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Original Research Article

Treatment of Unstable Intertrochanteric Femoral Fractures in Elderly Population: A Retrospective Comparison between Those Treated by PFNA versus Primary Hemiathroplasty of the Hip

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Abstract:
This retrospective study compared the outcomes of Proximal Femoral Nail Antirotation (PFNA) and Primary Hemiarthroplasty in the treatment of unstable intertrochanteric femoral fractures among the elderly. Data from 20 patients over one year revealed that PFNA led to shorter hospital stays and faster mobilization compared to Hemiarthroplasty, without a significant difference in complication rates or mortality. Long-term mobility was slightly better in the PFNA group, emphasizing its potential benefits in enhancing patient recovery and reducing hospitalization risks. The findings suggest the necessity for individualized surgical decisions based on specific patient and fracture characteristics to optimize clinical outcomes in this vulnerable population.
Keywords: PFNA, Primary Hemiarthroplasty, intertrochanteric fractures, elderly care.

Introduction

Unstable intertrochanteric femoral fractures represent a significant clinical challenge, particularly in the elderly population, due to their frailty, comorbid conditions, and the complex nature of these injuries [1,2]. The management of these fractures aims to stabilize the bone, allow early mobilization, and minimize complications. Among the surgical options, Proximal Femoral Nail Antirotation (PFNA) and Primary Hemiarthroplasty of the hip are two widely adopted approaches [3,4].

PFNA, a form of intramedullary fixation, is favored for its minimally invasive nature and its biomechanical stability, facilitating early weight-bearing [5]. On the other hand, Primary Hemiarthroplasty, which involves hip joint replacement, is typically reserved for cases where the bone quality or fracture pattern makes fixation challenging [6]. This procedure is also utilized to reduce postoperative pain and the risk of subsequent surgeries, which can be particularly advantageous in the elderly with life-limiting comorbidities [7].

The choice between PFNA and Primary Hemiarthroplasty largely depends on patient-specific factors including the fracture pattern, bone quality, and overall health status of the patient [8]. This retrospective analysis aims to compare the outcomes of these two surgical techniques in the treatment of unstable intertrochanteric femoral fractures among the elderly. By examining factors such as recovery times, complication rates, and long-term functionality, this study seeks to provide further insights that could guide clinical decision-making, ultimately improving patient outcomes in this vulnerable group.

Methodology

Study Design: This was a retrospective cohort study designed to compare the outcomes of Proximal Femoral Nail Antirotation (PFNA) and Primary Hemiarthroplasty in elderly patients with

unstable intertrochanteric femoral fractures. The study reviewed cases over a one-year period to evaluate the effectiveness and safety of these two surgical options.

Sample Selection: The study sample consisted of 20 elderly patients who had sustained unstable intertrochanteric femoral fractures and underwent either PFNA or Primary Hemiarthroplasty. Patients were identified from hospital records between January and December 2022. Ten patients underwent PFNA, and ten underwent Primary Hemiarthroplasty, ensuring a balanced comparison.

Data Collection: Data were extracted from electronic medical records maintained by the hospital. Key variables collected included patient demographics (age, sex), medical history, details of the fracture, surgical procedure specifics, length of hospital stay, time to mobilization, complications (such as infection, mechanical failure), and mortality. Follow-up data were collected for up to one-year post-surgery to assess long-term outcomes such as mobility and survival.

Outcome Measures: The primary outcome measures were the duration of hospital stay and time to mobilization. Secondary outcomes included postoperative complications, long-term mobility, and mortality at one year. These measures helped in assessing the immediate and prolonged benefits and risks associated with each surgical technique.

Statistical Analysis: Data were analyzed using SPSS software (version 25.0). Descriptive statistics such as means and standard deviations were calculated for continuous variables, while frequencies and percentages were used for categorical variables. The Chi-square test was employed for comparing categorical data, and the Student's t-test was used for continuous variables. A p-value of less than 0.05 was considered statistically significant, indicating meaningful differences between the two groups.

Results

The results of this retrospective study revealed distinct outcomes between patients treated with Proximal Femoral Nail Antirotation (PFNA) and those who underwent Primary Hemiarthroplasty for unstable intertrochanteric femoral fractures in the elderly. Patients treated with PFNA had a shorter average hospital stay (6 days) compared to those who underwent Primary Hemiarthroplasty (9 days). Additionally, the PFNA group achieved earlier mobilization, with patients beginning to walk with assistance at an average of 3 days post-surgery, as opposed to 5 days in the Hemiarthroplasty group.

The rate of postoperative complications was similar between the two groups. However, the nature of complications differed. The PFNA group experienced two cases of mechanical failure requiring revision surgery, while the Hemiarthroplasty group faced one case of deep infection and one dislocation, both of which required further surgical intervention. At the one-year follow-up, long-term mobility appeared slightly better in the PFNA group, with 8 out of 10 patients able to walk with minimal assistance compared to 6 out of 10 in the Hemiarthroplasty group. Mortality rates were similar, with one patient from each group passing away due to unrelated causes. The differences in hospital stay and time to mobilization were statistically significant ($p<0.05$), favoring the PFNA treatment. However, there were no significant differences in the rates of complications or mortality between the two groups.

These findings suggest that PFNA may offer benefits in terms of shorter hospital stays and quicker mobilization without increasing the risk of complications or mortality, making it a potentially preferable option for surgical treatment of unstable intertrochanteric femoral fractures in the elderly.

Treatment Type	Average Hospital Stay (days)	Time to Mobilization (days)	Patients Walking with Minimal Assistance at 1 Year (%)	Postoperative Complications (%)	Mortality at 1 Year (%)
PFNA	6	3	80	20	10
Primary Hemiarthroplasty	9	5	60	20	10

This table illustrates differences in hospital stay, mobilization time, long-term mobility, and similar rates of complications and mortality between the two treatment groups.

Discussion

The findings of this retrospective study highlight several important considerations in the

management of unstable intertrochanteric femoral fractures in the elderly [9]. Notably, Proximal Femoral Nail Antirotation (PFNA) demonstrated advantages in terms of shorter hospital stays and faster mobilization compared to Primary Hemiarthroplasty. These results are particularly significant given the vulnerability of the elderly population to prolonged immobilization and hospitalization, which can increase the risk of complications such as deep vein thrombosis, pulmonary embolism, and hospital-acquired infections [10,11].

While the overall rate of postoperative complications was equivalent between the two groups, the nature of these complications varied, suggesting differences in the risk profiles associated with each surgical approach [12]. The mechanical failures observed in the PFNA group could indicate issues related to the biomechanical stability in certain fracture patterns or bone quality conditions, whereas the complications in the Hemiarthroplasty group (infection and dislocation) emphasize the invasive nature and potential for more severe postoperative issues in this type of surgery [13,14]. The similar mortality rates across both groups indicate that neither surgical approach significantly impacts short-term survival, which could influence decision-making in clinical practice, particularly in patients with significant comorbidities where life expectancy is already compromised [15].

Finally, the better long-term mobility observed in the PFNA group could have substantial implications for patient quality of life, as maintaining independence in mobility is crucial for elderly individuals [16]. This aspect underscores the need for a personalized approach in choosing the surgical treatment, considering both the immediate surgical risks and the long-term functional outcomes [17]. These insights suggest that while PFNA might generally be more advantageous for quick recovery and early mobilization, the choice of surgical method should be tailored based on individual patient factors, including the specific fracture characteristics and overall health status. Future studies with larger sample sizes and diverse demographics are warranted to further validate these findings and aid in developing optimized treatment protocols [18-20].

Conclusion

The retrospective study comparing Proximal Femoral Nail Antirotation (PFNA) and Primary Hemiarthroplasty for treating unstable intertrochanteric femoral fractures in the elderly revealed that PFNA may be preferable due to shorter hospital stays and quicker postoperative mobilization without increasing the risk of complications or affecting mortality rates. However, both treatments showed similar effectiveness in managing complications and survival outcomes, indicating that the choice of surgical intervention should be tailored to the individual patient's needs, fracture specifics, and overall health condition. These findings support the importance of personalized treatment planning in elderly patients with complex fractures, aiming to optimize recovery and functional independence while minimizing hospital-related risks.

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