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ORIGINAL ARTICLE

Outcomes of Total Hip Arthroplasty for Femoral Neck Fracture in Elderly Patients

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ABSTRACT

Background: *Femoral neck fractures in older adults, usually from low-energy falls, are increasing with population ageing and remain linked to significant mortality, complications, and loss of independence, particularly where surgical delays and resource constraints are common. Total hip replacement can provide durable pain relief and functional recovery for selected elderly patients with displaced fractures.* ***Methods & Materials:*** *This observational cohort study at NITOR, Dhaka, enrolled 35 consecutive elderly patients with femoral neck fracture treated by total hip replacement from January 2024 to July 2025. Patients were followed up to 12 months for complications, readmission, revision, and mortality. Data were summarized descriptively in SPSS v26.* ***Results:*** *In 35 elderly patients undergoing total hip replacement for femoral neck fracture, the mean age was 71.8 ± 7.2 years. Most fractures resulted from simple falls (85.7%), were sub capital (54.3%) and displaced (91.4%), with Garden III–IV in 91.5%; median injury-to-surgery time was 72 hours (IQR 48–120). Spinal anesthesia (80.0%) and posterior approach (68.6%) predominated, with cemented fixation in 62.9%; mean operative time was 98 ± 18 minutes and median blood loss 350 mL (IQR 250–500). At least one complication occurred in 31.4%, with deep infection/PJI, dislocation, and DVT each 2.9%, and 12-month mortality was 8.6%. Functional outcomes improved markedly, with the Harris Hip Score rising from 35.2 ± 7.8 to 87.0 ± 8.5 and pain VAS falling from 8 to 1 by 12 months, while independent ambulation reached 71.9%.* ***Conclusion:*** *Total hip replacement for femoral neck fractures in elderly patients resulted in significant functional improvement and effective pain relief over a 12-month period, while maintaining acceptable rates of major complications and mortality.*

Keywords: *Femoral neck fracture, Total hip arthroplasty, Elderly patients, Functional outcome, and Postoperative complications*

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INTRODUCTION

Femoral neck fracture represents a significant injury among older adults, most often resulting from low-energy falls in the context of osteoporosis, frailty, and multimorbidity. The global burden of hip fractures is increasing in absolute terms due to population ageing, with substantial contributions to disability, loss of independence, and health-system costs. Recent Global Burden of Disease (GBD) analyses estimated a large worldwide hip-fracture burden in 2019, characterized by high years lived with disability and a marked concentration of cases among older adults and women, reflecting both increased longevity and disparities in bone health [1]. When all anatomical fracture sites are considered, global incident fracture counts have risen notably since 1990, even as age-standardized rates have declined slightly, underscoring the impact of demographic transition on service needs [2]. In Asia, where population ageing is accelerating, projections indicate that hip and vertebral fracture burdens will continue to increase, emphasizing the importance of timely surgical care and coordinated perioperative pathways for health systems with limited resources [3]. Although advances in anaesthesia, implants, and orthogeriatric co-management have been made, hip fracture continues to be associated with significant short-term and long-term mortality, as well as frequent medical complications such as pneumonia, thromboembolism, delirium, and infection [4,5]. Patient outcomes are strongly influenced by baseline physiological reserve and perioperative events. Early mortality is often used as a pragmatic indicator of quality of care in various settings [5]. Surgical timing remains a key modifiable factor; evidence indicates that earlier surgery, typically within 48 hours, is associated with reduced mortality risk and fewer complications in elderly hip fracture patients, supporting the implementation of streamlined admission-to-theatre pathways [6]. In low- and middle-income regions, delays are often more pronounced due to referral pathways, limited theatre capacity, and financial or logistical barriers. Multicentre evidence from

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LMIC settings demonstrates that time from injury to surgery can be prolonged and variable, with likely negative impacts on outcomes and costs [7]. For displaced intracapsular femoral neck fractures in selected older adults, arthroplasty is commonly preferred over internal fixation to reduce non-union and avascular necrosis risks, and total hip replacement can offer durable pain relief and functional recovery when appropriate patient selection, surgical technique, and rehabilitation are ensured [8]. Importantly, system-level factors also matter; higher institutional arthroplasty volume has been associated with better outcomes after total hip arthroplasty performed for femoral neck fracture, suggesting potential benefits from standardized protocols and experienced teams [9]. In Bangladesh, musculoskeletal morbidity and disability are common in the adult population, and as life expectancy rises, the national relevance of fragility fractures will increase, yet local outcome data for total hip replacement after femoral neck fracture remain limited [10]. Therefore, the study aims to evaluate clinical outcomes, complications, and functional improvement following total hip replacement for femoral neck fracture among elderly patients.

METHODS & MATERIALS

This observational cohort study was conducted at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh, over 1.5 years from January 2024 to July 2025. Consecutive elderly patients presenting with femoral neck fracture and managed with total hip replacement were enrolled, with a final sample of 35 cases. Baseline variables were recorded at admission, including age, sex, body mass index, residence, comorbidities, and anesthetic risk (ASA class). Injury characteristics were documented from clinical records and imaging, including side, mechanism of injury, fracture level, Garden classification, displacement status, and time intervals from injury to hospital presentation and to surgery. Operative details were extracted from operative notes, covering anesthesia type, surgical approach, fixation type, femoral head size, bearing surface, operative duration, estimated blood loss, intraoperative transfusion, and intraoperative complications. Postoperative outcomes were assessed through inpatient monitoring and follow-up visits, capturing complications, readmission, re-operation or revision, and mortality up to 12 months. Functional outcomes were measured longitudinally using the Harris Hip Score and pain severity using a 0-10 visual analogue scale at preoperative baseline and at 6 weeks, 3 months, 6 months, and 12 months postoperatively; ambulatory status was recorded using walking aid categories. Data were entered into a structured datasheet and analyzed descriptively using SPSS (v 26.0); continuous variables were summarized as mean ± standard deviation or median with interquartile range as appropriate, and categorical variables as frequency and percentage.

RESULTS

Table I shows a predominantly older cohort, with a mean age of 71.8 ± 7.2 years, most patients were 70–79 years (42.9%), and females were more common than males, 60.0% versus 40.0%. The mean BMI was 22.6 ± 3.1 kg/m^2, rural residents slightly predominated, 54.3%, and comorbidity burden was substantial, especially hypertension, 60.0%, diabetes, 34.3%, and ischemic heart disease, 22.9%, with most patients classified as ASA I–II, 62.9% (**Table I**).

Table – I: Baseline sociodemographic and clinical characteristics of elderly patients undergoing total hip replacement for femoral neck fracture (*n* = 35)

Variable	Category	n (%)
Age group	60–69	12 (34.3%)
	70–79	15 (42.9%)
	≥80	8 (22.9%)
	Mean ± SD	71.8 ± 7.2
Sex	Male	14 (40.0%)
	Female	21 (60.0%)
BMI (kg/m^2)	Mean ± SD	22.6 ± 3.1
Residence	Urban	16 (45.7%)
	Rural	19 (54.3%)
Comorbidities	Hypertension	21 (60.0%)
	Diabetes mellitus	12 (34.3%)
	Ischemic heart disease	8 (22.9%)
	COPD/asthma	5 (14.3%)
	CKD	3 (8.6%)
	Stroke/TIA	4 (11.4%)
	Dementia/cognitive impairment	6 (17.1%)
ASA class	I–II	22 (62.9%)
	III–IV	13 (37.1%)

Table II indicates that injuries were overwhelmingly due to simple falls, 85.7%, with near-equal right and left hip involvement, 51.4% versus 48.6%. Subcapital fractures were most frequent, 54.3%, and the majority were displaced, 91.4%, with most cases falling into higher Garden grades, Grade III 48.6% and Grade IV 42.9%. Median time to hospital presentation was 6 hours (IQR 3–12), while the median injury-to-surgery interval was 72 hours IQR 48–120.

Table II: Injury mechanism and femoral neck fracture characteristics, including time to presentation and surgery (N = 35)

Variable	Category	n (%)
Side	Right	18 (51.4%)
	Left	17 (48.6%)
Mechanism of injury	Simple fall	30 (85.7%)
	Road traffic accident	4 (11.4%)
	Fall from height	1 (2.9%)

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Fracture level	Subcapital	19 (54.3%)
	Transcervical	13 (37.1%)
	Basicervical	3 (8.6%)
Garden classification	I	1 (2.9%)
	II	2 (5.7%)
	III	17 (48.6%)
	IV	15 (42.9%)
Displaced fracture		32 (91.4%)
Injury to hospital (hours)	Median (IQR)	6 (3–12)
Injury to surgery (hours)	Median (IQR)	72 (48–120)

Table III highlights that spinal anesthesia was used in most cases, 80.0%, and a posterior approach was the commonest surgical approach, 68.6%. Cemented fixation was used in 62.9%, 32 mm heads were most common, 62.9%, and metal–polyethylene was the dominant bearing surface, 82.9%. Mean operative time was 98 ± 18 minutes, median blood loss was 350 mL (IQR 250–500), one-third required intraoperative transfusion, 34.3%, and intraoperative complications were uncommon, 5.7%.

Table – III: Operative and implant-related details of total hip replacement (*n* = 35)

Variable	Category	n (%)
Anesthesia	Spinal	28 (80.0%)
	General	5 (14.3%)
	Combined	2 (5.7%)
Surgical approach	Posterior	24 (68.6%)
	Lateral/anterolateral	10 (28.6%)
	Anterior	1 (2.9%)
Fixation type	Cemented	22 (62.9%)
	Uncemented	10 (28.6%)
	Hybrid	3 (8.6%)
Head size (mm)	28	6 (17.1%)
	32	22 (62.9%)
	36	7 (20.0%)
Bearing surface	Metal–polyethylene	29 (82.9%)
	Ceramic–polyethylene	6 (17.1%)
Duration of surgery (minutes)	Mean ± SD	98 ± 18
Estimated blood loss (mL)	Median (IQR)	350 (250–500)
Intraoperative transfusion		12 (34.3%)
Intraoperative complications		2 (5.7%)

Table IV shows that 31.4% experienced at least one complication, with UTIs, 8.6%, readmissions, 8.6%, and pneumonia, 5.7%, being among the more frequent events. Serious complications were relatively infrequent, including deep infection or PJI, dislocation, and DVT, each 2.9%, and the overall 12-month mortality was 8.6% (**Table IV**).

Table – IV: Postoperative complications and major clinical events during hospital stay and up to 12-month follow-up (*n* = 35)

Variable	Category	n (%)
Outcome	Any complication (≥1)	11 (31.4%)
	Superficial SSI	2 (5.7%)
	Deep infection / PJI	1 (2.9%)
	Dislocation	1 (2.9%)
	DVT	1 (2.9%)
	Pneumonia	2 (5.7%)
	UTI	3 (8.6%)
	Pressure sore	1 (2.9%)
	Readmission	3 (8.6%)
	Re-operation / revision	1 (2.9%)
	Mortality within 12 months (total)	3 (8.6%)

Table V demonstrates marked functional improvement over time, with mean Harris Hip Score rising from 35.2 ± 7.8 preoperatively to 87.0 ± 8.5 at 12 months, alongside pain reduction, with VAS improving from a median of 8 (IQR 7–9) preoperatively to 1 (0–2) at 12 months. Mobility also improved progressively, with independent walking increasing to 71.9% at 12 months, while wheelchair or bedbound status declined to 3.1% by 12 months (**Table V**).

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Table – V: Functional recovery and pain outcomes over follow-up after total hip replacement, including ambulatory status (*n* = 35)

Outcome	Pre-op (n=35)	6 weeks (n=34)	3 months (n=34)	6 months (n=33)	12 months (n=32)
Harris Hip Score, mean ± SD	35.2 ± 7.8	66.5 ± 9.6	78.4 ± 9.1	84.1 ± 8.7	87.0 ± 8.5
Pain VAS (0–10), median (IQR)	8 (7–9)	3 (2–4)	2 (1–3)	1 (0–2)	1 (0–2)
Walking aid use, n (%)					
None	0 (0.0%)	8 (23.5%)	16 (47.1%)	21 (63.6%)	23 (71.9%)
Cane or walker	7 (20.0%)	24 (70.6%)	17 (50.0%)	11 (33.3%)	8 (25.0%)
Wheelchair or bedbound	28 (80.0%)	2 (5.9%)	1 (2.9%)	1 (3.0%)	1 (3.1%)

DISCUSSION

The cohort undergoing total hip replacement for femoral neck fracture demonstrated a case mix with a mean age of 71.8 ± 7.2 years, a female predominance (60.0%), a high proportion of low-energy simple falls (85.7%), and a substantial burden of displaced fractures (91.4%). These characteristics broadly reflect total hip arthroplasty (THA)-eligible hip fracture populations reported in large trials and national registries, where displaced intracapsular fractures in relatively functional older adults are the primary indication for arthroplasty following injury [11,12]. Functional recovery in this series was substantial and clinically meaningful: the Harris Hip Score increased from 35.2 preoperatively to 87.0 at 12 months, pain improved markedly with median visual analogue scale (VAS) decreasing from 8 to 1, and walking-aid dependence progressively declined, with 71.9% walking without aids by 12 months among those followed. This recovery trajectory is consistent with evidence indicating that, among appropriately selected older adults, THA generally yields better hip-specific function than hemiarthroplasty, although the absolute advantage may be modest in certain settings and is sensitive to eligibility criteria, baseline function, and rehabilitation intensity [11,13-15]. Differences between studies and the present context likely reflect variations in patient selection (frailty spectrum, cognitive impairment), perioperative pathways, implant constructs, and access to structured rehabilitation, all of which can influence functional outcomes even when surgical reconstruction is technically successful [11,12-16].

A notable contextual factor in this dataset is the median injury-to-surgery interval of 72 hours, which exceeds the commonly targeted windows in many hip fracture pathways. Multiple large observational analyses and meta-analyses have associated longer waits with higher short-term mortality and increased medical complications after hip fracture surgery, supporting system-level efforts to minimize avoidable delays [6,17]. The observed 12-month mortality rate (8.6%) is lower than that reported in many unselected hip fracture series, likely due to the selection of fitter patients for THA, with 62.9% classified as ASA I–II, rather than indicating that surgical delay is benign. This finding reinforces the importance of streamlined preoperative optimization, protected theatre access, and early multidisciplinary, geriatric-informed perioperative care, particularly in resource-constrained settings [6,17,18]. Overall complications occurred in 31.4% of cases, with medical events such as urinary tract infection (8.6%) and pneumonia (5.7%) outnumbering major surgical events. This pattern is consistent with the hip fracture literature, in which multimorbidity, immobility, delirium risk, and perioperative frailty account for a large proportion of adverse outcomes, and are potentially modifiable through orthogeriatric co-management, early mobilization, pulmonary hygiene, and catheter stewardship [6,17,18]. Surgical complications were infrequent, including dislocation (2.9%) and deep infection or periprosthetic joint infection (PJI) (2.9%). Dislocation risk after THA varies by surgical approach, soft-tissue repair, component position, and head size. Large registry studies consistently show that larger femoral heads are protective, while certain approaches, particularly those without meticulous repair, can increase revision risk for instability [19,20]. The predominant use of 32 mm heads and a consistent operative strategy in this cohort may have contributed to the low dislocation rate. Evidence regarding dual-mobility constructs in acute fracture remains mixed; registry-based matched analyses have not demonstrated a clear reduction in revision risk compared to conventional cups in some fracture cohorts, suggesting that surgical technique and patient factors remain central determinants [21]. Contemporary matched-cohort studies indicate that THA performed for fracture may still yield inferior outcomes compared to THA for osteoarthritis, reflecting the physiologic insult of fracture and baseline patient vulnerability. Therefore, achieving strong functional outcomes in this cohort supports the argument that careful patient selection, early surgery, and pathway-based perioperative care are effective strategies to optimize outcomes in Bangladesh.

LIMITATIONS

Limitations include the single-center design and small sample size (N = 35), which limit generalizability and reduce power to detect infrequent complications. Follow-up attrition by 12 months and the absence of a comparator group restrict causal inference, while unmeasured confounding, such as frailty, bone quality, and rehabilitation adherence, may have influenced functional outcomes.

CONCLUSION

Among 35 elderly patients with femoral neck fractures, total hip replacement led to significant functional improvement and notable pain reduction over 12 months. Most survivors regained independent ambulation. Postoperative morbidity affected nearly one-third of patients; however, major surgical complications were rare, and the overall 12-month mortality rate was within acceptable limits. These results indicate that total hip replacement is a safe and effective intervention for appropriately selected elderly patients in Bangladesh. Additionally, there is a need to enhance early surgical intervention pathways and implement standardized perioperative care to further improve patient outcomes.

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