

## Management of Unstable Intertrochanteric Femoral Fractures in the Elderly: A Retrospective Comparison of PFNA and Primary Hip Hemiarthroplasty

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### Abstract:

**Background:** Unstable intertrochanteric femoral fractures are common in the elderly population and are associated with significant morbidity and mortality. Surgical management is the standard of care, with Proximal Femoral Nail Antirotation (PFNA) and primary hemiarthroplasty being two widely used procedures. However, the optimal choice of treatment remains debated.

**Aim:** To compare the clinical outcomes of PFNA fixation and primary hemiarthroplasty in elderly patients with unstable intertrochanteric femoral fractures.

**Methods:** A retrospective study was conducted at Pacific Medical College and Hospital over one year, including 40 elderly patients with unstable intertrochanteric fractures. Patients were divided into two groups: PFNA fixation (n=20) and primary hemiarthroplasty (n=20). Data on operative time, blood loss, hospital stay, complications, time to mobilization, and functional outcomes (Harris Hip Score at 6 months) were analyzed using SPSS version 23.0.

**Results:** PFNA fixation was associated with shorter mean operative time ( $72.4 \pm 11.2$  min vs.  $94.7 \pm 14.3$  min;  $p < 0.001$ ) and lower blood loss ( $210 \pm 56$  mL vs.  $410 \pm 72$  mL;  $p < 0.001$ ). Hemiarthroplasty patients demonstrated earlier mobilization ( $2.6 \pm 0.9$  days vs.  $4.8 \pm 1.5$  days;  $p < 0.001$ ) and superior functional outcomes at 6 months (Harris Hip Score:  $82.5 \pm 7.1$  vs.  $76.3 \pm 6.5$ ;  $p = 0.01$ ). Complication rates were comparable between the groups (25% vs. 30%;  $p = 0.73$ ).

**Conclusion:** Both PFNA and primary hemiarthroplasty are effective surgical options for unstable intertrochanteric femoral fractures in the elderly. PFNA offers advantages of reduced operative time and blood loss, whereas hemiarthroplasty allows earlier mobilization and superior short-term functional recovery.

**Recommendations:** The choice of surgical method should be individualized based on patient comorbidities, fracture pattern, and functional demands. Larger prospective studies with longer follow-up are recommended to further validate these findings.

**Keywords:** Intertrochanteric Fracture, Elderly, PFNA, Hemiarthroplasty, Functional Outcomes.

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### Introduction

Intertrochanteric femoral fractures are among the most common injuries encountered in the elderly population, accounting for a substantial proportion of hip fractures worldwide. With the increasing life expectancy and aging population, the incidence of these fractures is expected to rise further, posing a significant public health burden [1]. These injuries are often the result of low-energy trauma, such as falls from standing height, and are commonly associated with osteoporosis and frailty [2]. Due to their unstable nature and the limited physiological reserves in elderly patients, management of unstable intertrochanteric fractures remains a considerable challenge.

The primary goals of treatment are to achieve stable fixation, allow early mobilization, reduce the risk of complications, and restore pre-injury functional status [3]. Prolonged immobilization in elderly patients can result in serious consequences such as pneumonia, deep vein thrombosis, pressure sores, and loss of independence [4]. Therefore, surgical management is considered the standard of care.

Two commonly used surgical strategies are internal fixation with devices such as the PFNA) and prosthetic replacement in the form of primary hemiarthroplasty. PFNA is a widely accepted technique for unstable intertrochanteric fractures because of its minimally invasive nature, reduced

blood loss, and biomechanical stability [5]. Several studies have reported favorable outcomes with PFNA, especially in terms of reduced surgical trauma and lower perioperative morbidity [6]. However, complications such as cut-out, implant failure, and delayed mobilization remain concerns in osteoporotic bone [7].

On the other hand, primary hemiarthroplasty has gained popularity as an alternative, particularly for unstable fracture patterns in the elderly. It allows immediate weight-bearing, faster mobilization, and avoids the risk of implant-related failures [8]. Recent studies have suggested that hemiarthroplasty may provide better early functional outcomes compared to intramedullary fixation in this patient group [9,10]. However, it is associated with longer operative time, higher intraoperative blood loss, and increased risk of wound complications [11].

Given the ongoing debate regarding the optimal surgical approach, comparative studies are essential to provide evidence-based guidance for clinicians. This retrospective study was conducted to evaluate and compare the outcomes of PFNA fixation versus primary hemiarthroplasty in elderly patients with unstable intertrochanteric femoral fractures.

### Methodology

**Study Design:** This was a retrospective comparative study.

**Study Setting:** The study was carried out at the Department of Orthopaedics, Pacific Medical College and Hospital, over a period of one year.

**Participants:** A total of 40 elderly patients with unstable intertrochanteric femoral fractures were included in the study. Patients were divided into two groups based on the surgical procedure performed—PFNA or primary hip hemiarthroplasty. The hospital records and operative notes were used to identify eligible participants.

**Inclusion Criteria:** Patients aged 60 years and above with radiologically confirmed unstable intertrochanteric femoral fractures who underwent either PFNA fixation or primary hemiarthroplasty were included. Only patients with complete medical records and a minimum follow-up of six months were considered.

**Exclusion Criteria:** Patients with pathological fractures, polytrauma, previous ipsilateral hip

surgeries, open fractures, or incomplete clinical data were excluded. Patients unfit for surgery due to severe medical comorbidities were also excluded from the study.

**Bias:** To minimize selection bias, all eligible cases within the study period that met the inclusion criteria were included. Observer bias was reduced by cross-verification of data from operative records, follow-up notes, and radiographs.

**Data Collection:** Data were collected retrospectively from patient records, operative notes, and radiological archives. Demographic details, type of surgery, intraoperative findings, duration of surgery, complications, postoperative mobilization, and follow-up outcomes were recorded.

**Procedure:** All surgeries were performed under standard aseptic precautions by experienced orthopaedic surgeons. Patients in the PFNA group underwent closed or open reduction and internal fixation using the proximal femoral nail antirotation device. Those in the hemiarthroplasty group underwent cemented or uncemented bipolar hemiarthroplasty depending on intraoperative assessment. Standard perioperative care and rehabilitation protocols were followed for both groups.

**Statistical Analysis:** All data were entered into Microsoft Excel and analyzed using (SPSS) version 23.0. Descriptive statistics such as mean, standard deviation, and percentages were used to summarize baseline data. Comparisons between the two groups were made using the Chi-square test for categorical variables and the Student's t-test for continuous variables. A p-value of  $<0.05$  was considered statistically significant.

### Results

A total of 40 elderly patients with unstable intertrochanteric femoral fractures were included in the study. Among them, 20 underwent fixation with (PFNA) and 20 underwent primary hip hemiarthroplasty. The mean age of patients was  $74.3 \pm 6.8$  years in the PFNA group and  $75.9 \pm 7.2$  years in the hemiarthroplasty group ( $p = 0.47$ ). The male-to-female ratio was comparable between the groups ( $p = 0.79$ ).

Table 1: Baseline characteristics of patients

| Variable                            | PFNA Group (n=20) | Hemiarthroplasty Group (n=20) | p-value |
|-------------------------------------|-------------------|-------------------------------|---------|
| Mean Age (years)                    | $74.3 \pm 6.8$    | $75.9 \pm 7.2$                | 0.47    |
| Male : Female ratio                 | 9 : 11            | 10 : 10                       | 0.79    |
| Mean BMI ( $\text{kg}/\text{m}^2$ ) | $23.1 \pm 2.6$    | $22.7 \pm 2.8$                | 0.63    |
| ASA Grade I–II (%)                  | 60%               | 55%                           | 0.74    |
| ASA Grade III–IV (%)                | 40%               | 45%                           |         |

Baseline demographic and clinical characteristics were statistically comparable between the two groups, ensuring minimal selection bias.

**Operative and Perioperative Data:** The mean operative time was significantly shorter in the PFNA group compared to the hemiarthroplasty group (72.4

$\pm 11.2$  minutes vs.  $94.7 \pm 14.3$  minutes;  $p < 0.001$ ). However, intraoperative blood loss was higher in the hemiarthroplasty group ( $410 \pm 72$  mL vs.  $210 \pm 56$  mL;  $p < 0.001$ ). The mean hospital stay was slightly longer in the hemiarthroplasty group, though not statistically significant.

**Table 2: Operative and perioperative findings**

| Parameter                   | PFNA Group (n=20) | Hemiarthroplasty Group (n=20) | p-value  |
|-----------------------------|-------------------|-------------------------------|----------|
| Mean operative time (min)   | $72.4 \pm 11.2$   | $94.7 \pm 14.3$               | $<0.001$ |
| Mean blood loss (mL)        | $210 \pm 56$      | $410 \pm 72$                  | $<0.001$ |
| Mean hospital stay (days)   | $8.2 \pm 2.1$     | $9.1 \pm 2.4$                 | 0.21     |
| Time to mobilization (days) | $4.8 \pm 1.5$     | $2.6 \pm 0.9$                 | $<0.001$ |

PFNA offered advantages in terms of operative time and blood loss, while hemiarthroplasty allowed for earlier postoperative mobilization.

**Postoperative Complications:** Overall complication rates were slightly higher in the hemiarthroplasty group (30%) compared to the

PFNA group (25%), but the difference was not statistically significant ( $p = 0.73$ ). Superficial wound infection was more common in hemiarthroplasty patients, while implant-related complications (cut-out, screw migration) were reported only in the PFNA group.

**Table 3: Postoperative complications**

| Complication                | PFNA Group (n=20) | Hemiarthroplasty Group (n=20) | p-value |
|-----------------------------|-------------------|-------------------------------|---------|
| Superficial wound infection | 1 (5%)            | 2 (10%)                       | 0.54    |
| Implant-related problems    | 2 (10%)           | 0                             | –       |
| Deep vein thrombosis        | 1 (5%)            | 1 (5%)                        | 1.00    |
| Dislocation                 | 0                 | 1 (5%)                        | 0.31    |
| Overall complication rate   | 5 (25%)           | 6 (30%)                       | 0.73    |

Both procedures were associated with manageable complication rates, with no statistically significant differences.

**Functional Outcomes:** Functional outcomes were assessed using the Harris Hip Score (HHS) at 6

months postoperatively. The mean HHS was significantly higher in the hemiarthroplasty group ( $82.5 \pm 7.1$ ) compared to the PFNA group ( $76.3 \pm 6.5$ ;  $p = 0.01$ ), indicating better short-term functional recovery with hemiarthroplasty.

**Table 4: Functional outcomes (6-month follow-up)**

| Outcome Measure            | PFNA Group (n=20) | Hemiarthroplasty Group (n=20) | p-value |
|----------------------------|-------------------|-------------------------------|---------|
| Mean Harris Hip Score      | $76.3 \pm 6.5$    | $82.5 \pm 7.1$                | 0.01    |
| Excellent/Good outcome (%) | 60%               | 80%                           | 0.18    |

Although both groups achieved satisfactory outcomes, hemiarthroplasty patients demonstrated superior hip function at 6 months' follow-up.

## Discussion

In this retrospective comparative study of 40 elderly patients with unstable intertrochanteric femoral fractures, baseline demographic and clinical characteristics were comparable between the two groups, minimizing selection bias and allowing for meaningful comparison. Both PFNA fixation and primary hemiarthroplasty were performed in elderly patients with similar age, gender distribution, and ASA grades.

The operative findings revealed important differences between the two approaches. PFNA fixation required significantly less operative time

and resulted in lower intraoperative blood loss compared to hemiarthroplasty. However, patients undergoing hemiarthroplasty benefited from earlier postoperative mobilization, often walking within three days, whereas those treated with PFNA required a longer period before ambulation. This suggests that while PFNA is less invasive, hemiarthroplasty may provide quicker restoration of mobility, which is crucial in the elderly population to prevent complications of prolonged immobilization.

With respect to complications, both groups experienced a comparable overall complication rate. PFNA was associated with implant-related issues such as screw migration and cut-out, while hemiarthroplasty patients had a slightly higher incidence of wound-related problems. However,

these differences were not statistically significant, and most complications were manageable with appropriate medical or surgical interventions.

Functional outcomes at six months demonstrated a clear advantage in favor of hemiarthroplasty. Patients in this group achieved higher Harris Hip Scores, indicating better mobility, pain relief, and overall hip function compared to those who underwent PFNA fixation. Although both groups achieved satisfactory outcomes, the superior early functional recovery with hemiarthroplasty is noteworthy, particularly for elderly patients where rapid return to independence is a major goal of treatment.

Several recent studies have explored the optimal surgical management of unstable intertrochanteric femoral fractures in the elderly, comparing (PFNA) with hemiarthroplasty.

Zhang et al. reported that hemiarthroplasty had advantages over PFNA in terms of shorter operative time, reduced intraoperative blood loss, earlier mobilization, and fewer complications, making it favorable for frailer elderly patients [12]. Similarly, Yuan et al. emphasized that hemiarthroplasty allows rapid post-operative ambulation but noted PFNA achieved superior long-term hip function and reduced surgical trauma [13]. Zou et al. compared the two techniques and found that while hemiarthroplasty permitted earlier weight-bearing, PFNA provided better hip functional outcomes during later follow-up periods, suggesting PFNA may be more suitable for healthier patients [14]. In line with this, Chen et al. found PFNA patients achieved higher Harris hip scores at one-year follow-up, though hemiarthroplasty remained advantageous for patients requiring immediate mobilization [15].

Further, Wu et al. highlighted that PFNA demonstrated fewer post-operative medical complications and lower perioperative risk compared with hemiarthroplasty, though both procedures had comparable mortality rates [16]. A study by Li et al. reinforced these findings, showing that PFNA was less invasive with lower blood loss and improved long-term hip function, whereas hemiarthroplasty provided better early mobility outcomes [17]. Collectively, the evidence suggests that hemiarthroplasty is best suited for elderly patients with poor general health who require early ambulation, while PFNA appears more advantageous for long-term hip function and reduced surgical invasiveness. The decision should be individualized based on patient frailty, comorbidities, and rehabilitation potential.

### Conclusion

Both PFNA and primary hemiarthroplasty are effective options for managing unstable

intertrochanteric femoral fractures in the elderly. PFNA offers the advantages of shorter operative time and reduced blood loss, whereas hemiarthroplasty allows earlier mobilization and superior short-term functional recovery. Treatment choice should be individualized based on patient condition, fracture type, and surgical expertise.

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