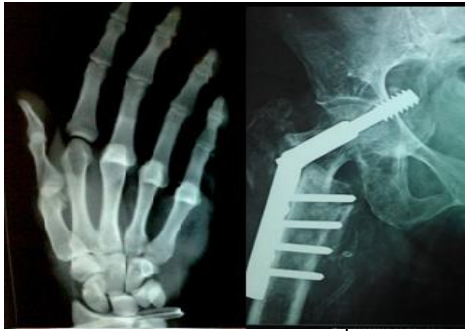




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Superiority of dynamic hip screw fixation over proximal femoral locking plate in treating stable intertrochanteric fractures

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Abstract

Background: Intertrochanteric fractures in the elderly pose a significant clinical challenge, frequently resulting in extended disability and increased mortality rates. Determining the most effective fixation method to promote early mobilization and minimize complications is therefore a critical concern. This study aims to determine the superiority of the Dynamic Hip Screw (DHS) over the Proximal Femoral Locking Plate (PFLP) in the management of these fractures.

Methods: A prospective, comparative study was conducted at Orthopedic Department from 2020 to 2024. This research focused on a select group of 18 cases, all above the age of 60, with intertrochanteric fractures. These cases were classified into two groups: Group A (PFLP), and Group B (DHS). Hip Rating Score was used to assessed outcomes. Follow-up assessments were conducted at predetermined intervals after the surgery. The initial evaluation took place the day after the procedure, followed by a second assessment at 14 days to observe early recovery and identify any immediate complications. The final evaluation was performed at three months to assess long-term outcomes.

Results: The preoperative analysis for both arms shown no significant differences in age, symptoms, hospital stay, anticoagulant drugs, and energy trauma. A significant difference in the duration of operation, with Group A longer duration than Group B ($P=0.02$). Group B reported a quick recovery as a statistically significant faster time to starting weight bearing ($P=0.01$). HRS between Group A and Group B, showed no significant overall in mean scores. For Group A, most fractures in good HRS more than Group B. Group B more excellent than A, with a significant difference in fracture stability and fixation technique ($p=0.01$). Both groups showed the same rate of varus deformity. Cases of Group A experienced pain doubled than Group B.

Conclusions: Both proximal femoral locking plate (PFLP) and dynamic hip screw (DHS) fixation methods yielded comparably favorable outcomes in the treatment of stable intertrochanteric fractures. However, DHS demonstrated certain advantages, including reduced operative time and a lower incidence of postoperative complications such as infections and hip discomfort which superior to PFLP.

Keywords: Intertrochanteric fractures, proximal femoral locking plate (pflp), dynamic hip screw (dhs), geriatric orthopedic surgery, functional outcomes

Introduction

Intertrochanteric fractures, which are extracapsular breaks of the proximal femur located between the greater and lesser trochanters, are most commonly seen in the elderly population [1]. These injuries significantly contribute to both morbidity and mortality among older adults, making them a major public health issue [2, 3]. Annually, millions of individuals suffer from trochanteric fractures, placing a considerable strain on healthcare systems globally [4, 5].

The leading risk factor for intertrochanteric fractures is osteoporosis, a condition that greatly increases bone fragility. By 2025, it is projected that osteoporosis-related fractures will reach around 3 million annually in the United States, incurring healthcare costs estimated at \$25.3 billion [6]. Most intertrochanteric fractures occur in individuals over 65 years of age, who frequently present with multiple comorbidities, further amplifying the financial burden on healthcare systems [7].

These fractures are associated with high morbidity and an alarming 27% mortality rate within the first year following surgery [8, 9]. As the elderly population continues to grow, the incidence of intertrochanteric fractures is expected to rise sharply, highlighting the pressing need for effective treatment strategies to reduce both the clinical and economic impact [10, 11].

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This study aims to compare the clinical and functional outcomes of two surgical fixation methods—Proximal Femoral Locking Plate (PFLP) and Dynamic Hip Screw (DHS)—in the treatment of intertrochanteric fractures in elderly patients, with a particular focus on differences in performance between stable fracture patterns and to determine which method offers superior postoperative results, shorter operative time, and fewer complications, especially in cases of unstable fractures.

Methods

Study Design

A prospective, comparative study was conducted at Orthopedic Department from 2020 to 2024. This research focused on a select group of 18 cases, all above the age of 60, with intertrochanteric fractures. These cases were classified into two groups: Group A (PFLP), and Group B (DHS).

Inclusion Criteria

- Intertrochanteric fractures stable types.

Exclusion Criteria

- Open fractures.
- Unstable fractures.
- Loss of follow-up

Ethical approval

The Medical Ethical Committee of The Department of Orthopedic, Abu-Graib General Hospital approved this study.

Assessment

1. Preoperative

- Mechanism of Trauma (low or high energy).
- Symptoms: pain, bear weight disability, swelling and bruises.
- Hospital stay: >48 hours.
- Anticoagulant treatment.
- Knee joint trauma.

2. Intraoperative

- I.V. Antibiotic

- Anesthesia (general or spinal anesthesia)
- Assess complications.
- Blood transfusion.

3. Postoperative

- Weight bearing time
- Anticoagulant treatment

4. Complications

Which are varus deformity, wound infection, pain, implant cutout and infected non-union.

5. Hip Rating Score

It served as the main instrument for assessing patient outcomes, covering a range of factors including pain levels, functional ability, mobility, and the capacity to resume daily activities. The scoring system is divided into categories that indicate symptom severity and recovery progress: poor (below 16), fair (16-24), good (24-31), and excellent (above 31).

Follow-Up

Follow-up assessments were conducted at predetermined intervals after the surgery. The initial evaluation took place the day after the procedure, followed by a second assessment at 14 days to observe early recovery and identify any immediate complications. The final evaluation was performed at three months to assess long-term outcomes, such as implant stability, functional mobility, and the presence of any late-onset complications.

Statistical analysis

Statistical analysis was conducted using SPSS version 24. The chi-square test was employed to compare the outcomes between the two groups, with a $P < 0.05$ regarded as statistically significant.

Results

The preoperative analysis for both arms shown no significant differences in age, symptoms, hospital stay, anticoagulant drugs, and energy trauma, Table (1).

Table 1: Analysis of preoperative assessment.

Variables		Group A (PFLP)	Group B (DHS)	P-value
		No. (%)		
Age	Mean ±SD	65.2±5.8	66.1±7.9	0.3
Mechanism of injury (energy)	Low	9 (100)	9 (100)	NA
	High	-	-	
Symptoms	Pain	9 (100)	9 (100)	NA
	WBD	9 (100)	9 (100)	NA
	Swelling	5 (55.6)	7 (77.8)	0.7
	Bruises	5 (55.6)	4 (44.4)	0.4
Hospital stay (hours)	<48	4 (44.4)	6 (66.7)	0.2
	>48	5 (55.6)	3 (33.3)	
Anticoagulant drugs		5 (55.6)	5 (55.6)	1

Table (2) showed intra to postoperative assessment between both arms. A significant difference in the duration of operation, with Group A longer duration than Group B

($P=0.02$). Group B reported a quick recovery as a statistically significant faster time to starting weight bearing ($P=0.01$).

Table 2: Intra to postoperative assessment.

Variables	Group A (PFLP)	Group B (DHS)	P-value
	No. (%)		
Duration (hours)	1 and ½	1	0.02
Weight bearing time (months)	7	6	0.01
Anticoagulant drugs	9 (100)	9 (100)	NA

Table (3) showed HRS between Group A and Group B, with no significant overall difference in mean scores.

Table 3: HRS at 3 months postoperative follow-up.

HRS	Group A (PFLP)	Group B (DHS)	P-value
	mean±SD		
Mean	25.5+6.3	26.8+4.9	0.1
Stable fractures	29.1+1.8	29.3+3.6	0.1

Table (4) HRS by fracture type and fixation method in two groups. For Group A, most fractures in good more than Group B. Group B more excellent than A, a significant difference in fracture stability and fixation technique that affect recovery ($p=0.01$).

Table 4: HRS of each modality of fixation

Group	Poor (<16)	Fair (16-23)	Good (24-31)	Excellent (>31)
	No. (%)			
A	1 (5.6)	1 (5.6)	6 (33.3)	1 (5.6)
B	-	2 (11.1)	4 (22.2)	3 (16.7)
P-value	0.01			

Table (5) listed the complications postoperative. Both groups showed the same rate of varus deformity. Cases of Group A experienced pain doubled than Group B.

Table 5: Complications postoperative.

Complications	Group A (PFLP)	Group B (DHS)	P-value
	No. (%)		
Varus deformities	1 (11.1)	1 (11.1)	0.4
Infection	-	-	
Pain	4 (44.4)	2 (22.2)	
Implant cutout	-	1 (11.1)	
Infected non-union	1 (11.1)	-	

Discussion

The management of intertrochanteric fractures in the elderly remains a central focus in orthopedic research, given the need for this population to return quickly to pre-injury levels of daily function. Prompt and effective treatment is essential not only to minimize systemic, local, and psychological complications associated with such injuries but also to avoid the negative consequences of prolonged immobility. These risks can be significantly reduced through the use of rigid internal fixation methods combined with early mobilization.

The demographic characteristics of patients in both groups were largely comparable, ensuring that outcomes were not influenced by age-related variations in recovery. All patients sustained their injuries through low-energy falls—a frequent occurrence in the elderly due to factors such as vertigo, reduced visual acuity, or minor accidents—with no associated life-threatening injuries or neurovascular damage. These findings are consistent with those of Agrawal *et al.*, although our study exclusively targeted a geriatric population, highlighting the age-specific implications of such fractures [12].

Group A experienced longer surgical durations, indicating greater intraoperative complexity compared to Group B. This supports the preference for DHS in situations where minimizing operative time and blood loss is a priority, a conclusion also drawn by Agrawal *et al.* [12]. The time to weight-bearing differed between groups, with stable fractures allowing earlier mobilization. This underscores the significance of both fracture stability and fixation rigidity in planning rehabilitation. Our findings align with the growing

consensus favoring early mobilization, as reported by Grabmann *et al.* [13].

Functional outcomes, as assessed by the Harris Hip Score (HRS) during follow-up, revealed no significant differences between fixation methods for stable fractures. These results are consistent with those of Agrawal *et al.* [12] and Raj *et al.* [14], with the latter even reporting superior outcomes for PFLP compared to DHS.

Postoperative local complications occurred at comparable rates across both groups, echoing trends seen in previous studies [12].

The prognosis for intertrochanteric fractures in elderly patients—whether treated with a proximal femoral locking plate (PFLP) or a dynamic hip screw (DHS)—depends on a multifactorial interplay. Key determinants include the type of fixation used, fracture stability (stable vs. unstable), existing comorbidities, pre-fracture activity level, knee joint status, surgical precision, fixation rigidity, and the timing of both postoperative mobilization and weight-bearing initiation.

Conclusions

Both proximal femoral locking plate (PFLP) and dynamic hip screw (DHS) fixation methods yielded comparably favorable outcomes in the treatment of stable intertrochanteric fractures over a three-month follow-up period. However, DHS demonstrated certain advantages, including reduced operative time and a lower incidence of postoperative complications such as infections and hip discomfort.

Conflict of Interest

Not available

Financial Support

Not available

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