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Original Research Article

Comparison of PFN and DHS for Intertrochanteric Fractures: A Retrospective Study of Outcomes in Patients Undergoing PFN vs. DHS (Dynamic Hip Screw) for Intertrochanteric Fractures, Including Complications, Functional Outcomes, and Mortality Rates

Vivekanand[1], Mohit Kumar[2], Kumar Anshuman[3]

[1]PG-3, Department of Orthopedics, Narayan Medical College and Hospital Sasaram
[2]Assistant Professor, Department of Orthopedic, Narayan Medical College and Hospital, Sasaram
[3]Professor and Head Department of Orthopedic, Narayan Medical College and Hospital, Sasaram

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Corresponding author: Dr. Vivekanand
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Abstract

Background: Intertrochanteric fractures are a frequent form of hip fracture, especially in the elderly group of the population, and are characterized by high morbidity and mortality. Surgery treatment is necessary so that premature mobilization and the minimization of complications can be achieved. Proximal Femoral Nail (PFN) and Dynamic Hip Screw (DHS) are some of the most popular methods of fixations, but the effectiveness of these techniques is still a controversial issue.

Methods: This retrospective observational study, which was done in Narayan Medical College and Hospital, Sasaram, between January 2025 to July 2025. The total of 68 were included and was split into two categories PFN (n=34) and DHS (n=34). Operative parameters, functional outcome by means of the Harris Hip Score, complications and mortality rates were analyzed in the data.

Results: The average surgical time in PFN group (65.3 ± 10.4 minutes) was much less than in DHS group (78.6 ± 12.1 minutes). The PFN group (145 ± 30 ml) versus the DHS group (210 ± 45 ml) also differed with regards to intraoperative blood loss. The average Harris Hip Score in PFN group (85.6 ± 6.8) was more than that of DHS (78.9 ± 7.5). Complication rates were lower in the PFN group, with infection observed in 5.9% versus 11.8% in the DHS group, and 2.9% versus 8.8%, being the incidence of implant failure respectively. The PFN group had a mortality rate of 5.9% and DHS had 11.8%.

Conclusion: PFN has shown better results in relation to operative parameters, functional recovery, and complication rates than DHS, and it is a better alternative especially in unstable intertrochanteric fracture.

Keywords: Complications, Dynamic Hip Screw (DHS), Functional outcome, Intertrochanteric fracture, Mortality, Proximal Femoral Nail (PFN).

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Introduction

Intertrochanteric fractures are extracapsular fractures of the proximal femur that take place between the greater and lesser trochanter [1]. The most frequent type of hip fracture, and they are normally related to low-energy trauma like falls in the elderly population but people of younger age can get them due to high-energy trauma.

These fractures may have a high level of instability and may need urgent surgical treatment to ensure mobility and avoid complications due to the anatomical position and the cancellous bone affected. The intertrochanteric fracture epidemiology reflects the global tendency towards an aged population [2]. Older people (those who are not menopausal women mostly) are especially prone to it because of osteoporosis that makes the bones weak and prone to fractures despite the minimal trauma [3,4]. As life expectancy increases, the number of such fractures is bound to increase considerably, and it is a significant issue in the field of public health [5]. These fractures have been linked to high morbidity, decrease in quality of life, and high healthcare expenditure.

Intertrochanteric fractures are clinically very important since they affect patient mobility and independence to a large extent [6,7]. When untreated, they may result in long-term immobilization, which predisposes them to the

risks of developing complications as noted by deep vein thrombosis, pulmonary embolism, pressure ulcers, and respiratory infections [8]. Besides, these fractures lead to a high mortality rate especially during the first year after injury, which is largely due to comorbid conditions and postoperative complications in the elderly.

The standard of care is surgical treatment, and two popular methods of fixation include the PFN and DHS [9,10]. PFN is an intramedullary device with the benefit of biomechanical advantages including shorter lever arm and better distribution of loads, and therefore it is more suitable in unstable patterns of fractures [11]. Conversely, DHS is an extramedullary apparatus, which has been in use over the decades and is considered to be efficient and affordable particularly on stable fractures [12]. Regardless of the popularity of both practices, there is still a debate on its comparative effectiveness especially on functional outcomes, complications, and mortality.

Objectives

- To compare the functional outcomes of patients operated with PFN and DHS with the Harris Hip Score.
- To compare and contrast the intraoperative outcomes like the duration of surgical operation and blood loss with PFN and DHS.
- To determine the occurrence of postoperative complications, such as infection, implant failure, and malunion/nonunion in the two groups.

Materials and Methods

Study Design: This retrospective observational research strategy intended to compare and contrast the results of two primarily used surgical procedures PFN and DHS when it comes to treating intertrochanteric fractures. The retrospective quality of the research was the review of patient data recorded in the past in order to evaluate clinical and functional outcomes.

Study Setting: The research was held in Narayan Medical College and hospital, Sasaram, a tertiary care facility that handles a large number of population and regularly receives cases of orthopedic traumas, including hip fractures.

Study Duration: The patients that were included in the study were treated during a duration of seven months, between January 2025 and July 2025. In this period, all the cases of intertrochanteric fractures that were eligible to be handled through surgical procedures using either PFN or DHS would be included.

Sample Size: The study involved 68 patients and these patients were separated into two groups according to the surgical intervention performed which included the PFN group and the DHS group. The two groups were allocated the exact number according to the number of available surgical records.

Inclusion Criteria: The patients were selected according to the following criteria like adults with intertrochanteric fractures, surgery with PFN or DHS, and complete and available medical history with follow-up data required to assess the outcomes.

Exclusion Criteria: The exclusion criteria were the presence of pathological fractures, polytrauma with many injuries, or a previous hip surgery in the patients since they might confound the results of the surgical measures.

Data Collection: Hospital medical records and operative notes were used as the sources of data.

The demographic factors that were noted were age and gender, fracture type, the kind of surgery that is done, the length of surgery and the amount of intraoperative blood loss. All the information was recorded and tabulated to analyze it.

Outcome Measures: Functional outcome was the main outcome measure and it was evaluated by the use of Harris Hip Score. Postoperative complications (surgical site infection, implant failure, and malunion or nonunion of the fracture) constituted the secondary outcome measures. The mortality rates were also noted and compared in the follow-up period in the two groups.

Statistical Analysis: The statistical analysis was done using the standard software SPSS. The independent t-test was used to analyse continuous variables whereas the Chi-square test was used to compare categorical variables. Any p-value less than 0.05 was taken as statistically significant.

Results

The sample size of the study was 68 intertrochanteric fracture patients who were grouped into two categories according to the nature of the surgical procedure applied on them PFN and DHS. The results have been compared based on demographic variables, operative parameters, functional outcomes, complications and mortality rates.

Demographic Data: The patient population of the two groups was similar. Most of the patients were aged at the elderly age group with a mean of 67.4 ± 8.2 years in the PFN group and 68.1 ± 7.9 years in the DHS group. Majority of the fractures were noticed in patients older than 60 years of age. The gender representation was female dominated in both groups which shows that older women experience more incidence of osteoporosis.

Table 1: Demographic Characteristics of Patients

Parameter	PFN Group (n=34)	DHS Group (n=34)
Mean Age (years)	67.4 ± 8.2	68.1 ± 7.9
Age > 60 years	26 (76.5%)	27 (79.4%)
Male	14 (41.2%)	13 (38.2%)
Female	20 (58.8%)	21 (61.8%)

Operative Parameters: The parameters of the operation showed that the PFN group took a shorter time of operation and less intraoperative blood loss than the DHS group. The average time that the patients in the PFN required was 65.3 ± 10.4 minutes and the average time that the patients in the DHS took was 78.6 ± 12.1 minutes. Mean blood loss was also less in PFN (145 ± 30 ml) group than in DHS (210 ± 45 ml) group.

Table 2: Operative Parameters

Parameter	PFN Group (n=34)	DHS Group (n=34)
Duration of Surgery (min)	65.3 ± 10.4	78.6 ± 12.1
Blood Loss (ml)	145 ± 30	210 ± 45

Functional Outcomes: The Harris Hip Score was used to determine functional outcome at the follow up period. The PFN group performed better in functional results with a mean score of 85.6 ± 6.8 than that of 78.9 ± 7.5 in the DHS group. The percentage of patients with excellent and good outcomes was higher in the PFN group.

Table 3: Functional Outcome (Harris Hip Score)

Outcome Category	PFN Group (n=34)	DHS Group (n=34)
Excellent (>90)	12 (35.3%)	7 (20.6%)
Good (80–89)	15 (44.1%)	13 (38.2%)
Fair (70–79)	5 (14.7%)	9 (26.5%)
Poor (<70)	2 (5.9%)	5 (14.7%)

Complications: The total complication was lesser in PFN group than in DHS group. There were 2 PFN patients (5.9%) and 4 DHS patients (11.8%) with infections. In PFN group, the rates of failure of implants were 1 (2.9%) and in DHS group the rates were 3 (8.8%). Reoperation had to be done in 1(2.9%) patient within the PFN group and 3 (8.8%) patients within DHS group.

Table 4: Complications

Complication	PFN Group (n=34)	DHS Group (n=34)
Infection	2 (5.9%)	4 (11.8%)
Implant Failure	1 (2.9%)	3 (8.8%)
Reoperation	1 (2.9%)	3 (8.8%)

Mortality Rates: The PFN group had slightly low mortality rates during the follow-up period. Two patients (5.9%) in PFN group and four patients (11.8%) in DHS group died within the period of the study. This was however not statistically significant.

Table 5: Mortality Rates

Outcome	PFN Group (n=34)	DHS Group (n=34)
Mortality	2 (5.9%)	4 (11.8%)

Overall, the findings show that PFN could be beneficial compared to DHS regarding shorter operating time, less blood loss, improved functional outcome, and fewer complications, even though some of them were not statistically significant.

Discussion

The current study was conducted to compare the clinical and functional results of PFN and DHS in intertrochanteric fracture treatment.

The results of the current study indicate that PFN is linked to considerably positive perioperative and postoperative results as opposed to DHS. PFN-treated patients had a shorter operational time, decreased intraoperative bleeding, better functional outcome assessed by Harris Hip Score, and fewer complications. The findings indicate that PFN offers a more efficient and effective fixation mode especially in the unstable fracture pattern where biomechanical stability is paramount. The positive results of the PFN group place emphasis on the benefits of intramedullary fixation techniques in

facilitating early rehabilitation and minimizing the morbidity of the subjects.

Comparison with Previous Studies: The results of the current study are similar to some previous published studies that have shown better results of PFN than DHS. [13] have emphasized that PFN, due to its minimally invasive insertion method, causes less soft tissue injury, shortened surgery time, and intraoperative blood loss. Moreover, PFN enables the earlier weight-bearing and the use of mobilization which is especially critical in elderly patients because they are especially prone to complications associated with the long-term immobilization, including the development of deep vein thrombosis, pulmonary infections, and pressure ulcers [14]. DHS is an extramedullary fixation technique so it demands more exposure of the surgical area and more dissection of the soft tissue which can lead to more blood loss and increased operating time [15]. In spite of such restrictions, DHS is a good and commonly used technique of fixation particularly in the fixation of stable intertrochanteric fractures because it is not only simple and cheap, but is also clinically used over a long period of time.

Biomechanical and Surgical Considerations: The differences in biomechanical characteristics and surgical methods are a major cause of the differences in clinical outcome between PFN and DHS. PFN is an intramedullary appliance that locates on the mechanical axis of the femur and may permit an ideal distribution of loads as well as minimizing the flexion of the implantation. This design has a higher mechanical stability especially when the fracture is not stable and the chances of the implant failure are minimized. However, DHS is an extramedullary load bearing device with a longer lever arm, which may augment the stress on the implant and predisposes it to complications like screw cut-out and fixation failure especially in osteoporotic bone.

Clinical Implications: Clinically, this study has indicated that PFN is a treatment mode of choice that can be recommended to elderly patients with unstable intertrochanteric fractures. This has been made possible by the capability of creating stable fixation with minimal surgical trauma that results in early mobilization which is important in minimizing postoperative morbidity and mortality in this high-risk group. Early weight-bearing is not only functional recovery but it also reduces the chances of complication of long bed rest. However, DHS has a significant place in the treatment of solid fractures, especially in the resource-constrained environment when the cost factor and skill level of the surgeon might factor into the implant selection. Thus, the choice of the fixation technique may be personalized depending on the fracture type, the condition of the patient, and the healthcare resources.

Limitations of the Study: The sample size was comparatively small (n=68) and this could have an impact on the statistical power and restrict the extrapolation of the results to a larger population. The retrospective study design creates an opportunity of selection bias and having dependability on the accuracy of data recorded. Also, the duration of the follow-up was not so long, which limits the analysis of the long-term outcome, including the duration of implants, late complications, and functional status in the long-term. These findings should be proven and extended by future research which is more efficiency in terms of sample size, prospective and follow up.

Conclusion

This study shows PFN to have superior functional outcomes, reduced operating time, less intraoperative bleeding, and decreased complication rates than DHS in intertrochanteric fractures treatment, especially in the unstable cases. All these benefits make PFN a better surgical choice in old age patients who need early mobilization.

However, DHS remains a predictable, easy, and cost-effective approach, particularly in the case of constant fracture patterns and in limited resource environments.

The choice of the correct implant should thus be a personalized one, and it should consider the level of fracture stability, the characteristics of the patient and the resources available at the institute.

Recommendations: In accordance with the results of this study, it can be suggested that bigger multicenter studies with a longer follow-up should be done to confirm these findings. It would be better to have prospective randomized controlled trials in the comparison of PFN and DHS. Also, the long-term functional outcome, cost-effectiveness analysis, and quality of life measures should be considered in the future research to inform the clinical decision-making process more successfully.

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