Section: Orthopaedics

Original Research Article

A COMPARATIVE STUDY OF FUNCTIONAL OUTCOME BETWEEN PROXIMAL FEMORAL NAILING AND HEMIARTHROPLASTY IN UNSTABLE EXTRACAPSULAR FRACTURE FEMUR

Surapathi Sankararao[1]

[1]*Associate Professor of Orthopaedics, Krishnanagar Institute of Medical Science, Pal Para More, Bhatjangla, Krishnanagar, West Bengal 741102, India.*

Received *: 25/03/2026*
Received in revised form *: 01/05/2026*
Accepted *: 16/05/2026*

Corresponding Author:
Dr. Surapathi Sankara Rao,
Associate Professor of Orthopaedics, Krishnanagar Institute of Medical Science, Krishna Nagar, West Bengal, India.
Email: orthopaedic.rao1960@gmail.com

DOI: 10.70034/ijmedph.2026.2.376

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (2); 2254-2264

ABSTRACT

Background: Unstable extracapsular fractures of the femur are common injuries in the elderly population and are associated with significant morbidity and functional impairment. Proximal femoral nailing (PFN) and hemiarthroplasty are two commonly employed treatment modalities for such fractures. **Aim:** To compare the functional outcomes between proximal femoral nailing and hemiarthroplasty in unstable extracapsular fractures of the femur.
Materials and Methods: This comparative study was conducted in the Department of Orthopaedics on 40 patients with unstable extracapsular fractures of the femur. Patients were divided into two groups: Group A underwent proximal femoral nailing (20 cases) and Group B underwent hemiarthroplasty (20 cases). Functional outcomes were assessed using the Modified Harris Hip Score during short-term follow-up. Parameters such as operative blood loss, complications, and postoperative functional recovery were evaluated.
Results: The patients were in the age group of 30–80 years, with a mean age of 61 years in the PFN group and 63.5 years in the hemiarthroplasty group. Mean intraoperative blood loss was lower in the PFN group compared to the hemiarthroplasty group. In the PFN group, 9 patients demonstrated good functional outcomes, while 4 patients in the hemiarthroplasty group achieved good Harris Hip Scores. Excellent Harris Hip Scores were observed in 14 patients (70%) in the hemiarthroplasty group. Fair functional outcome was noted in one patient in the PFN group and two patients in the hemiarthroplasty group. Only one case of superficial infection was reported, with an infection rate of 1%, which is comparatively lower than rates reported in previous studies. No mortality was observed during the study period.
Conclusion: Both proximal femoral nailing and hemiarthroplasty are effective treatment options for unstable extracapsular fractures of the femur with satisfactory short-term functional outcomes. PFN offers the advantage of reduced blood loss, whereas hemiarthroplasty allows early weight-bearing and rehabilitation. Complications associated with both procedures were minimal and less disabling, with low rates of reoperation. Early mobilization and satisfactory functional recovery make both modalities viable options in the management of unstable extracapsular femoral fractures.
Keywords: Unstable extracapsular fracture femur; Proximal femoral nailing; Hemiarthroplasty; Bipolar prosthesis.

INTRODUCTION

Intertrochanteric fractures constitute a major proportion of proximal femoral fractures and commonly require operative intervention because of their unstable nature and the need for early mobilization. These fractures are frequently encountered in the elderly population, particularly in

postmenopausal women with osteoporosis, where trivial trauma such as a simple slip and fall may result in fracture. In younger individuals, these fractures are usually associated with high-energy trauma such as road traffic accidents. Unstable extracapsular fractures remain a challenge to orthopedic surgeons because of difficulties related to fixation stability, osteoporosis, postoperative complications, and associated morbidity.[1,2]

Fractures of the proximal femur are broadly classified into intracapsular and extracapsular fractures based on their relationship to the hip joint capsule. Intracapsular fractures include subcapital, transcervical, and basicervical fractures, whereas extracapsular fractures include intertrochanteric and subtrochanteric fractures. Among these, intertrochanteric fractures occur between the greater and lesser trochanters and account for nearly 45% of all hip fractures.[3] Basicervical fractures, located at the junction of the femoral neck and intertrochanteric region, are generally managed similarly to intertrochanteric fractures.[4]

Several classification systems have been described for extracapsular fractures of the femur, including the Evans classification, Jensen's modification, Boyd and Griffin classification, and AO/OTA classification. According to Evans, posteromedial cortical continuity is the key determinant of fracture stability. Loss of medial or posterolateral support, reverse obliquity patterns, and subtrochanteric extension are features associated with unstable fractures.[5]

Management of unstable extracapsular fractures aims to achieve stable fixation, allow early mobilization, reduce complications associated with prolonged recumbency, and restore pre-fracture functional status. Earlier, conservative treatment consisting of traction, analgesics, and prolonged bed rest was commonly practiced. However, non- operative management was associated with significant complications such as pressure sores, deep vein thrombosis, pulmonary complications, malunion, and increased mortality. Consequently, operative management has become the standard of care for most unstable extracapsular fractures.[6]

Various surgical options are available for the treatment of unstable extracapsular fractures, among which proximal femoral nailing (PFN) and hemiarthroplasty are commonly employed. Proximal femoral nailing is an intramedullary fixation technique that provides biomechanical advantages such as a shorter lever arm, controlled collapse, minimal soft tissue dissection, and reduced blood loss. It allows stable fixation and early rehabilitation, especially in unstable fracture patterns. Nevertheless, complications such as implant failure, screw cut-out, shaft fractures, and nonunion have been reported.[7]

Hemiarthroplasty, on the other hand, involves replacement of the femoral head and neck using a prosthesis, usually a bipolar prosthesis. It is particularly useful in elderly osteoporotic patients with severely comminuted unstable fractures where internal fixation may fail. Hemiarthroplasty allows immediate weight-bearing and early mobilization, thereby reducing complications related to prolonged immobilization. However, it is associated with complications such as dislocation, periprosthetic fracture, infection, loosening, and increased blood loss during surgery.[8]

Biomechanically, the hip joint is subjected to significant forces during activities such as walking, running, lifting, and climbing stairs. These forces are further increased in obese individuals, predisposing to implant failure and periprosthetic fractures. In hemiarthroplasty, stress transfer occurs either directly from the prosthetic stem to the femur in cementless prostheses or through the cement mantle in cemented prostheses. Improper stem fixation may result in loosening or sinking of the prosthesis. Similarly, hoop stresses and radial stresses generated during loading influence implant stability and long-term outcomes.[9]

Although several studies have compared intramedullary fixation and hemiarthroplasty, there remains controversy regarding the ideal treatment modality for unstable extracapsular fractures. Some studies favor PFN because of shorter operative time and less blood loss, while others advocate hemiarthroplasty due to early weight-bearing and reduced risk of fixation failure. Meta-analyses have not conclusively demonstrated the superiority of one treatment over the other.[10,11]

Therefore, the present study was undertaken to compare the functional outcomes of proximal femoral nailing and hemiarthroplasty in patients with unstable extracapsular fractures of the femur.

Aim of the Study

To compare the functional outcomes between proximal femoral nailing and hemiarthroplasty in unstable extracapsular fractures of the femur.

MATERIALS AND METHODS

Study Setting

The present study was conducted in the Department of Orthopaedics, Krishnanagar institute of Medical science, Krishna Nagar.

Study Design

This was a prospective comparative study.

Study Duration

The study was conducted for the duration of 18 months [October 2024 to March 2026].

Study Population

The study included patients aged between 30 and 80 years who presented with unstable extracapsular fractures of the femur.

Sample Size

A total of 40 patients with unstable extracapsular fractures of the femur were included in the study. The patients were allocated into two groups:

- Group A: Proximal Femoral Nailing (PFN) – 20 cases

- Group B: Hemiarthroplasty – 20 cases Each patient was followed up for 6 months. Inclusion Criteria
- AO/OTA classification 31A and 31B3 fractures[1]
- Age between 30 and 80 years

Exclusion Criteria

- Associated hip osteoarthritis
- Age less than 30 years
- Neuromuscular disorders such as poliomyelitis and myasthenia gravis
- Pathological fractures
- Ipsilateral associated fractures

Data Collection

Detailed clinical data were collected and maintained electronically. All patients were evaluated clinically and radiologically at regular follow-up visits. Parameters such as limb length discrepancy, postoperative range of movements, complications, time required for fracture union, and functional outcomes were assessed and documented. After admission, all relevant patient information was recorded in a structured proforma specifically designed for the study. Patients were followed regularly in the outpatient department and through telephonic communication when necessary.

Preoperative Evaluation

All patients were admitted to the orthopaedic ward and underwent thorough clinical evaluation, including detailed history regarding mode of injury and associated comorbidities. Clinical and radiological assessments were performed in all cases. Skin traction with appropriate weight was applied preoperatively to immobilize the affected limb and prevent shortening.

Analgesics, including non-steroidal anti-inflammatory drugs (NSAIDs), were administered for pain relief. Radiographs of the pelvis with both hips and the affected hip joint were obtained. Routine blood investigations, viral screening, blood grouping and typing, electrocardiography (ECG), and chest radiography were performed in all patients.

Patients with associated medical comorbidities were appropriately evaluated and optimized prior to surgery. The surgical procedure, associated risks, benefits, and possible complications were explained to patients and their attendants, and written informed consent was obtained. Intravenous antibiotics were administered one hour prior to surgery.

Surgical Procedure

Proximal Femoral Nailing Technique

The patient was positioned supine on a fracture table under spinal anesthesia. Closed reduction was achieved by applying traction along the line of deformity followed by internal rotation to restore alignment and length.

A 3–5 cm skin incision was made proximal to the tip of the greater trochanter. The fascia overlying the gluteus maximus and vastus lateralis was incised longitudinally. Blunt dissection of the gluteus maximus fibers exposed the greater trochanter.

A guidewire was inserted through the entry point at the tip of the greater trochanter in line with the femoral canal under fluoroscopic guidance. Reaming was performed, followed by insertion of the proximal femoral nail. Guidewires for the neck screw and antirotation blade were inserted, and appropriate drilling and screw placement were performed. Distal locking screws and end caps were inserted under image intensifier guidance to complete fixation.[2]

Hemiarthroplasty Technique

Patients were operated in the lateral decubitus position under spinal anesthesia using either the direct lateral (Hardinge) approach or posterior approach.

A longitudinal skin incision centered over the greater trochanter was made extending proximally and distally along the femoral shaft. Fascia lata was incised and gluteus medius fibers were split longitudinally. The hip capsule was exposed and opened using a T-shaped capsulotomy.

The femoral head was removed using a corkscrew after neck osteotomy. Femoral canal preparation was carried out using sequential reamers until a snug fit was achieved. Trial prosthesis insertion was performed to assess stability, limb length, and anteversion.

A cement restrictor was inserted, and the femoral canal was prepared for cementation. Cemented bipolar prosthesis was inserted in appropriate anteversion and maintained until cement polymerization was complete. Stability, leg length, and range of movement were checked before wound closure.[3]

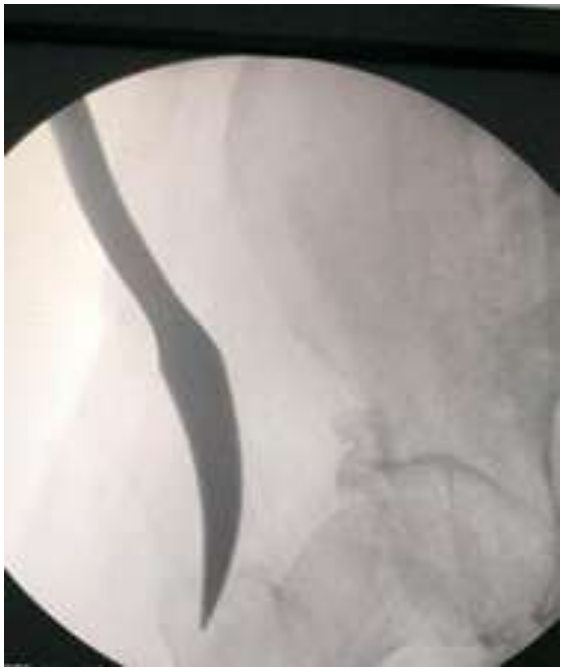

Figure 1: fluoroscopy images during making entry point

Intra-operative pictures of hemiarthroplasty

Instruments

position of patient

Prosthesis insertion

Intraoperative blood loss was estimated in all patients, and postoperative blood transfusion was administered when indicated based on postoperative hemoglobin levels. Intravenous antibiotics were continued for a duration of five days postoperatively, and analgesics, either parenteral or oral, were prescribed according to patient tolerance and pain severity.

Postoperatively, the lower limbs were maintained in an abducted position using a pillow placed between the legs to prevent adduction and reduce the risk of dislocation, particularly in hemiarthroplasty patients. Surgical drains, when used, were generally removed after 48 hours depending on the amount of fluid collection.

Early mobilization was encouraged in all patients. On the second postoperative day, patients were encouraged to sit in bed. Assisted standing was initiated on the third postoperative day, followed by ambulation with the help of a walker on the fourth postoperative day, depending on pain tolerance, bone quality, and stability of fixation. Progressive weight-bearing and walking were encouraged thereafter. Activities such as squatting and sitting cross-legged were avoided during the postoperative rehabilitation period.

Suture removal was performed on the eleventh postoperative day. Patients were carefully monitored for postoperative complications including surgical site infection, bed sores, limb shortening, deformity, implant-related complications, and other medical complications, and appropriate treatment was instituted whenever necessary before discharge from the hospital.

Follow-up

All patients were followed up regularly at intervals of 1 month, 3 months, and 6 months postoperatively. Functional outcome was assessed using the Modified Harris Hip Score. Clinical examination and radiological evaluation were performed during each follow-up visit.

Radiographs of the operated hip were obtained at every follow-up to assess fracture fixation, implant position, fracture union, consolidation, and collapse, if any. Patients were advised regarding rehabilitation protocols and precautions during each visit.

At the time of discharge, all patients were instructed to return for scheduled follow-up visits. Patients who attended follow-up visits or could be contacted telephonically were included in the final assessment. All clinical and radiological findings were systematically documented in the follow-up chart for further analysis.

Table 1: Functional outcome - Harris hip scoring system

Functional outcome	Harris hip score
Poor	70
Fair	71 - 80
Good	81 - 90
Excellent	91 -100

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistical analysis was performed for all study variables.

The Frequencies procedure was used to obtain statistical summaries and graphical representations for various demographic and clinical variables. Quantitative variables were expressed as mean and standard deviation, while qualitative variables were presented as frequencies and percentages.

The mean postoperative Modified Harris Hip Score of the patients in both groups was calculated and compared to assess functional outcomes. Clinical and radiological outcomes between the two groups were analyzed using suitable statistical methods. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 2: Age Wise Distribution of Cases

Age group	Hemiarthroplasty (HA)	PFN	P value
	N(%)	N (%)	
31-40 yrs	2 (10.0)	2 (10.0)	0.3
41-50 yrs	1 (5.0)	1 (5.0)	
51-60 yrs	3 (15.0)	6 (30.0)	
61-70 yrs	4 (20.0)	7 (50.0)	
>70 yrs	10 (50.0)	4 (20.0)	
Total	20 (100.0)	20 (100.0)	
Mean+/- SD	63.5+/-16.24	61.1+/- 13.70	

Table 3 : Sex Wise Distribution

SEX	PFN	Hemiarthroplasty (HA)	
	N (%)	N (%)	
Female	14 (70.0)	11 (55.0)	0.5
Male	6 (30.0)	9 (45.0)	
Total	20 (100.0)	20 (100.0)	

Table No 4 : Mode of Trauma

Mode of injury	PFN	Hemiarthroplasty (HA)	P value
	N (%)	N (%)	
Assault	1 (5.0)	0	0.5
RTA	5 (25.0)	4 (20.0)	
Slip and fall	14 (70.0)	16 (80.0)	
Total	20 (100.0)	20 (100.0)	

Table 5: Side of injury in the patients among two groups

Side of injury	PFN	Hemiarthroplasty (HA)	P value
	N (%)	N (%)	
Left side	7 (35.0)	8 (40.0)	0.744
Right side	13 (65.0)	12 (60.0)	
Total	20 (100.0)	20 (100.0)	

Table 6: Co-morbidity in the patients among the two groups

Comorbidity	PFN N (%)	Hemiarthroplasty (HA) N (%)
Diabetes	2 (10.0)	2 (10.0)
Hypertension	3 (15.0)	3 (15.0)
No comorbidity	15 (75.0)	15 (75.0)
Total	20 (100.0)	20 (100.0)

Table 7: Intraoperative details among two groups

Parameter	PFN	Hemiarthroplasty(HA)	P value
	Mean+/- SD	Mean+/- SD	
Blood loss (ml)	179 +/-24.04	258.5 +/- 39.5	<0.001
Duration of operation (minutes)	100.5 +//9.45	77.5 +/- 7.86	<0.001

Table 8: General complications

General complications	PFN	Hemiarthroplasty (HA)	P value
Chest infection	1 (5.0)	1 (5.0)	0.548
Superficial wound infection	2 (10.0)	0	
Urinary tract infection	1 (5.0)	1 (5.0)	
No complications	16 (80.0)	18 (90.0)	
Total	20 (100.0)	20 (100.0)	

Table 9: Harris hip score among two groups

Harris Hip score	PFN	Hemiarthroplasty	P value
	N (%)	N (%)	
Excellent	10 (50.0)	14 (70.0)	0.197
Good	9 (45.0)	4 (20.0)	
Fair	1 (5.0)	2 (10.0)	
Poor	0	0	
Total	20 (100.0)	20 (100.0)	

In the PFN group, 13 patients (65%) had fractures involving the right side, while 7 patients (35%) had left-sided fractures. In the hemiarthroplasty group, 12 patients (60%) sustained right-sided fractures and 8 patients (40%) had left-sided involvement. Slip and fall was the most common mode of injury observed

in the present study, accounting for 30 cases (75%), whereas road traffic accidents accounted for 9 cases (22.5%). These findings indicate that low-energy trauma was the predominant mechanism of injury among the study participants.

Minor associated injuries in the form of abrasions were observed in nearly one-fourth of the patients. With regard to associated medical comorbidities, no significant medical history was present in approximately half of the study participants. Diabetes mellitus was the most common comorbidity observed in 4 patients, followed by hypertension, which was present in 6 patients.

Table 10. Postoperative hospital stay

Postoperative hospital stay (Days)	Group A (PFN)	Group B (Hemiarthroplas ty)
0-2 days	8	12
3-5 days	10	6
6-10 days	2	2

All patients in the study were treated either with proximal femoral nailing (PFN) or cemented bipolar hemiarthroplasty. The majority of the patients, particularly in the hemiarthroplasty group, did not experience any major postoperative complications. Approximately 70% of the study participants treated with cemented bipolar hemiarthroplasty had an uneventful postoperative recovery.

In the PFN group, two cases of superficial surgical site infection were reported. One patient developed a urinary tract infection and one patient developed bedsore during the postoperative period. In addition, two cases of screw loosening with the "Z-effect" phenomenon were observed in the PFN group.

In the hemiarthroplasty group, two patients developed bedsores and one case of posterior hip dislocation was reported postoperatively.

Postoperative hospital stay was also evaluated among the study participants. In Group A (PFN group), the majority of patients had a postoperative hospital stay of approximately 5 days. However, two patients required hospitalization beyond 5 days due to postoperative complications such as bedsores and the need for repeated wound dressing. In Group B (hemiarthroplasty group), only two patients required hospital stay for more than 5 days postoperatively.

Table 11: Post-Procedure indications of the study participants

Sl.no	Post-Procedure indications	Variables	Group A	Group B
1	Pain	Mild	10(50%)	6(30%)
		Moderate	6 (30%)	10(50%)
		Severe	2(10%)	2(10%)
		Pain at bed	2(10%)	2 (10%)
2	Limp	Slight	3 (15%)	4 (20%)
		Moderate	3 (15%)	3 (15%)
		Severe	2 (10%)	3 (15%)
		No limp	12(60%)	10(50%)
3	Use of cane	No use of cane	14(70%)	13(65%)
		Cane for long- distance	2 (10%)	3 (15%
		Cane for long walks	1(5%	1(5%)
		Cane most of the time	1 (5%)	1(5%)
		One crutch	1(5%)	1(5%)
		Two crutches	0	0
		Unable to walk	1 (5%)	1 (5%)
4	Currently walking after the surgery	Yes	19(95%)	19(95%)
		No	1 (5%)	1 (5%)
		31-60	2 (10%)	2 (10%
5	Range of Motion 61			
		-100	2 (10%)	1 (5%)
		101-160	5 (25%)	6(30%)
		161-210	9(45%)	8(40%)
		211-300	2 (10%)	3 (15%)
6	Harris hip scoring	Poor	0	0
		Fair	1 (5%)	2 (10%)
		Good	9(45%)	4(20%)
		Excellent	10(50%)	14(70%
		Mean Post- operative (HHS)	81	83.3
7	X-ray findings	normal	15(75%)	14(70%)
		periprosthetic fracture/Screw loosening	2(10%)	2(10%)
		posterior dislocation + subsidence of prosthesis>5mm	0	1(5%)
		radiolucent zone >2mm	3(15%)	3(15%)
		subsidence of prosthesis >5mm	0	1(5%)

Moderate pain was the most common postoperative complaint among the study participants. Mild pain was observed in 10 patients (50%) in the PFN group and 6 patients (30%) in the hemiarthroplasty group, while severe pain was reported in two patients in each group. Two patients in both groups experienced pain at rest.

Nearly half of the patients in both groups had no postoperative limp. Slight limp was observed in 3 patients (15%) in the PFN group and 4 patients (20%) in the hemiarthroplasty group. Moderate and severe limp were each observed in 3 patients in the hemiarthroplasty group.

Approximately 50% of patients in both groups did not require walking aids after surgery. Three patients (15%) used a cane for long-distance walking, while two patients in the hemiarthroplasty group required one crutch for ambulation. Most patients (95%) in both groups were ambulatory postoperatively.

Better range of motion was observed in the hemiarthroplasty group, with 8 patients (40%) demonstrating a range of motion score between 161–210 degrees.

According to the Modified Harris Hip Score, good functional outcome was observed in 13 patients, including 9 in the PFN group and 4 in the hemiarthroplasty group. Excellent scores were recorded in 14 patients (70%) in the hemiarthroplasty group. Fair results were noted in one patient in the PFN group and two patients in the hemiarthroplasty group.

Radiological assessment showed normal X-ray findings in 15 patients (75%) in the PFN group and 14 patients (70%) in the hemiarthroplasty group. Radiolucent zones >2 mm were seen in 3 patients (15%) in both groups. Screw loosening and periprosthetic fractures were observed in 2 patients (10%), while prosthesis subsidence >5 mm and posterior dislocation were each noted in 1 patient (5%).

Figure 1: Pre and postoperative x-rays and Range of motion post- operatively

Figure 2: Pre& post-operative x rays of hemiarthroplasty-Case.2

Figure 3: Pre &post-operative x rays of PFN-Case.3

DISCUSSION

Majority of the individuals in current study belongs to age group of 5th to 7thdecade. Mean age in years for group operated with PFN was 61.1+/_13. Mean

age for group operated with hemiarthroplasty was 63.5+/_16.2 years. This implies that patients from the above age group are at high risk of slip and fall at their residencies. In contrast with Western patients with hip fractures, it could be attributed to poorer life expectancy among the Indian population within 1styear of injury, but the mortality rate is equivalent to the general population after one year. The sample group appeared to be comparatively old (usually about 70) and usually with very serious osteoporosis through selection, as evidenced by the presence of spinal fractures. This may leave us with the assumption that hip fractures are correlated with osteoporosis in older age groups. Most individuals with fractures do not have a bone mineral density that is associated with osteoporosis.

Hip fractures are described to be more collective in females and the elderly. In this study the fracture was seen more commonly in females across all the age groups. This female preponderance was seen to be increasing with advancing age. This could perhaps be attributed to the higher male to female ratio in the general population as age increases and lower bone density (BMD) in women compared with men.

In this study, a total of 9 cases of RTAs and 30 cases of Slip and fall were determined and the majority of the victims were in the 51-70-year-old group.

The majority of our study patients sustained the injury due to a trivial trauma like tripping or slipping. Falls are a common event, particularly among the elderly. Modest changes in balance function have been described in fit older subjects. Subtle deficits in sensory systems, attention, and motor reaction time contribute to the risk, and environmental hazards abound. A variety of risk factors have been recognized by epidemiological research, such as fatigue, coordination deficiency, gait impairment, vision deficit, etc. Such accidents can be described as "indirect trauma". It is a common scenario in a developing country where patients present to a doctor much late given the seriousness of the condition or seek treatment from osteopaths and then come to an orthopaedician only after no relief in pain is obtained.

In the current study of 40 different cases of intertrochanteric fractures, 7 cases of PFN and 8 cases of hemiarthroplasty had left sided fracture.[13] patients of PFN and 12 patients of hemiarthroplasty had right sided hip involvement.

In the elderly who have a related medical history, fractures of intertrochanteric region are normal. Osteoporosis, comorbidities and elevated levels of mild injuries increase the occurrence of such fractures and exacerbate their care. The most prevalent form of primary osteoporosis in women is postmenopausal osteoporosis, caused by oestrogen deficiency. Estrogen deficiency imbalances the mechanism of bone remodelling, resulting in accelerated bone resorption and bone mass destruction of 25-30 per cent for 5 to 10 years. Fragility fractures are a frequent complication of osteoporosis that affects the elderly population after oestrogen deficiency in postmenopausal age, mainly women. Estrogen deficiency-related bone loss is typically due to an inconsistency between bone resorption and development that results in bone mass loss and trabecular bone microarchitecture degradation. Complications as there is a potential risk of BCS development leading to hypoxemia, hypotension, arrhythmias and cardiac arrest.

Patients with hemiarthroplasty group had mean blood loss of 258 +/- 39 ml and duration operation was about 78 – 85minutes.

The risks of hip hemiarthroplasty associated with prosthesis include periprosthetic fracturing, dislocation, inflammation, aseptic loosening, acetabular wear and potential bone cement implantation syndrome. Increased cost, morbidity & mortality will contribute to these complications. This is seen in infection and dislocation patients, with up to 50 per cent one- year mortality after deep infection and 65 per cent mortality after six months after a dislocation. Studies have reported 4-24 per cent revision rates after trauma hemiarthroplasty.

Many factors contribute to complications in patients with the cemented prosthesis, and the distribution of bone cement is one such factor that can be controlled by the surgeon. Gaughen et al,[12] suggested that sufficient filling of bone cement in the vertebral body is a key factor associated with recompression.

We found a superficial infection rate of 1%. This is low compared with other studies, which quote infection rates between 1.3% and 3.6%. These low rates may reflect the use of laminar flow theatres for all hip fracture surgery and excellent compliance with appropriate antibiotic prophylaxis.

Length of stay, pre-discharge mortality and cost all increased with infections. Periprosthetic fractures are problematic to deal with in presence of infection. Options include implant preservation and fracture fixing to attempt to achieve healing or implant removal paired with fracture bracing or fixation. Second- stage reimplantation should then be called in the above case. It can also be called a single-stage revision with fixation. It is possible to attempt suppressive therapy, but the outcomes may or may not be effective. THA-associated periprosthetic femoral fractures remain difficult to manage. Reoperation rates are high and long-term pain 6 and unsatisfactory findings are commonly reported by patients.

The length of hospital stay (more than 6 days) after surgery is elevated. Prolonged hospital preoperative stay was associated with the risk of SSI. The duration of the operation was assessed based on the cut-off point of the NHSN/CDC methodology, where the number of minutes specified was for this form of procedure. While this is a feature classically associated with SSI, the present study did not correlate it with surgical infection. The long duration of a procedure in a polluted atmosphere facilitates surgical contamination and, subsequently, infection growth.

Standard Harris Hip Score is a validated and the most commonly used tool to measure the functional

capacity of an individual before and after a surgical procedure. It has been used extensively in many studies for evaluating functional outcomes of THRs. We observed that 50% had pain (moderate) & 30% of patients had mild pain at post- procedure. Two individuals with pain at bedtime and two had severe pain. Pain coming after hemiarthroplasty Is a vital concern.

Haynes RC in their study of 294 individuals observed pain coming after hemiarthroplasty in twenty-two patients initial postoperative stay. The pain was mild to moderate and needed medication.[13]

Ten of our patients had varying degrees of limp. Four of our patients had only a slight limp and three had moderate limp. Only three patients had severe limps. Limping is a common consequence of hemiarthroplasty in adults. The exact cause cannot be attributed to this. Alteration in the abductor mechanism due to excision of a little more neck is the most probable cause. All patients were consulted to use a cane on the sound side regularly. This decreases the load on the prosthetic head. Once the patient got enough endurance they were told to discard the cane. Our study results are comparable to Cameron and Botsford with an incidence of limp.

The variables recorded in Range of Motion indication include 31-60, 61-100, 101-160, 161-210 and 211-300, in which 40% between 161-210.

Results of the study agreed to the Lee et al and other studies.[14,15]

Harris hip scoring was 50% of the patients with excellent scores and 40% patients with an good score. Present study was following Söderman et al., 344 patients who were assessed using Harris hip score.

X- ray showed 60% normal cases, 10% had a periprosthetic fracture and 20% with radiolucent zone>2mm. These results are comparable with Charissoux et al., Mazenet al., show good outcomes based on relatively small numbers of patients.[16,17]

In this study, all the surgical procedures were performed by the same surgeon in a standard manner. Number of cases requiring hip revisions is on an upward trend and thus we feel that results of this study and technique are relevant to today's practice. This trend is only predicted to go further up carrying along with it an increasing economic burden on the healthcare system. This particular technique described in the above research presents a cost and time-effective option for revision hip arthroplasties in suitable patients.

Limitations of the Study

1. The study was conducted on a limited number of selected patients.
2. Only PFN and bipolar hemiarthroplasty were evaluated.
3. The sample size was relatively small (20 patients in each group), limiting statistical power.
4. The study was conducted at a single institution, limiting generalizability of results.
5. Assessment was based primarily on two-dimensional radiographs, which may not detect fine structural changes accurately.
6. Detailed cardiovascular monitoring parameters were not evaluated intraoperatively.
7. Embolic phenomena such as fat or cement embolism were not assessed using transesophageal echocardiography.

Recommendations

Comprehensive preoperative evaluation, including detailed radiographic assessment and optimization of comorbidities, is essential before surgery. Surgeons should anticipate technical difficulties such as difficult implant removal, excessive blood loss, and intraoperative fractures during revision procedures. Elderly patients undergoing cemented bipolar hemiarthroplasty require careful anesthetic assessment and perioperative monitoring. Further multicentric studies with larger sample sizes and longer follow-up periods are recommended to establish more robust evidence.

CONCLUSION

The present study concludes that both proximal femoral nailing and cemented bipolar hemiarthroplasty are effective treatment options for unstable extracapsular fractures of the femur. No mortality was observed during the study period. Both procedures were associated with acceptable morbidity and satisfactory early functional outcomes. PFN demonstrated advantages such as reduced blood loss and minimal surgical exposure, whereas hemiarthroplasty allowed early weight-bearing and mobilization. Complications associated with both procedures were minimal and generally manageable. The need for secondary surgical procedures was infrequent.

REFERENCES

1. Rockwood CA, Green DP, Bucholz RW, Heckman JD. Rockwood and Green's Fractures in Adults. 8th ed. Philadelphia: Wolters Kluwer; 2015.
2. Canale ST, Beaty JH. Campbell's Operative Orthopaedics. 13th ed. Philadelphia: Elsevier; 2017.
3. Court-Brown CM, Caesar B. Epidemiology of adult fractures: A review. Injury. 2006;37(8):691-697.
4. Parker MJ, Handoll HH. Replacement arthroplasty versus internal fixation for extracapsular hip fractures in adults. Cochrane Database Syst Rev. 2006;(2):CD000086.
5. Evans EM. The treatment of trochanteric fractures of the femur. J Bone Joint Surg Br. 1949;31-B(2):190-203.
6. Boyd HB, Griffin LL. Classification and treatment of trochanteric fractures. Arch Surg. 1949;58(6):853-866.
7. Simmermacher RK, Bosch AM, Van der Werken C. The AO/ASIF-Proximal Femoral Nail (PFN): A new device for the treatment of unstable proximal femoral fractures. Injury. 1999;30(5):327-332.
8. Haentjens P, Casteleyn PP, De Boeck H, et al. Treatment of unstable intertrochanteric and subtrochanteric fractures in elderly patients. Primary bipolar arthroplasty compared with internal fixation. J Bone Joint Surg Am. 1989;71(8):1214-1225.
9. Charnley J. Low Friction Arthroplasty of the Hip: Theory and Practice. Berlin: Springer-Verlag; 1979.
10. Kumar GNK, Meena S, Kumar NV, et al. Bipolar hemiarthroplasty versus proximal femoral nailing in unstable intertrochanteric fractures in elderly patients: A prospective randomized study. J Clin Orthop Trauma. 2013;4(4):166-172.

11. Zhou ZB, Chen S, Gao YS, et al. Comparison between proximal femoral nail antirotation and hemiarthroplasty in the treatment of unstable intertrochanteric fractures in elderly patients. Orthop Surg. 2012;4(4):229-233.
12. Gaughen JR Jr, Jensen ME, Schweickert PA, Kaufmann TJ, Marx WF, Kallmes DF. The therapeutic benefit of repeat percutaneous vertebroplasty at previously treated vertebral levels. AJNR American Journal of Neuroradiology. 2002;23(10):1657–1661.
13. Haynes RC, Pöll RG, Miles AW, Weston RB. Failure of femoral head fixation: a cadaveric analysis of lag screw cut-out with the gamma locking nail and AO dynamic hip screw. Injury. 1997 Jun 1;28(5-6):337-41.
14. Lee PYF, Chua YP, Low WY. Factors predicting functional outcome after hip fracture surgery in elderly patients. J Orthop Surg (Hong Kong). 2014;22(3):308-312.
15. Söderman P, Malchau H. Is the Harris Hip Score system useful to study the outcome of total hip replacement? Clin Orthop Relat Res. 2001;(384):189-197.
16. Charissoux JL, Asloum Y, Marcheix PS. Surgical management of recurrent dislocation after total hip arthroplasty. Orthopaedics & Traumatology: Surgery & Research. 2014 Feb 1;100(1):S25-34.
17. Mazen S, Julien G, Riad F. Retrospective evaluation of bipolar hip arthroplasty in fractures of the proximal femur. North American journal of medical sciences. 2010 Sep;2(9):409.