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Clinical outcomes and functional recovery following hemiarthroplasty for unstable hip / intertrochanteric fractures in elderly patient: A review of 40 cases at CBMCB Hospital (2020-2023)

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Abstract

Unstable intertrochanteric fractures in the elderly population often lead to significant morbidity and disability, necessitating surgical intervention. Hemiarthroplasty is considered an effective surgical treatment for managing these fractures, especially in frail elderly patients. This study aims to evaluate the clinical and functional outcomes of hemiarthroplasty for unstable intertrochanteric fractures in elderly patients, with a retrospective analysis of 40 cases treated at CBMCB Hospital. We analyzed surgical outcomes, recovery rates, complications, and functional assessments. Most patients (85%) were mobilized within 48 hours postoperatively. The mean hospital stay was 6.5 days. At the end of 12 months, 70% of patients had good to excellent outcomes based on the Harris Hip Score. The results suggest that hemiarthroplasty provides satisfactory functional recovery, but complications such as infections and dislocations remain important considerations. This study highlights the need for individualized management in the elderly and underscores the importance of early postoperative rehabilitation.

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Introduction

A hip fracture represents a disturbing and potentially ominous landmark in a person's health history.[1] An intertrochanteric fracture is one of the most common health problems in the elderly, having a high one-year mortality rate of up to 20%.[2,3] An increase in life expectancy and a sedentary lifestyle increased the incidence of these fractures from 1.66 million in 1990 to an expected 6.26 million by 2050.[4] These fractures occur in the elderly as a result of trivial trauma, most commonly, sideways falls from a standing height.[5] One of the major risk factors for these fractures is osteoporosis, and females are more likely to be affected than males.[4,5] The management of intertrochanteric fractures is done by two modes: conservative and operative. At the moment, the conservative method has a limited role and is used only in patients who are at a high risk of anesthesia and surgery, as well as non-ambulatory patients who have minimal pain after fracture. Successful surgery of an unstable intertrochanteric fracture should provide a stable, pain-free hip with a good range of movement. Osteosynthesis of these fractures with an angled blade plate, dynamic hip screw, and cephalomedullary nailing in the osteoporotic bone has a number of problems, such as unstable geometry of the fracture that is hard to fix, pullout of screws, poor screw purchase, varus collapse of the fracture, and slow rate of union, which can cause a decubitus ulcer, an upper respiratory tract infection, or pneumonia if the patient stays in bed for months.[6-8] Bipolar hemiarthroplasty emerges as a good implant for unstable intertrochanteric fractures to overcome these shortcomings by bypassing the stages of bone

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healing.[9] It allows early mobilization, fewer hospital stays, and a good range of motion. It can be done primarily or after the failure of conservative or internal fixation.[10-16] The aim of this study was to prospectively evaluate the functional and clinical outcomes of primary cemented bipolar hemiarthroplasty for older patients with unstable osteoporotic intertrochanteric fractures.

Methods

This was a retrospective observational descriptive study conducted at the Department of Orthopedics and Traumatology, Community Based Medical College Hospital (CBMCB), Bangladesh. The study was carried out over a four-year period, from January 2020 to December 2023, and was designed to evaluate the clinical and functional outcomes of bipolar hemiarthroplasty in elderly patients with unstable intertrochanteric femoral fractures. Institutional ethical clearance was obtained before the commencement of the study, and all data were anonymized to maintain patient confidentiality. A total of 40 patients, aged 65 years and above, who were admitted with radiologically confirmed unstable intertrochanteric fractures (classified as AO/OTA type 31-A2 and 31-A3) and managed with primary bipolar hemiarthroplasty, were included in the study.

Inclusion Criteria

1. Age ≥ 65 years.
2. Unstable intertrochanteric femoral fracture (AO/OTA 31-A2 or 31-A3).
3. Pre-injury independent ambulation (with or without support).
4. Operated with bipolar hemiarthroplasty as the primary treatment.
5. Availability of complete clinical, radiological, and follow-up data for at least 12 months postoperatively

Exclusion Criteria

1. Patients with stable intertrochanteric fractures (AO/OTA 31-A1).
2. Pathological fractures (e.g., secondary to malignancy or metabolic bone disease).
3. Polytrauma patients with other major skeletal injuries
4. Prior surgery or arthroplasty on the affected hip
5. Patients who were non-ambulatory before injury
6. Incomplete medical records or lost to follow-up

Upon admission, a thorough clinical history was taken, and a detailed physical examination was performed. Investigations included routine blood tests (CBC, RBS, creatinine, electrolytes), ECG, chest radiography, and hip X-rays (AP and lateral views). Fractures were classified using the AO/OTA classification system. Patients were assessed for anesthetic fitness, and comorbid conditions such as hypertension, diabetes mellitus, ischemic heart disease, or chronic respiratory illness were optimized before surgery. A multidisciplinary approach involving internists, anesthesiologists, and orthopaedic surgeons was followed to ensure comprehensive preoperative care. Informed consent was obtained after counseling patients and their families about the nature of the surgery, prosthesis type, possible complications, postoperative rehabilitation, and prognosis.

Surgical Procedure

All procedures were performed in a laminar airflow-equipped operating theater under spinal or combined spinal-epidural anesthesia. Patients were positioned in the lateral decubitus position, and the surgery was carried out using the posterior (Moore's) approach to the hip joint.

Operative Technique:

- A curved incision was made posteriorly, centered over the greater trochanter.
- Dissection was carried down to the hip joint capsule, which was incised in a T- or reverse L-shaped fashion.
- The femoral head and neck fragments were extracted, and the fracture morphology was carefully assessed.
- The femoral canal was prepared using broaches and rasps. Trial reduction was performed with appropriate prosthetic components to assess limb length and stability.
- In patients with poor bone quality (common in this age group), cemented bipolar prostheses were used to ensure stable fixation. In selected patients with adequate metaphyseal-diaphyseal bone quality, uncemented stems were used.
- The greater trochanter, if fractured or detached, was reconstructed and fixed using non-absorbable sutures, steel wire, or cable grip systems to restore abductor function.
- The final prosthesis was implanted, and the joint was reduced. Stability and limb length were reassessed.
- A drain was inserted in all cases, and the wound was closed in layers over a suction drain.
- A sterile pressure dressing was applied.
- The average duration of surgery and estimated intraoperative blood loss were recorded in the operative notes.

Figure 1: Lateral decubitus position of the patient and exposure of the hip by the posterior approach

Figure 2: Opening of the fracture site

Postoperatively, patients were monitored in the orthopaedic high-dependency unit for 24–48 hours. Intravenous fluids, analgesics, and antibiotics were administered. Wound inspection was done on day 2 or 3, and the drain was removed once output was minimal (<50 mL over 24 hours). Thromboembolic prophylaxis was administered using low molecular weight heparin or oral aspirin depending on patient risk profiles. Deep breathing exercises, chest physiotherapy, and DVT prophylaxis were initiated early. Patients were encouraged to sit up in bed and perform static quadriceps and ankle-pump exercises from the first postoperative day. Assisted mobilization with partial or full weight bearing was allowed within 48–72 hours postoperatively, based on pain tolerance and hemodynamic stability.

Data were compiled and analyzed using SPSS version 25.0 and Microsoft Excel. Descriptive statistics were used to summarize demographic and clinical variables. Quantitative data were expressed as mean ± standard deviation (SD), while categorical data were presented as frequencies and percentages. Paired t-tests were used to compare HHS across follow-up periods. A p-value <0.05 was considered statistically significant.

Results

A total of 40 elderly patients (aged ≥65 years) with unstable intertrochanteric fractures underwent bipolar hemiarthroplasty between January 2020 and December 2023. All patients were followed up for a minimum period of 12 months postoperatively.

Table 1: Demographic profile, Gender distribution, laterality & fracture classification

Demographic Profile		
Sl No.	**Age (Yrs)**	**No. of Patient (%)**
1	65-70	10 (25%)
2	71-75	14 (35%)
3	76-80	9 (22.5%)
4	80	7(17.5%)
Gender Distribution		
1	Male	23(57.5%)
2	Female	17(42.5%)
Laterality		
1	Right Hip	22(55%)
2	Left Hip	18(35%)
Fracture Classification (AO/OTA)		
1	31-A2 type	26(65%)
2	31-A3 type	14(35%)

All patients were ambulatory before injury, with or without support. 80% (n=32) had at least one comorbidity.

Table 2: Comorbidity before injury

Comorbidity	**Percentage**
Hypertension	60%
Diabetes mellitus	47.5%
Chronic obstructive pulmonary disease (COPD)	15%
Ischemic heart disease (IHD)	10%

During surgical time span, the mean operative time was 82.5 ± 12.6 minutes (range: 65–105 minutes) & Mean intraoperative blood loss was 280 ± 75 mL. There were no cases of deep vein thrombosis (DVT), implant loosening, or periprosthetic fractures within the 12-month follow-up. Functional recovery was assessed using the Harris Hip Score at 3, 6, and 12 months postoperatively

Table 3: Type of prosthesis used & Fixation of grater trochanter

Type of prosthesis	**No. of Patient (%)**
Cemented bipolar prosthesis	34(85%)
Uncemented bipolar prosthesis	6(15%)
Fixation of greater trochanter (when fractured)	
Non-absorbable sutures	18(45%)
Wire fixation	6(15%)
No Fixation required	16(40%)

Table 4: Postoperative Hospital Course

Time to Mobilization	**No. of Patient (%)**
Within 48 hours	30(70%)
Within 72 hours	10(25%)
Length of hospital stay	
Mean hospital stay	7.8 ± 2.1 days (range: 5–12 days)

Table 5: Complications

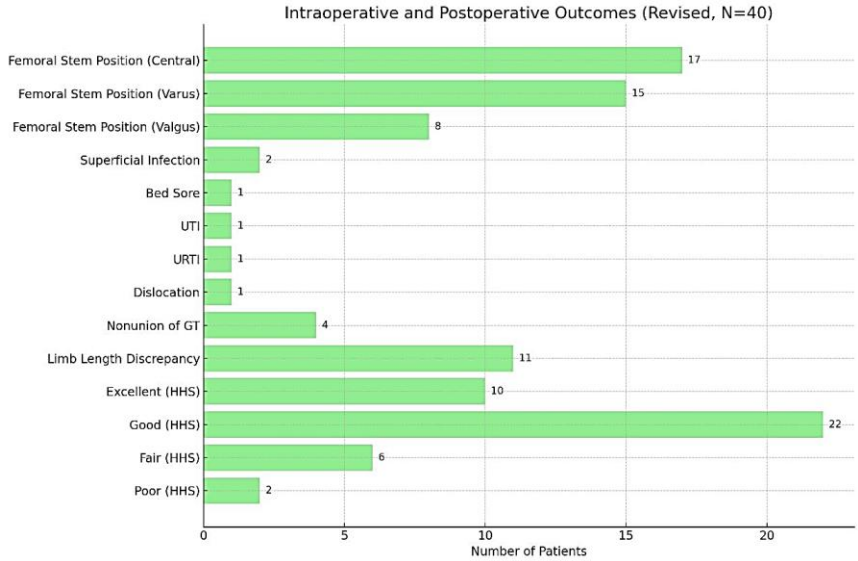
Type	**Case**
Superficial surgical site infection (SSI)	2 cases (managed with antibiotics and dressing)
Urinary tract infection (UTI):	1 case
Pulmonary complications (atelectasis or bronchitis)	2 cases
Periprosthetic dislocation	1 case (occurred at 3 weeks, reduced under anesthesia, managed with abduction brace)

Table 6: Functional Outcome (Harris Hip Score - HHS)

Time point	Mean HHS± SD	Excellent (90)	Good (80-90)	Fair (70-79)	Poor (< 70)
3 month	62.8 ±9.6	0	3 (7.5%)	18 (45 %)	19 (47.5%)
6 month	75.3± 8.4	4 (10%)	12 (30%)	16 (40%)	8 (20%)
12 month	83.7 ± 7.1	10(25%)	22 (55%)	6(15%)	2 (5%)

There was a statistically significant improvement in HHS scores over time ($p < 0.01$), with most patients achieving good to excellent functional recovery by 12 months.

Figure 3: Intraoperative and Postoperative Outcomes (n=40)



Radiological Outcome

All patients underwent follow-up X-rays at each visit. There were no cases of prosthetic loosening, subsidence, or malpositioning. Fracture healing of the greater trochanter, when fixed, was confirmed by 6 months in 91.6% (22 out of 24) of cases.

Overall Success and Satisfaction

At 12 months, patient satisfaction was high. Among them, 32 (80%) patients reported being “very satisfied”, 6(15%) patients reported “moderate satisfaction”. Only 2(5%) reported “dissatisfaction” (due to persistent limp or mild pain).

Figure 04: Anteroposterior X-Ray view of the pelvis with both hip joints of 60 years old male showing an unstable intertrochanteric fracture.

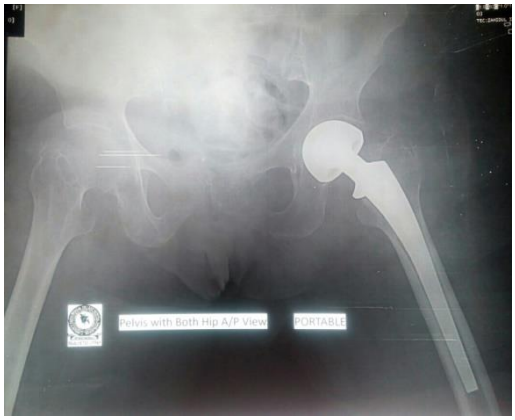


Figure 05: postoperative antreropostrerior X-RAY view of the patient managed by primary cemented bipolar hemiarthroplasty

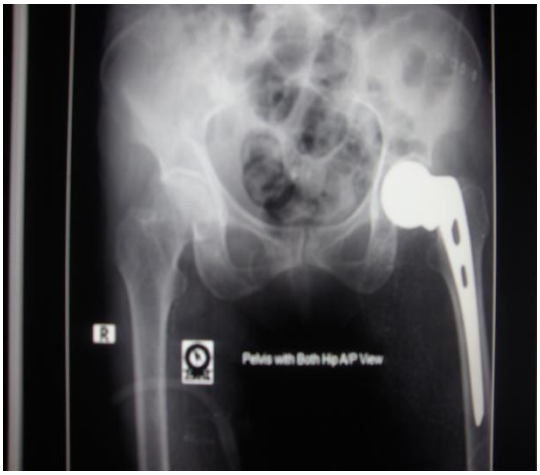


Figure 06: X-RAY of a post- operative patient with hemiarthroplasty

Figure 07: X-RAY of a post -operative patient with bipolar hemiarthroplasty

Discussion

Several surgical options are available for the treatment of unstable intertrochanteric fractures in osteoporotic elderly patients, but they still remain controversial. Due to weak, osteoporotic bones and the geometry of the fracture in these patients, it is hard to get a good grip of the screw in the femoral head. This leads to a high failure rate of internal fixation by proximal femoral nail (PFN) and sliding hip screw (SHS) and causes varus malposition, prolonged immobilization, and being bedridden for several weeks. Although it is known that early ambulation following rigid fracture fixation may help reduce morbidity and mortality, determining the optimal treatment approach for these fracture types remains difficult. Primary cemented bipolar hemiarthroplasty has emerged as a better choice for treatment of unstable inter-trochanteric fractures and has been advocated with the view of making rehabilitation early and decreasing the incidence of complications of prolonged immobilization.[17,18]

In our study, the average age of patients with unstable intertrochanteric fractures was 74.6 ± 6.8 years. This is in contrast to the older age group as reported by the western literature.[10,12,17] Our results are comparable with those of Rawate *et al.,* who reported the average age as 79.35 years, Rodop et al. who reported 75.6 years, and Sancheti *et al.* reporting 77.1 years as the average age.[19,21] In the present study, the female-to-male percentage 42.5% and 57.5%. There was a male sex preponderance seen in our study, which may be due to osteoporosis and lower peak bone mass. The most common associated comorbidity was hypertension in 60% of cases, followed by diabetes in 47.5% of cases. They were all treated accordingly. In the study by Sancheti *et al.,* 14% of patients had high blood pressure and

10% had diabetes. In our study, the average blood loss was 280 ml. Our results are comparable with those of Rawate *et al.* who reported 409.37 ml blood loss, Sancheti *et al.* who reported 350 ml blood loss and Patil *et al.* who reported 354.5 ml intraoperative average blood loss.[19,21,22] In our study, 56.57% of patients required postoperative blood transfusions, while Rawate *et al.* and Kiran Kumar *et al.* found 28.12% and 55% of patients needed perioperative transfusions, respectively.[19,20] The average operating time was estimated at 82.5 minutes. In the initial cases, our operating time was in the higher range. With experience, the operating time was reduced, which was comparable with results by Sancheti *et al.* who had an average of 77.1 minutes, Rawate *et al.* who had an average time of 82.53 minutes, and Sinno *et al.* with an average of 112 minutes.[19,21,24]

In the present study, postoperatively, limb length discrepancy over the operated limb was seen in 11 patients. Seven out of 40 patients had a shortening of less than 2 cm, so they were given a heel raise. Two patients had a shortening of more than 2 cm; they had a slight limp and used the support of a stick while walking; one patient had a lengthening of less than 2 cm. Siwach *et al.* reported shortening of less than 5 mm in 64% of cases, while 28% of cases had limb lengthening of between 5 and 10 mm.[25] They noticed the shortening was due to excessive sinking of the prosthesis following weight bearing. Kiran Kumar *et al.* reported that 20% of cases had a shortening of less than 2 cm, 10% of cases had a shortening of more than 2 cm, and one patient had a lengthening of more than 1.5 cm.[23] In this study, the mean time of full weight bearing was 4.5± 1.12 days, while in the studies by Sancheti *et al.* and Kiran Kumar *et al.,* the mean time was 4.2 and 5.4 days, respectively.[21,23] Eighteen patients were discharged on postoperative day 14 after suture removal. The mean number of days spent by the patient in the hospital was 7.8 ± 1.12, which is comparable to the outcome of other studies: Rawate *et al*., 14.53 days; Sancheti *et al.,* 10.96 days; Kiran Kumar *et al.,* 13.3 days.[19,21,23]

In our study, at the end of 12 months, 10 patients (25 %) had excellent results, 22 patients (55%) had good results, 6 patients (15 %) had fair results, and 2 cases (5 %) had poor results. Excellent to fair results were achieved in 95 % of cases, which is comparable to other studies, as Sancheti *et al.,* in a study of 35 patients treated with hemiarthroplasty, reported excellent to fair results in 91% patients according to the Harris Hip Score.[21] Kiran Kumar *et al.* achieved 90% excellent to fair results as assessed by the Harris Hip Score.[23] Saoudy *et al*. in a series of 30 cases reported 86% fair to excellent results (4 cases as excellent, 12 as good, 10 as fair, and 4 as poor).[26] Similarly, Elmorsy *et al.* reported that the Harris Hip Score at the final follow-up ranged between 93 and 51, with a mean of 78.19, in which four cases (9.76%) were rated excellent, 16 (30.02%) were rated good, 16 (30.02%) were rated fair, and 5 (12.02%) were rated poor.[27] Hongku *et al.* conducted a systematic review to compare the efficacy of osteosynthesis (dynamic hip screw, proximal femoral nail) and bipolar hemiarthroplasty and showed that dynamic hip screw and PFN had a significantly higher risk of operative failure compared with bipolar hemiarthroplasty in unstable intertrochanteric fractures in elderly patients.[28] Chowdhury *et al.* did a systematic review to compare hemiarthroplasty and DHS fixation for intertrochanteric fractures in elderly patients.[29] They found that at 12 months, hemiarthroplasty led to significantly higher Harris Hip Scores and allowed patients to start bearing weight sooner than with DHS fixation.

In a study comparing total hip replacement arthroplasty and cemented bipolar hemiarthroplasty, Fan et al. found that there was no difference between total hip replacement and cemented bipolar hemiarthroplasty in functional outcomes and managing the pain.[30] However, they also noted that there was no evident difference in the hospitalization period, general complications, and rate of revision and mortality during the follow-up. They also concluded that total hip replacement arthroplasty posed some unique challenges for geriatric patients, including higher intraoperative blood loss, longer duration of surgery, increased rates of dislocation, impaired reflexes, and cognitive decline, and greater costs, suggesting that hemiarthroplasty might be a better or more reasonable choice for unstable intertrochanteric fractures of the femur in elderly patients.

Conclusion

Unstable intertrochanteric fractures in elderly patients remain a major orthopedic challenge. This study demonstrates that hemiarthroplasty provides a reliable, effective, and functionally rewarding treatment option in this group, offering early mobilization, acceptable complication rates, and good-to-excellent functional outcomes in most patients. While some postoperative complications like limb length discrepancy and superficial infections were observed, these were manageable and did not significantly affect overall recovery in most cases. Femoral stem alignment and technical precision remain critical for optimal outcomes. With careful patient selection and surgical planning, hemiarthroplasty should be considered a preferred option in osteoporotic elderly patients with unstable fracture patterns where internal fixation may fail. However, further prospective, randomized studies with larger samples and longer follow-up are essential to confirm the long-term superiority and cost-effectiveness of hemiarthroplasty over alternative methods. Nevertheless, based on our data and experience, we recommend this technique as a valuable addition to the surgical armamentarium for managing this complex injury.

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