics (79% cefazoline), and 75% received b-blockers peri-operative. 5 intraoperative fractures existed (3.8 percent). Femur cables were placed in 6 individuals — 5 for fracture and 1 for prophylaxis (4.8 percent) — 5. One (0.8 percent) fracture needed conversion from a cemented hemiarthroplasty to a long, twisted, cemented femoral component. No statistically significant differences were found when the operational features of the 2 study groups were compared (Table 2).

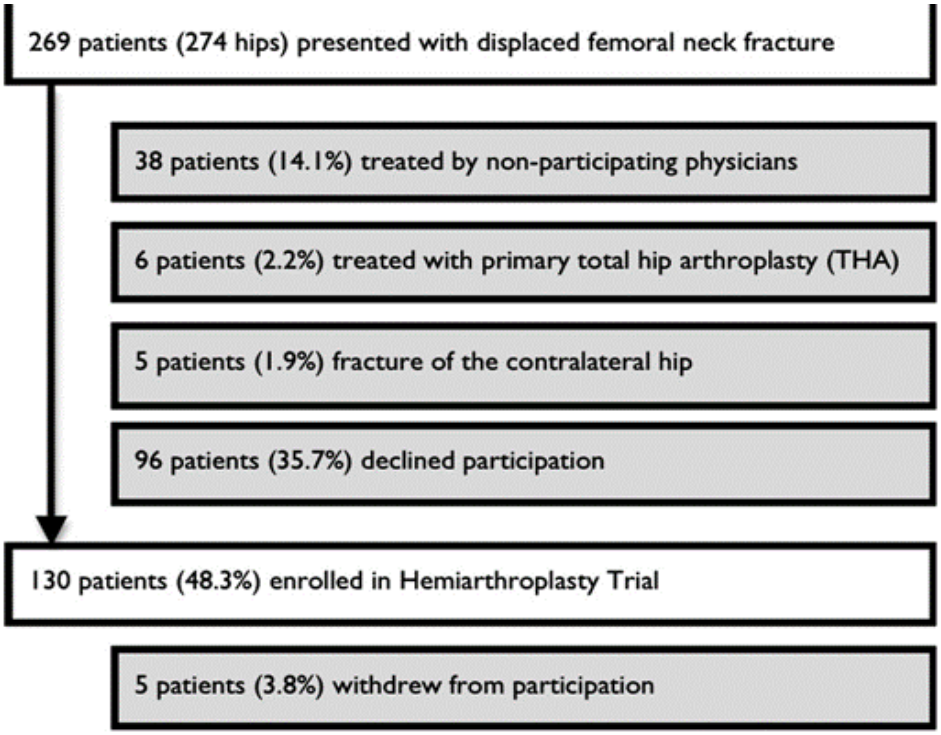

Figure 1: Patient recruitment hemiarthroplasty test flowchart. Patient recruiting, eligibility, enrollment, and withdrawal schemes

Table 1: Demographic Data and Baseline Characteristics

Uncemented		Cemented	
Hemiarthroplasty	**Hemiarthroplasty**		
	(n = 64)	**(n = 66)**	**P**
Age (yr), mean (SD)	82.8 (7.6)	81.8 (9.0)	0.490
Female (%)	75.0	78.8	0.608
White (%)	95.3	92.4	0.410
Body mass index, mean (SD)	23.6 (3.9)	24.2 (4.4)	0.471
Medical comorbidities (%)			
Cardiovascular disease	40.6	39.4	0.886
Dementia	21.9	18.2	0.599
Coronary artery disease	20.3	18.2	0.758
Diabetes	15.6	13.6	0.748
Congestive heart failure	14.1	12.1	0.743
Chronic lung disease	12.5	18.2	0.369
Cerebrovascular disease	9.4	6.1	0.478
Peripheral vascular disease	1.6	3.0	0.577
Reside at home	81.3	75.8	0.446

The resource to assist epidemiologists and other health and medical researchers in the assessment of their mortality [25].

At 30 days, 60 days, and 1-year post-randomization, all patients were called to evaluate their capacity to walk independently. Their status was categorized as domestic.

Table 2: Operative Characteristics

	Un-Cemented Hemiarthroplasty (n = 64)	**Cemented Hemiarthroplasty (n = 66)**	**P**
General anesthesia (%)	51.6	68.2	0.053
ASA 1–3:4	56:8	54:12	0.369
Anterolateral approach (%)	95.3	98.5	0.295
Anesthesia time (min), mean (SD)	148.3 (35.9)	153.2 (29.7)	0.394
Operative time (min), mean (SD)	103.6 (32.0)	108.2 (30.8)	0.405
Estimated blood loss (mL), mean (SD)	279 (177)	257 (158)	0.452
Perioperative antibiotics			
Ancef: other	49:15	54:12	0.594
Perioperative b-blocker (%)	70.3	80.3	0.186
Intraoperative fracture (%)	4.7	3.0	0.623
Cables used (%)	6.3	3.1	0.381

On admission, the average hemoglobin level was 12.9 g/dL (SD, 1.6), with a mean of 12.0 g/dL. (1.5 SD). Before discharge, all patients had average hemoglobin of 10.4 g/dL. (SD, 1.1). 5 patients had blood transfusions before surgery (3.8%), 13 patients received blood transfusions during surgery (10.0%), and 49 individuals received blood transfusions after surgery (37.7 percent). Throughout the inpatient system, 62 patients (47.7%) had a blood transfusion. There was no significant difference in hemoglobin or transfusion rates between the two groups (Table 3). In terms of acute complications or arrangement, there were no differences between the cemented and uncemented groups (Table 4). Around 23 (17.7%) patients had acute cation: nine (6.9%) patients were admitted to the critical care unit, four (3.1%) patients developed pneumonia, three (2.3%), two Wound Infections (1.5%), and one patient was sent to the reoperation unit (0.8 percent). There were no brain vascular injuries, major hemorrhages, or thromboembolic events (0 percent) (0 percent). 126 (98.4%) of the 130 patients were admitted to an assisted living facility, a health center, or a short-term rehabilitation hospital. No patient went home immediately after being admitted to the hospital. Two people died during the hospitalization index (1.5%), and seven people died within 30 days after surgery (5.7 percent). By 60 days, 13 patients (10.8 percent) had died, and 22 patients had died (21.6 percent). In 30 days, 60 days, and one year, there was no statistically significant difference in deaths between the two groups (Table 5). 53.5 percent of responders were living at home within 30 days after surgery. This number increased to 66.7 percent after 60 days, and 71.3 percent of individuals lived at home after a year. Between the groups, there were no statistically significant differences. When it came to assessing functional outcomes, 88.8% still needed assistance with ambulation after 30 days, 79.2% after 60 days, and 62.0 percent after a year. For 30 days, 60 days, and one year, the Daily Living Physical Activity ratings for the group

were 8.8 (3.2), 6.7 (3.9), and 5.0 (4.3), respectively. Similarly, daily life instrumental activity scores were 3.8 (0.7), 3.6 (1.0), and 3.3 (1.3) for 30 days, 60 days, and one-year follow-ups, respectively, while energy/fatigueless scales were 1.2 (0.6), 1.1 (0.5), and 0.9 (0.4) for 30 days, sixty days, and one-year follow-ups, respectively. There was no statistically significant functional difference between the cemented and uncemented groups (Table 6).

Table 4: Acute Postoperative Complications and Disposition

Acute complications (%)	**Un-cemented Hemiarthroplasty (n = 64)**	**Cemented Hemiarthroplasty (n = 64)**	***P***
Any	18.8	16.7	0.756
Intensive care unit stay	7.8	6.1	0.694
Pneumonia	1.6	1.6	0.325
MI	1.6	3.0	0.577
Wound infection	1.6	1.5	0.983
Reoperation	0	1.5	0.323
Cerebral vascular accident	0	0	-
Major hemorrhage	0	0	-
Thromboembolic event	0	0	-
Discharge disposition (%)			
Assisted living	93.8	93.9	0.999
Rehabilitation facility	4.7	4.5	-

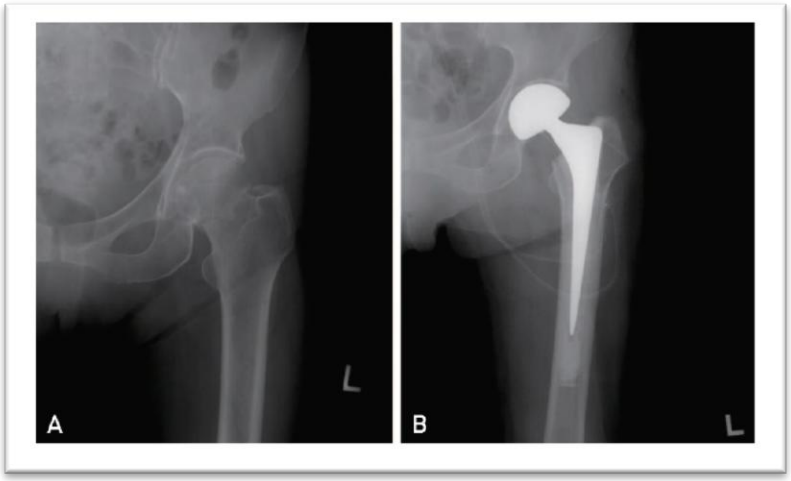

Fig 2: Cemented hemiarthroplasty

Fig 3: Uncemented hemiarthroplasty

Table 5: Mortality Rates

	Press-Fit Hemiarthroplasty	Cemented Hemiarthroplasty	P
Death (%)			
In hospital	1.6	1.5	0.983
At/before 30 d	3.2	8.3	0.265
At/before 60 d	8.5	13.1	0.559
At/before 1 year	20.0	23.1	0.811

Table 6: Residential Status and Functional Outcomes

	Fellow-up	Un-Cemented Hemiarthroplasty	Cemented Hemiarthroplasty	*P*
Living at home (%)	At 30 days	52.9 (39.2–66.6)	54.0 (40.2–67.8)	0.915
	At 60 days	69.2 (56.7–81.8)	64.0 (50.7–77.3)	0.575
	At 1 year	65.0 (50.2–79.8)	77.5 (64.6–90.4)	0.217
Requiring assistance with ambulation (%)	At 30 days	87.0 (77.2–96.7)	90.7 (82.0–98.4)	0.577
	At 60 days	80.0 (68.9–91.1)	78.3 (66.3–90.2)	0.834
	At 1 year	69.4 (54.4–84.5)	54.3 (37.8–70.8)	0.188
Physical Activities of Daily Living	At 30 days	8.7 (3.5, 7.7–9.7)	8.9 (3.0, 8.1–9.8)	0.730
	At 60 days	6.7 (4.1, 5.5–7.8)	6.8 (3.8, 5.7–7.9)	0.875
	At 1 year	5.7 (4.7, 4.2–5.7)	4.4 (3.9, 3.1–5.6)	0.168

DISCUSSION

For older patients with displaced femoral neck fractures, hemiarthroplasty is currently the treatment of choice. There is minimal evidence of a hemiarthroplasty implant comparison between cemented and uncemented implants. This prospective randomized research looked at the function, morbidity, and mortality of a non-ceased and cemented implant after a year. At one year, the functional results of the cemented and non-cemented hemiarthroplasties were comparable. After 30 days, 60 days, and a year, patients in both groups had similar levels of function and required similar amounts of assistance. Furthermore, the two groups' rates of adverse events were similar. This research resulted in a solid early attachment of the cemented prosthesis and good functional outcomes after a year. There have been no major issues related to the use or application of cement (no intraoperative cardiopulmonary collapse). However, the goal of this study was not to find a change in the rate of this rare issue. (There would be thousands of samples available to study cement-related issues) [26].

There were 3 intraoperative fractures (4.8 percent) in this 130-hemiarthroplasty series in the uncemented arm, which had to be converted to a cemented extended groove component. Two intraoperative fractures occurred in the cemented cohort (3.0%), but no modification in the operating strategy was needed. Despite concerns about intra-operative fracture being a convincing reason for practitioners who choose a cemented implant, the fracture rate between the 2 groups was not statistically different. Similarly, there have been no differences in anesthesiological or operational times, indicating that the advantage of an uncemented method may be weighed against the care needed for its correct performance in a big academic institution. This result runs counter to previous recent research. 19 This study was not a succession of single surgeons, and numerous practitioners could not properly describe their effects. The similar operating durations and intra-operative fracture rates across the 2 groups indicate that these figures reflect general orthopaedic surgery. The merits of this research are the result of the design of the study. The possible confusing variables are equally divided across the groups as in a prospective randomized controlled experiment. The effectiveness of randomization is shown by the comparable baseline features of the registered patients (absence of baseline differences in the 2 groups). The block randomization was likewise successful in the equal distribution of pants across the two groups (64 uncemented vs. 66 cemented). It was not feasible to blind the surgical or anesthetic personnel during an operation. Clinical reasons Equipoise, if they so asked, the decision was taken to notify patients following surgery of their group assignment. However, the study team did not know about the implant utilized throughout the follow-up period. Thus, members of the blinded study team gathered the patient's answers. The kind of anesthetic was not controlled in the design of the research (general or spinal). Before induction, the anesthetic personnel were informed of the patient's group task (uncemented or cemented) and enabled their anesthetic drugs to be independently selected. 51.6% got general anesthesia in the uncemented group, compared to 67.7% in the cemented group. This distribution showed no statistically significant change. The impact of numerous surgeons on the enrolled population cannot be completely appreciated as a restriction since a single surgeon did not conduct this series. Although this research method must generate a (generalizable) externally valid dataset, the contributions of many techniques may confuse the findings. This impact may consider equally valid operational time and anaesthesia and can also talk about

anticipated blood loss depending on the length of the operation rather than the kind of prosthesis. Since there was no difference between the two groups, there are probably no differences between cemented and cemented hemiarthroplasties. However, a Type II error can not be ruled out in a comparative study with functional results the following hemiarthroplasty. Figured et al. 19 solved the problem of sample size using the Harris Hip Score and the equivalence criteria. They found that 64 patients in each group were needed to justify that 64 were adequate in each group. With this future randomized test for cemented and uncemented hemiarthroplasty, the results show similar morbidity, mortality, and functional recovery in displaced femoral neck fractures. The similarly excellent outcomes enable practitioners to better guide their treatment of displaced femoral neck fractures.

CONCLUSION

Compared with cemented hemiarthroplasty, the available data suggests improved postoperative hip function, fewer postoperative hip fractures, and interoperative breakdowns have been obtained in the displaced femoral neck. Uncemented hemiarthroplasty has achieved a shorter period of surgery.

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