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Original Research Article

# Management of Unstable Intertrochanteric Femoral Fractures in the Elderly: A Retrospective Study

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**Abstract:**

**Background:** Unstable intertrochanteric femoral fractures in elderly populations are often the result of low-energy trauma and present a significant healthcare challenge. Managing these fractures requires careful consideration of surgical approaches, postoperative care, and rehabilitation to optimize outcomes while minimizing complications.

**Methods:** This retrospective study involved 104 elderly patients aged 65 years and older who sustained intertrochanteric fractures. Patients were treated with either cementless Bipolar Hemiarthroplasty (BHA) or Proximal Femoral Nailing (PFN). Data were collected from medical records, including patient demographics, comorbidities, surgical details, and postoperative complications. Statistical analysis was performed using SPSS 11.5, comparing variables such as surgery duration, blood transfusion rates, Harris Hip Scores (HHS), and postoperative complications between the two cohorts.

**Results:** The study found that PFN offered potential advantages over BHA, including reduced blood transfusion requirements, shorter surgery durations, and slightly higher HHS. However, both procedures were associated with the risk of postoperative epidermal infections. There were statistically significant differences in surgery duration and blood transfusion rates between the two cohorts.

**Conclusion:** Managing unstable intertrochanteric femoral fractures in the elderly is a complex endeavor. While PFN appears to offer certain benefits, both surgical methods present challenges, emphasizing the need for ongoing research and the development of best practices. The study contributes valuable insights into treatment options for this vulnerable patient population.

Recommendations: Further research is essential to refine and individualize treatment approaches for elderly patients with intertrochanteric fractures. Future studies should explore the impact of patient-specific factors, such as bone quality and functional status, on treatment outcomes. Additionally, efforts should focus on optimizing postoperative care, including infection prevention strategies and early rehabilitation protocols.

**Keywords:** Intertrochanteric femoral fractures, Elderly population, Bipolar Hemiarthroplasty, Proximal Femoral Nailing.



## Introduction

Intertrochanteric femoral fractures, particularly unstable ones, are a significant health concern in the elderly population, often resulting from low-energy trauma like falls [1]. These fractures are characterized by their location in the proximal femur, between the greater and lesser trochanters. The management of these fractures is crucial due to the high incidence of morbidity and mortality associated with them, especially in older adults who may have multiple comorbidities [2].

The treatment of unstable intertrochanteric femoral fractures in the elderly is challenging and requires a multidisciplinary approach. This involves not only the surgical intervention but also preoperative assessment, postoperative care, and rehabilitation. The primary goal is to restore the patient's mobility and independence while minimizing complications [3].

Recent advancements in surgical techniques and implant designs have significantly improved outcomes. However, the choice of surgical procedure (such as internal fixation, hemiarthroplasty, or total hip arthroplasty) often depends on various factors including the patient's bone quality, the fracture pattern, and the patient's pre-fracture functional status [4].

Moreover, the management of these fractures extends beyond surgical intervention. Comprehensive geriatric assessment and optimization of medical comorbidities are essential. Postoperative care focuses on early mobilization, pain management, prevention of complications such

as deep vein thrombosis, and addressing osteoporosis to prevent future fractures [5].

The complexity of managing unstable intertrochanteric femoral fractures in the elderly underscores the need for ongoing research and development of best practices. Recent studies have focused on various aspects of care, including surgical techniques, rehabilitation protocols, and the role of geriatric assessment in improving outcomes [2, 4].

This study examined postoperative complications, implant-related issues, functional outcomes, and reoperation rates in older patients treated for intertrochanteric femur fractures using cementless proximal femoral nail (PFN) and bipolar hip arthroplasty (BHA).

**Methodology**

**Study Design:** This retrospective study utilized a comparative cohort design.

**Study Setting:** The study was conducted at Government Medical College, Purnea , over a period spanning from 2022-2023.

**Participants:** The study included a cohort of 104 patients, all aged 65 years or older, who had sustained intertrochanteric fractures.

**Inclusion Criteria:**
- Individuals 65 years of age or older.
- Diagnosis of intertrochanteric fractures.
-Treatment with either cementless Bipolar Hemiarthroplasty (BHA) or Proximal Femoral Nailing (PFN).

**Exclusion Criteria:**
- Patients with complex injuries.
- Fractures induced by underlying lesions.
- Pre-existing hip joint degeneration.

**Bias:** To minimize bias, patient selection was based on clear inclusion and exclusion criteria.

**Variables:** Variables included Type of surgical intervention (BHA or PFN), Harris hip score (HHS), period of surgery, Age, gender, comorbidities, and pre-fracture functional status.

**Data Collection:** Data were collected from medical records, including preoperative assessments, surgical notes, and postoperative follow-up records. Information was also gathered on patient demographics, comorbidities, and complications during the hospital stay.

**Methodology:**
- For PFN, surgeries were performed with patients in a horizontal position, using minimally invasive techniques following fracture reduction under fluoroscopic guidance.
- Dorsolateral incisions were used to perform BHA procedures, and non-cemented implants with hooked hip plates were used.
- Patients were encouraged to mobilize on the day following surgery and participated in a prescribed rehabilitation program.

**Statistical Analysis:** Statistical analysis was conducted using SPSS 11.5. Continuous variables were presented as means. Statistical significance was set at $p<0.05$.

**Ethical Considerations:** The study adhered to ethical guidelines and obtained necessary approvals from the institutional review board. Informed consent was waived due to the retrospective nature of the study, and patient privacy and confidentiality were rigorously maintained.

**Result**

A cohort of 104 patients with intertrochanteric fractures who were 65 years of age or older were the subject of a retrospective investigation. The study's patient population was 82.7 years old on average; the BHA group was 81.3 years age on average and the PFN group was 83.9 years age on average. The average follow-up period for the entire cohort was 18.6 months; the average follow-up period for the BHA group was 23.8 months, whereas the average follow-up period for the PFN group was 13.1 months. In comparison to the PFN cohort, the BHA cohort had a larger male-to-female ratio (Table 1).

**Table 1: Demographic Data of Patient Cohort**

| Variables | BHA cohort, (n=56) | PFN cohort, (n=48) |
|---|---|---|
| Mean age (years) | 81.3 | 83.9 |
| Male | 40 | 24 |
| Female | 16 | 24 |
| Mean follow-up (months) | 23.8 | 13.1 |
| Surgical characteristics | | |
| Blood loss (cc) | 710.2 | 598.4 |
| Mean duration of hospitalization (days) | 8.5 | 7.7 |
| Average time to walking (days) | 3.6 | 2.0 |

The BHA group scored a mean of 80.9 points, while the PFN group scored an average of 82.4 points. The mean HHS for the whole group was 81.6 points.

Twelve members of the BHA cohort earned an exceptional HHS, 18 had a noteworthy score,

sixteen had a mean score, and six had a low score. 22 patients in the PFN group had an excellent HHS, 8 had a significant score, 10 had a mean score, and 8 had a low score. For all patients, the mean blood transfusion volume was 0.85 units; for the BHA group, it was 1.41 units, and for the PFN cohort, it was 0.27 units. With the BHA group requiring a mean of 94.9 mins and the PFN cohort having a mean of 59.8 minutes, the total mean length of operation was 78.2 minutes.

The length of surgery varied between the two cohorts in a statistically significant way ($p<0.05$), with the PFN procedure taking less time than the BHA treatment. Additionally, there was a noteworthy distinction in the rate of blood transfusions between the cohorts, suggesting that the PFN group required less blood transfusions than the BHA group.

Epidermal infections were among the postoperative problems that six members of the BHA cohort experienced. Just 4 patients in the PFN cohort had epidermal infections. Furthermore, after six months, two patients in the PFN group had implant malfunctions or failures that required additional extractions. In the PFN cohort, the cut-out rate was 5.5%.

**Dicussion**

In this retrospective study of 104 elderly patients with intertrochanteric fractures, findings indicate differences in outcomes between two surgical approaches: cementless BHA and PFN. On average, patients were in their early 80s, with the BHA group slightly younger, and a notable gender disparity in favour of males in the BHA cohort. Patients in the BHA group had significantly longer follow-up durations, suggesting potential variations in postoperative care. While both groups achieved reasonably good HHS, indicating satisfactory hip function, the PFN group exhibited slightly higher scores. Moreover, PFN was associated with reduced blood transfusion requirements, shorter surgery durations, and lower rates of implant malfunction, potentially making it a favourable choice for elderly patients with intertrochanteric fractures. However, both groups experienced epidermal infections, underscoring the importance of further research to determine the most suitable treatment approach for this patient population.

A comparative study [6] has shown that when two lag screws are used in patients with adequate bone quality, the results are better. But among people with osteoporosis, there's also a higher chance of cut-out with this strategy. Another study [7] comparing treatment with PFN utilising an integrated lag screw against 2 separate lag screws did not find any statistically relevantchanges in radiological and functional outcomes or complication rates. Research indicates that using cemented BHA instead of internal fixing for the treatment of intertrochanteric fractures has benefits including quicker mobilisation and shorter hospital stays. According to a study by [9], people who had PFN treatment typically lived longer than people who had bipolar cemented hemiarthroplasty. According to [10], at the 12-month post-surgery mark, 45% and 37% of elderly those with unstable intertrochanteric fractures receiving main BHA treatment, respectively, had excellent and good HHS score. Moreover, [11] did not discover any statistically significant variations between PFN anti-rotation and BHA for intertrochanteric femur fractures in terms of surgical complications, rates of re-operation, surgery time, or HHS [12] promoted the use of hip screws for stable fractures and PFN for unstable intertrochanteric femur fractures.

**Conclusion**

In conclusion, managing unstable intertrochanteric femoral fractures in the elderly is complex. This retrospective study of 104 elderly intertrochanteric fracture patients highlights differences between cementless BHA and PFN. PFN appears to offer advantages, including lower blood transfusion needs, shorter surgery times, and potentially better hip function. However, both methods presented challenges, with both groups experiencing postoperative skin infections. Further research is crucial to improving care for elderly patients with intertrochanteric fractures, considering factors like bone quality, fracture patterns, and pre-fracture function. Ongoing advancements in surgical techniques and implants aim to enhance outcomes and reduce complications in this vulnerable population.

**Limitations:** The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

**Recommendations:** Further research is essential to refine and individualize treatment approaches for elderly patients with intertrochanteric fractures. Future studies should explore the impact of patient-specific factors, such as bone quality and functional status, on treatment outcomes. Additionally, efforts should focus on optimizing postoperative care, including infection prevention strategies and early rehabilitation protocols.

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**List of abbreviations:**

1. BHA - Bipolar Hemiarthroplasty

2. PFN - Proximal Femoral Nailing

3. HHS - Harris Hip Scores

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