IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 6 Ser.12 (June. 2023), PP 31-39
www.iosrjournals.org

Functional Outcomes of PFN Fixation In Elderly Patients With Intertrochanteric Fractures: A Prospective And Retrospective Observational Study

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Abstract:
Introduction:
Intertrochanteric Femur Fractures Are Common In The Elderly And Can Have Significant Morbidity And Mortality. While Dynamic Hip Screws Are Commonly Used For Stable Fractures, Intra-Medullary Nailing With The Proximal Femoral Nail (PFN) Is Becoming More Popular. The Purpose Of This Study Was To Evaluate The Outcomes Of PFN In The Treatment Of Intertrochanteric Femur Fractures.
Material And Methods:
The Study Included 40 Patients With Intertrochanteric Femur Fractures, With Approval From The Zydus Hospital Institutional Ethics Committee. Patients With Unstable Fractures And Over 65 Years Old Were Included, While Those With Stable Fractures, Previous Hip Implant, Or Under 65 Years Old Were Excluded. All Patients Received Pre-Operative Care, Complete Blood Work, And Imaging. Intraoperative Care Included Prophylactic Antibiotics And Reduction Through Traction And Internal Rotation. All Patients Were Treated With A Proximal Femoral Nail Implant. Post-Operative Care Included Clinical Assessment, Prophylactic Antibiotics, And Pain Management.
Results:
In The Study, 40 Patients Over 65 Years Old With Intertrochanteric Femur Fractures Were Examined, With A Fairly Even Distribution Between Genders. The Majority Of Patients Were In The 75-84 Age Group And Had A Healthy Weight Or Were Overweight. Most Fractures Were Caused By Low Velocity Trauma Due To Osteoporosis, And The Right Side Was More Commonly Affected. X-Rays Showed The Neck Shaft Angle To Be Between 125-130 For Most Patients. The Average Surgery Time Was 80 Minutes, And The Hospital Stay Was Around 7 Days.
Conclusion:
The Harris Hip Score Showed That PFN Had Better Functional Outcomes Than Other Devices For Intertrochanteric Fractures. PFN Overcomes Challenges Associated With Traditional Treatment Techniques By Reducing Stress And Using More Proximal Distal Locking Screws. It Also Allows For Early Weight Bearing And Biomechanically Sound Structures. PFN Is A Secure And Reliable Option For Repairing Intertrochanteric Femoral Fractures, But Like Any Surgical Procedure, It Carries Some Risks And Requires Careful Analysis Before Use.

Date of Submission: 15-06-2023 Date of Acceptance: 25-06-2023

I. Introduction

Intertrochanteric fractures are most common extracapsular proximal femur fractures which occurs between the greater and lesser trochanters. The femur's intertrochanteric region, which lies between the larger and lesser trochanters, is made of dense trabecular bone. The vastus lateralis originates from the greater trochanter, which also acts as the attachment point for the gluteus medius, gluteus minimus, obturator internus, and piriformis. For the iliacus and psoas major, also known as the iliopsoas, the lesser trochanter acts as their point of attachment. (1) The vertical wall of dense bone known as the calcar femorale runs from the posteromedial aspect of the femur shaft to the back of the femoral neck. The stability of a fracture is determined by its structure, which makes it crucial. In comparison to fractures of the femoral neck, the large metaphyseal region has a better union rate and less osteonecrosis because of its enormous blood supply. (2)

The incidence of hip fractures in the elderly, particularly intertrochanteric fractures, will continue to rise due to greater frequency of osteoporosis and already accounting for 55% of proximal femoral fractures with

an increase in life expectancy and the worldwide old population. (3) Intertrochanteric femur fractures are also associated with high fatality and disability rates, resulting in a huge burden on the economy and on society. (4, 5)Patients with intertrochanteric femur fractures are encouraged to ambulate as soon as possible to reduce the risk of complications and mortality. (6)

Extramedullary fixation with a dynamic hip screw (DHS), percutaneous compression plate (PCCP), Medoff sliding plate, proximal femoral locking compression plate, less invasive stabilization system, or intramedullary fixation with Gamma nail, proximal femoral nail (PFN), and proximal femoral nail anti-rotating are various modalities employed for the treatment of intertrochanteric fractures aiming towards early mobility and reduced risk of re-operation. (7, 8, 9)

There is always a chance of general problems in the aged, but especially a chance of losing independence and, specifically, the ability to walk. To prevent the major consequences linked to decubitus, the chosen treatment should provide verticalization and early seating. (10) In order to prevent recovery from being hampered by treatment, as minimum shock, operation time, and blood loss should be required. The greatest way to preserve walking ability is to allow for the resumption of unrestricted weight bearing. (11)

The dynamic hip screw is generally accepted as gold standard surgical treatment of stable trochanteric fractures (AO classification type A1) (DHS). However, this kind of attachment is biomechanically inferior to intramedullary implants since the proximal femur bears most of its weight through the calcar femorale which is a significant disadvantage in unstable trochanteric and subtrochantric fractures. (12) An effective treatment for trochanteric fracture is intra-medullary nailing whichrecently has grown more popular than screw-plate fixation due to the improvement of positioning instrumentation, preference for minimally invasive insertion, and mechanical advantage inherent to intra-medullary material in complex fracture. With the anti-rotational hip pin present to lessen the likelihood of implant cut-out and the nail tip having a smaller diameter and a specific design to reduce stress and, as a result, low energy fracture at the tip, PFN has been devised to overcome a number of drawbacks. (13) There always have been a consensus about PFN implant which may be a more biomechanically acceptable implant for trochanteric fractures. Hence, the purpose of this study was to evaluate the outcome of PFN in the treatment of intertrochanteric femur fractures.

II. Material and method

A combined prospective and retrospective, observational, time bound study was conducted on 40 patients with intertrochanteric femur fracture admitted in the Department of Orthopaedics at Zydus Hospital between June 2017 and May 2019.Prior to the start of the study, Zydus Hospital Institutional Ethics Committee clearance was obtained with approval number SDUMC/KLR/IEC/156/2019-2020.

Patients with Type A31A2 and A31A3 (unstable intertrochanteric femur fracture) as per AO classification [11] and age more than 65 years were included. Patients with a stable type of fracture, expired before final follow-up, compound fractures with age of less than 65 years, and previous implant in the injured hip were excluded.

Instrument and Implant:

Length of short PFN - 135^0	25 cm
Length of Long PFN - 135^0	32,34,36, 38, 40, 42 cm
Proximal diameter	15 mm
Proximal nail angulation	6^0
Distal diameter	9, 10, 11,12 mm
Lag screw diameter	8 mm
Derotation screw diameter	6.4 mm
Distal locking bolt	4.9 mm
Jig for proximal and distal reamers & for locking Guide wire Cannulated step reamer Guide wire sleeve & drill sleeve	

Initial Management and Pre-operative care

All patients were given a clinical examination when they arrived at the hospital's Out Patient Department (O.P.D.) or Casualty, which included checking for echymosis, limb length discrepancy, limb attitude, and related bone injuries. To evaluate the cardiovascular, pulmonary, and central nervous systems, a quick systematic examination was conducted. Pulse, blood pressure, and respiration rate were recorded as vital signs. Resuscitation was performed until the patient became hemodynamically stable if the patient was hemodynamically unstable upon presentation due to concomitant trauma. In AP view, radiographs of the patient's pelvis with both hip joints were taken. Clinical and radiological examinations were used to confirm the

patient's diagnosis. The injured limb was placed in ankle traction for temporary immobilisation, to lessen pain and spasm, and to keep the limb's length.

All patients underwent a complete blood count, blood grouping, and Rh typing, as well as aPTT, PT with INR, urine analysis, HIV, HBsAg, and HCV testing, renal and liver function checks, electrocardiograms, 2D echocardiograms, and chest X-rays.

Intraoperative Care

All patients were prophylactically started on intravenous injections of the antibiotics cefoperazone and sulbactum 30 minutes before to surgery. To provide room for the c-arm to fit between the legs, the opposing limb was fully abducted and the working leg was placed in traction. With some adduction or abduction as needed, reduction was mostly achieved through traction and internal rotation. An anterior-posterior and lateral view were used to assess reduction under the c-arm. If reduction is difficult to achieve, the proximal fragment is controlled by a unicortical 5mm threaded joystick, or restricted open reduction is used, in which the anterior proximal fragment is moved from anterior to posterior with a bone lever or by proximal femoral nail assembly after draping.

Surgical Procedure

All patients were treated with proximal femoral nail implant. At the greater trochanter's tip, a lateral incision measuring 5 cm was made; the length of the incision varies depending on the patient's size. Little muscle attachments were removed after palpating the greater trochanter's tip. A tissue protector was used to insert the guide wire. In AP and lateral views, the guiding pin's position was examined. Using a 15mm entrance point, the entry point was reamed. Where necessary, graded cannulated reamers should be used to ream and distal ream canals. The jig was used to insert the measured nail over the guiding wire. Hand twisting motions were used to gently insert the nail and the jig. The drill sleeve is connected to the jig once the nail has been properly positioned on the guide wire and is then taken out. Guide pins are advanced up to 10 mm short of the articular surface of the femoral head through a stab incision made over the lateral thigh. The screw's inferior guide wire was inserted through the calcar femorale in the AP view. In lateral view, the screw's two guide pins were placed slightly posterior to the head and neck's midline. Next, an 8.0 mm proximal locking compression screw is applied.

For short PFN, distal locking was carried out using a jig. The ultimate position of the nail was confirmed in the C-arm in both views, the long PFN was distal fastened using a free hand approach, and the wound was closed in layers without a drain.

Post-operative care

Clinical assessment was used to analyse limb length discrepancy and rotational mal-alignment following surgery. The limb was elevated on a pillow, and patients were kept under observation in the ICU until stable. Post-operative x-rays at the neck shaft angle of the pelvis with both hips were taken and compared with the unaffected side. Prophylactic antibiotics were given for 12 days after surgery. Initially, for the first three to five post-operative days, intravenous antibiotics were given, after which oral antibiotics were given for the next few days. Oral or intravenous analgesia was also used to minimise pain.

Starting on the second or third postoperative day, static quadriceps strengthening activities were performed. When the third postoperative day came around, the drain, if used, was afterwards taken out. Ten to fourteen days later, the sutures were taken out. As soon as the localised discomfort or overall patient status allowed, the patients were mobilised without assistance.

All patients were followed up at 12 days, 1st month, 2nd month, 3rd month, 4th month, 6th month, 12th month (Final).

At each follow up patients were assessed clinically and functionally for pain, limp, support and range of movements and weight bearing were advised accordingly. Radiological assessments were done to know fracture union, position of implant, position of fragment.

The patients underwent follow-up visits scheduled at 12 days, 1 month, 2 months, 3 months, 4 months, 6 months, and 1 year following the procedure, or earlier if required. The patient underwent a Harris Hip Score evaluation based on the Harris Hip Score Questionnaire (14) at every visit.

The HHS, which takes into account aspects including pain, joint function, deformity presence or absence, and range of motion, determines the ultimate outcome. The level of pain, its impact on daily activities, and the need for painkillers are all measured in the area of pain. Daily tasks like using stairs, taking public transportation, sitting, tying/managing shoes and socks, and gait are included in the domain's function portion (limp, support needed, and walking distance). Hip flexion, adduction, internal rotation, and disparity in extremity length are among the factors that deformity considers. Hip flexion, abduction, adduction, external rotation, and internal rotation are all measured by range of motion.

The HHS score has a maximum possible value of 100. Range of motion is given 5 points, deformity 4 points, function 47 points, and pain 44 points. The dysfunction decreases as HHS increases. A total score of less than 70 is seen as a poor performance; 70 to 80 is regarded as acceptable; 80 to 90 is good; and 90 to 100 is regarded as superb. Data were entered into a Microsoft Excel datasheet, and SPSS 22 version software was used for analysis (IBM SPSS Statistics, Somers NY, USA). For the Chi-square test to determine whether qualitative data was significant, Data visualisation: MS Word and Excel were used to create numerous graph forms, including bar and line diagrams. Data were analysed using statistical tools, MS Excel, and SPSS version 22, and a P-value < 0.05 was deemed statistically significant.

III. Results:

The study involved 40 confirmed cases of intertrochanteric femur fractures with more than 65 years of age with either sex were enrolled in the study. The demographic details of the patients were shown in table no: 1. Out of 40 patients, 11 (27.5%) patients were 66-74 years of age group, 19 (47.5%) patients in 75-84 years of age group, 8 (20%) patients in 85-94 years age group while only 2 (5%) patients were more than 95 years of age. The male patients were 19 (47.5%) while female patients were 21 (52.5%) who enrolled in the study. Most number of patients were having healthy weight or overweight category based on their BMI data. Out of 40 patients, 15 (37.5%) patients were well nourished, 19 (47.5%) moderately malnourished while 06 (15%) were severely malnourished. The patients were also reported with co morbidity. Most common co morbid condition in patients were hypertension (70%), Diabetes (30%) and Ischemic Heart Disease (17.5%).

Table 1: Demographic details of the patients

Parameters	No. of Patients (n=40)
Age	
66-74	11 (27.5)
75-84	19 (47.5)
85-94	8 (20)
95+	2 (5)
Gender	
Male	19 (47.5)
Female	21 (52.5)
BMI	
Underweight (<18.5)	6 (15)
Healthy weight (18.5-24.9)	15 (37.5)
Overweight (25-29.9)	14 (35)
Obese (>30)	5 (12.5)
Nutritional Status	
Well nourished	15 (37.5)
Moderately malnourished	19 (47.5)
Severely malnourished	06 (15)
Co-Morbidity	
Hypertension	28 (70)
Diabetes	12 (30)
Ischemic Heart Disease	7 (17.5)
Cerebrovascular Accident	6 (15)
Repiratory Disease	4 (10)
Renal Disease	2 (5)

Most intertrochanteric fracture (92.5%) occurred following low velocity trauma, largely due to osteoporotic bone in elderly. Patients sustained fracture following low velocity trauma such as fall in bathroom or stairs, fall from standing height, slippage while walking. 7.5 % of fractures occurred following high velocity trauma like vehicular accident as data shown in table no: 2. Out of 40 patients, the right side (67.5%) was more prone to get fractured compared to left side (32.5%) as per table no:2. The 15 (37.5%) patients were undergone 31A1 type of fracture, 20 patients (50%) with 31A2 and 5(12.5%) with undergone 31A3 type of fracture. The present study shows 55 % with Singh's index III, 27.5% with Singh's index II, 5 % with Singh's index I, and 2.5 % with Singh's index IV. The 2 patients were also associated with Colles' fracture along with proximal femoral nail.

Table 2: Fracture characteristic in proximal femoral nail

Parameter	**No. of Patients N (%)**
Cause of injury	
Domestic Fall	37 (92.5)
Traffic Accident	3 (7.5)
Side of Fracture	
Right	27 (67.5)
Left	13 (32.5)
Type of Fracture	
31A1	15 (37.5)
31A2	20 (50)
31A3	5 (12.5)
Singh's Index	
I	2 (5)
II	11 (27.5)
III	22 (55)
IV	5 (2.5)
V	0
VI	0
Associated Injuries	
Colles' fracture	2 (5)
Shaft Humerus Fracture	0
Clavicle Fracture	0
Wound	0

Table no: 3 shows the detail about size of proximal femoral nail used in male and females. In males 360*10 mm was the commonest size used while in females 320*9 mm was used most frequently. Long nail size was used for better lever arm and good mechanical force distribution.

Table 3: Size of Proximal Femoral Nail

Size (mm)	**Male**	**Female**	**Total N (%)**
250*9	0	2	2 (5)
320*9	0	8	8 (20)
340*9	0	2	2 (5)
340*10	0	5	5 (12.5)
360*9	1	2	3 (7.5)
360*10	7	1	8 (20)
360*11	2	1	3 (7.5)
380*10	3	0	3 (7.5)
380*11	3	0	3 (7.5)
400*10	3	0	3 (7.5)
Total	19	21	40 (100)

X-Ray study suggests that neck shaft angle between 125-130 in 19 (47.5%) patients and 21 (52.2%) patients for normal side and affected side respectively and remaining shaft angle were in the range of 131-135 in both the sides. (Table No: 4). the mean neck shaft angle was 129 in normal side and 131 in affected side.

Table 4: Comparison of shaft angle between normal side and post-operative affected side

Angle (in degree)	Normal side	Affected side
< 125	0	0
125-130	19 (47.5)	21 (52.5)
131-135	21 (52.5)	19 (47.5)
136-140	0	0
Mean Shaft angle	129	131

Limb length was decreased in only 2 (5%) patients while in other 38 patients no discrepancy were found. The maximum shaft angle variation was seen up to 5 degree from normal side as shown in Table No: 5

Table 5: Limb Length Discrepancy and neck shaft angle variation in patients

Limb length discrepancy	**No. of Cases (n=40)**
None	38 (95)
Shortening (less than 1 cm)	02 (5)
Shortening (1 cm and above)	0
Lengthening	0
Angle (in degree)	
0-2	13 (32.5)
3-5	27 (67.5)
6-10	0

In our study, screw placement achieved in calcar femorale (inferiorly) in 33 (82.5%) patients and in non calcar femorale in 7(17.5%) patients. Screw placed from calcar femorale (inferiorly), out of 33 patients 32 (96.96%) patients had good hold with no back out accounting while screw placed from non calcar femorale, out of 7 Patients 4 cases (57.14%) had good hold with no back out accounting.

Table 6: PFN Screw Placement and hold of screw

Screw Placement	**No. of Cases (n=40)**	**Number of screw backout**
Calcar femorale (inferiorly)	**33 (82.5)**	**01**
Non Calcar femorale	**07 (17.5)**	**03**

On completion of operation, only 2 (5%) patients had superficial infection. The average hospital stay was 7.7 (3- 33) days from date of admission to date of discharge. It varied in patients due to factors like co-morbid conditions. Maximum number of patients stayed in hospital for less than 10 days. 33 (82.5%) patients were discharged within 10 days after clean dressing, adequate mobilization, proper instruction and follow up in outpatient department for suture removal, 6 (15%) patients for 11-20 days and 1 (2.5 %) for more than 30 days in hospital due to associated injuries, systemic diseases and superficial wound infection. The average mortality rate was 7.5% in present study. It was 5% for less than 80 years of age and 10% for more than 80 years of age due to single or multiple co-morbidity. In present study, 02 patients died in 1 month from completion of operation, 3 patients from 1 month to 6 month and 1 patient after 6 month of completion of operation.

Table 7: Post-operative complications, hospital stay and mortality

Parameter	**N (%)**
Superfacial infection	02 (5)
Deep infection	00
Bed Sores	00
Hospital Stay	
<10 days	33 (82.5)
11-20 days	6 (15)
21-30 days	0
>30 days	1 (2.5)
Mortality	
<80 Years	02 (5)
>80 years	04 (10)
Time of Mortality	(n=6)
Date of operation to 1 month	02 (33.33)
1 month to 6 months	03 (50)

6 months to 12 months	01 (16.67)
Mortality along with co-morbid condition	(n=6)
Single	01 (16.67)
Multiple	05 (83.33)

The Harris Hip Score is a validated outcome measure used to assess hip function and is commonly used in clinical trials evaluating treatments for hip fractures. In this prospective randomized study, 40 patients with intertrochanteric fracture were randomized to receive a specific treatment approach. The results of this study show that the treatment approach used was associated with a high proportion of patients achieving excellent or good Harris Hip Scores. Specifically, 23 patients (57.5%) achieved an excellent score, indicating an asymptomatic hip joint and good function, while 8 patients (20%) achieved a good score, indicating mild symptoms and no need for further treatment.

Table 8: Harris Hip Score of patients

Score	No. of Cases (n=34)
Excellent(90-100)	23 (67.65)
Good(80-89)	8 (23.53)
Fair(70-79)	3 (8.82)
Poor(<70)	0

IV. Discussion

The orthopaedic community has identified fractures of the femur's intertrochanteric zone as a significant issue, not only for achieving fracture union but also for restoring maximal function in the shortest amount of time with the fewest consequences. Thus, the goal of fracture management has shifted to very early mobilisation, swift rehabilitation, and quick return of the person to pre-morbid home and work-like environment as a functional and psychologically independent unit. (15) Internal fixation is the gold standard treatment of choice for almost all fractures in the intertrochanteric region because it allows for extremely early rehabilitation and provides the best possibilities for functional recovery. The compression hip-screw is the most widely used (and still the gold standard) among the various types of implants available, including fixed nail plate devices, sliding nails or the screw plates, and intramedullary devices, but recently surgical techniques of closed intramedullary nailing have gained extremely high popularity. (16)

In the current study, we sought to assess the functional result of older patients who underwent proximal femoral nail treatment for intertrochanteric femur fracture. This study, which included 40 cases of intertrochanteric femur fractures repaired with proximal femoral nails and performed in the orthopaedics department of Zydus hospitals Ahmedabad, was both retrospective and prospective with12 months of follow-up, from June 2017 to May 2019.

The patients in our study were 79.25 years old on average. The majority of our patients (72.5%) were over 75 years old. The youngest and oldest patients ranged in age from 66 to 100. Males had a mean age of 77.31 years, and females had a mean age of 81.14 years. It was well evident that with advancing age, chances of getting an intertrochanteric femur fracture increase due to osteoporosis. (17) Similar observations pertaining to the age of patients with intertrochanteric femur fractures were respectively.made by Cengiz et al. and Ozkayn N et al. in their reported studies, where the mean age of the patients was 80.17 and 79.57 years. (18, 19) 19 patients in our study were men, and 21 patients were women, making up the bulk of the patient population. This imbalanced representation results from women experiencing intertrochanteric femur fractures more frequently than men. Compared to men, women have less bone mass and are more prone to osteoporosis, which causes the bones to become fragile and brittle and increases the risk of fractures. Moreover, the rapid loss of bone density brought on by the menopause-related fall in oestrogen levels increases the risk of fractures. (20, 21) In the study conducted by Konde SS et al., wherein out of the 25 patients included in the study, 11 were male and 14 were female, consistent results were seen. (22)

Due to slight variations in the structure or alignment of the hip and femur on the right side compared to the left side and because of right-side dominance, which may make the right side more prone to fractures, intertrochanteric femur fractures may occur more frequently on the right side than on the left side. In line with earlier published investigations, similar findings were found in our study. (23, 24)

The Singh index was utilised in the current investigation as a gauge of the severity of osteoporosis based on a radiographic examination of the proximal femur. As a result of their age, decreased bone density, and increased risk of osteoporosis, the majority of the patients in our study had lower Singhs Indexes. (25, 26) It was shown that 55% of the patients had a grade III Singhs Index, which is the most prevalent since it represents a common stage of osteoporosis in older persons and represents mild osteoporosis. The trabecular bone in the

femoral neck and proximal femur significantly gets thinned in this stage, although the cortex still remains intact, and 2.5% of patients had a grade IV Singhs index. Similar outcomes were attained in earlier investigations that were reported. (27) In older persons with osteoporosis or decreased bone density, the 31A2 form of intertrochanteric femur fracture is generally thought to be more common than other types of intertrochanteric fractures because it involves a stable fracture pattern with limited displacement of the femoral head and neck. The 31A2 type accounted for 52.9% of all intertrochanteric fractures in the research group, according to a 2019 study that was published in the journal Hip Pelvis. (28) The findings of our investigation, which showed that 50% of all patients hospitalised had 31A2 type fractures, whereas 37.5% of patients had 31A1 type fractures, and 12.5% had 31A3 type fractures, are consistent with the findings of a prior study. (29)

Intertrochanteric femur fractures are frequently fixed with a sliding hip screw or another implant after being reduced. To increase stability, load distribution across the hip joint, and to reduce stress on the lateral cortex of the femur, the implant is often positioned somewhat valgus. The intertrochanteric fracture neck shaft angle (FNSA) often falls between the range of 120 to 140 degrees, with 125 to 135 degrees being the most frequently mentioned range. In the current study, the mean neck shaft angles on the affected and unaffected sides are respectively 129 degrees and 131 degrees after surgery. (30) A modest valgus stance can also aid in reestablishing the hip joint's proper biomechanical alignment and lowering the danger of further joint deterioration. It's crucial to remember that the ideal FNSA for fracture reduction and fixation relies on the particulars of the fracture, the individual patient, and the surgeon's level of experience. (31)

The orthopaedic community is still researching and debating whether inserting screws in the calcar femorale (inferior) region is preferable for treating intertrochanteric femur fractures. While the calcar region of the femur is made up of dense cortical bone, providing a firm foundation for screw placement, some studies have indicated that placing screws in the calcar femorale (inferior) part of the femur gives effective fixation and prevents screw back out. (32, 33) In the current study, we discovered that patients with calcar screws had better stability and resistance to screw loosening and migration than patients with non-calcar screws, who experienced a higher rate of screw back out. Only 5% of patients in the screw PFN group in the current study had a superficial wound infection after surgery with 95% cases without limb length discrepancy. Similar findings were made by Tyllianakis et al. in their study of 4.76% infection, which is equivalent to our investigation. (34) Majority of patients (67.6% & 23.53%) demonstrated an excellent and good Harris hip score results respectively indicating a better functional outcome in terms of pain, function (gait and activity), and absence of deformity and range of motion following intramedullary surgery with a hospital stay less than 10 days. The mean Harris hip score was at par and in line with findings of other reported studies. (35)

V. Conclusion

According to the functional outcome calculated from the Harris Hip Score, PFN had a better outcome in terms of range of motion, HHS, improved fracture reduction, early mobilisation, and decreased rates of complications in intertrochanteric fractures. By reducing stress and putting the distal locking screws more proximally than in some other devices, PFN as an intramedullary device aids in overcoming a number of challenges associated with older traditional treatment techniques preventing the construct's rigidity from changing suddenly. Moreover, it aids in the development of biomechanically sound structures that permit early weight bearing. PFN devices can be crucially used to manage a good reduction of the fracture as well as the ideal location and length of the hip pin and lag screw. Overall, the PFN implantation procedure is a secure and reliable way to repair intertrochanteric femoral fractures. However, like any surgical procedure, it carries some risks, and the decision to use this technique should be analysed precisely.

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