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Comparative analysis of the clinical, functional and radiological outcomes of proximal femoral nail alone verses proximal femoral nail along with lateral wall plating in management of unstable intertrochanteric femur fracture, AO/OTA, type 31A2 fractures with deficient lateral wall

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ABSTRACT

Background: The objective of the study was to compare the effectiveness in terms of clinical, functional and radiological outcomes of management of unstable intertrochanteric femur fracture, AO/OTA type 31A2 intertrochanteric fractures with deficient lateral wall with proximal femoral nail (PFN) alone verses PFN along with lateral wall plating.

Methods: In our study 52 patients with intertrochanteric femur fractures, AO/OTA type 31A2 which met the selection criteria were divided into two groups, group A (PFN) with lateral wall plating and group B (PFN) alone by randomization and were analysed prospectively with no significant difference in terms of gender, age, side of injury, cause of injury, and combined medical diseases. The intraoperative time and blood loss, time to full weight-bearing and radiological union, varus collapse, functional outcome and postoperative complications were recorded and compared.

Results: Comparatively, no significant difference was observed between both groups for the time for full weight bearing. However significant difference was observed between both the groups for HHS at 9 months, neck shaft angle and time for radiological union (in weeks). Statistically significant difference was observed between both the groups for neck shaft angle and HHS at 9 months. The incidence of complications was 30.77% in group B. The incidence of complications was around 26.92% in group A; with no significant difference. At 9 months after operation, the Harris scores of pain, function, malunion, range of motion, and total score in group A were significantly better than those in group B.

Conclusions: For unstable intertrochanteric femur fracture with incomplete lateral wall, the incidence of varus collapse after augmentation of PFN fixation with lateral wall plating was lower, the time for radiological union was earlier and functional outcome was better.

Keywords: Unstable/AO/OTA type 31-A2 intertrochanteric femur fracture, Lateral wall plating, PFN, Intramedullary nail, Deficient lateral wall

INTRODUCTION

Intertrochanteric femoral fractures and their management have been a matter of research since long. Intertrochanteric femur fractures are grossly classified into stable type or unstable type. Unstable fractures are considered those having significant posteromedial cortex communition, lateral cortex breach or thickness of lateral wall less than

25 mm, fracture with subtrochanteric extension and reverse oblique types of fracture.

There are many studies in the past that have shown that intact lateral wall plays a key role in stabilization of unstable trochanteric fractures by providing a lateral buttress for proximal fragment and its deficiency leads to excessive collapse and varus malpositioning.[6] The importance of the integrity of the lateral femoral wall is increasingly being recognised in the treatment of intertrochanteric fracture therefore, maintaining the integrity of this structure should be an important objective in all stabilization procedures for unstable trochanteric fractures.[12] Lateral wall thickness of less than 25 mm have shown high chances of intraoperative and postoperative lateral wall fractures. Intact lateral wall serves as a support for axial, rotational and varus stability of proximal head neck fragment. The lateral wall is crucial to the treatment of intertrochanteric fractures. Many scholars believe that the ruptured lateral wall should be fixed at the same time to minimize the risk of reoperation and fixation failure.

Proximal femoral nail (PFN) has emerged as the preferred implant of choice in unstable Intertrochanteric fracture of femur over the last few decades as it has mechanical advantage of solid intramedullary fixation with less abductor lever arm and so the less failure rate. Other advantage of proximal femoral nail is smaller incision, less blood loss, less operative time and less infection rate. PFN fixation has been thoroughly assessed and randomized comparison have shown it to be superior to fixed nail plates and DHS. The PFN has therefore become one of the standard treatments of intertrochanteric fractures.

In most cases of stable IT fracture’s, PFN yields equally good results if standard fixation norms are strictly followed. But in unstable fractures especially those with compromise of lateral femoral wall, complication rate of PFN alone is high and fracture union rate is low.[20] In this study augmentation of PFN with addition of a plate fixation of lateral femoral wall has been used to reinforce fixation and reduce medialization and shortening of the femoral shaft and is regarded as a more effective solution for treating unstable type fractures that use a more familiar approach and implant application. By providing a lateral buttress for the proximal fragment, fracture impaction is facilitated and followed by rotational and varus stability. If the lateral wall is broken there is no lateral buttress for the proximal neck fragment and collapse will occur. Collapse has been reported to be a major contributor to postoperative morbidity because it is followed by a long period of disability.

Thus this study will help us to understand the management of unstable intertrochanteric fractures in a more effective way in terms of surgical technique, possible complications, and evaluate the functional, clinical and radiological outcomes after fixation of unstable intertrochanteric femur fractures with PFN along with advantages of augmentation of PFN with lateral wall plating.

The objective of this study is to compare the clinical and functional outcomes of patients with the unstable type of intertrochanteric fractures treated with IM nailing alone (PFN) verses PFN with lateral wall fixation in unstable intertrochanteric fractures with regards to operation time, blood loss, pain relief, functional outcome, osseous union rate, varus collapse and implant related complications.

METHODS

Study type

It was prospective randomized control trail.

Study place

The study was conducted at the department of orthopaedics, Government Medical College and Hospital, Aurangabad.

Period of study

The period of the study was from October 2020 to October 2022.

Clinical data

Patient selection criteria

Inclusion criteria

Clinical diagnosis of unstable trochanteric femur fracture confirmed by radiographs and computed tomography (CT) scan when needed (AO/OTA types 31A2.1to 31A2.3), age >30 years, co-operative and compliant patients. Patients who are medically fit for surgery and fractures less than 3 weeks old.

Exclusion criteria

Compound/pathological fractures, polytrauma patients, patients non ambulant before the fracture, patients below 30 years of age, fractures more than 3 weeks old, patients with cognitive disorders, on steroids or immune-suppressants.

Surgical procedure – PFN

After anaesthesia all patients are screened under c arm to check reduction in ap and lateral views on fracture traction table. K wire is used for trans-fixation antero-superiorly to hold reduction. Entry is made with awl from modified medial trochanteric portal. Guidewire is passed in the canal and proximal reaming done with reduction in hold guide wire inserted and serial reaming done according to intraoperative chattering sound. Appropriate sized nail mounted on zig and inserted. Nail is passed over guide wire upto proper position to pass compression screw just above calcar and anti-rotation screw accordingly. Guide wires inserted into the head of femur and checked in both AP and lateral projections. First 8 mm lag screw is inserted after which 6.3 mm anti-rotation screw of size 15 mm less than lag screw is inserted and fixed proximally. Tip apex distance is kept below 20 mm. Two 4.9 mm locking screws both fixed distally using distal aiming device and wound closed in layers.

PFN with lateral wall plate

Under aseptic precautions affected limb painted and draped in standard fashion for hip surgery in supine position. Fracture site is exposed by standard lateral approach to hip joint. Skin and subcutaneous tissue incised, tensor fascia lata and vastus lateralis was split and proximal part of femur exposed. Adequate reduction achieved under C arm guidance. PFN is inserted and locked similarly to the procedure described above. Lateral femoral wall plating is done by application of the TSP which is buttressed by the lag and derotation screw of PFN itself requiring no pre-contouring. In cases of non-comminuted trochanteric fractures simple buttressing effect is sufficient. However, in cases of comminution multiple fragments can be fixed with 3.5 and 4.5 locking screw options through the plate. In cases where other options for lateral wall plating are used like LCP, DCP or proximal humerus PHILLOS plate, precontouring is necessary to fit the trochanteric wall surface and locking screws are used for plate fixation. Plate is usually slided upon after the PFN lag and derotation screws are tightened and fixed proximally and distally with screws in multiple directions. Plate is passed subperiosteal through same incision and unicortical locking screws are inserted proximal and distal to fracture site.

RESULTS

52 patients of unstable intertrochanteric fractures were treated and divided into groups, PFN with lateral wall plating and PFN in equal numbers by random sampling. The fractures were classified according to AO/OTA classification and fractures of AO type 31A2.1 to 31A2.3 were included in our study. All patients were followed up at least for a period of 9 months and were assessed for clinical, radiological and functional outcome.

AO/OTA classification system used for patient selection. We included AO31A2 fractures in our study: group A – PFN without lateral wall plating, and group B – PFN with lateral wall plating (Table 1).

The present study reveals that – in group A – majority of the patients i.e. 12 (46.15%) were reported in age group of 61–80 years, followed by 10 (38.46%) patients having age greater than 81 years, and 4 (15.38%) patients reported in age group of 41–60 years. Where in group B – majority of the patients i.e. 14 (53.85%) were reported in age group of 61–80 years, followed by 6 (23.08%) patients having age greater than 81 years, 5 (19.23%) patients reported in age group of 41–60 years and 1 (3.85%) patient was having age in between 18–40 years (Table 2).

Table 1: The distribution of fractures.

S. no.	Type of fracture	Number of patients	
		Group A	Group B
1	31A2.1	8	9
2	31A2.2	10	12
3	31A2.3	8	5

Table 2: Age wise distribution.

Age in years	Group A		Group B	
	No. of patients	%	No. of patients	%
18–40	0	0.00	1	3.85
41–60	4	15.38	5	19.23
61–80	12	46.15	14	53.85
≥81	10	38.46	6	23.08
Total	26	100	26	100

In group A – maximum 15 (57.69%) patients were male and 11 (42.31%) patients were female, where in group B – majority of the patients i.e. 17 (65.38%) were male and remaining 9 (34.62%) patients were female (Table 3).

Table 3: Gender wise distribution.

Gender	Group A		Group B	
	No. of patients	%	No. of patients	%
Female	11	42.31	9	34.62
Male	15	57.69	17	65.38
Total	26	100	26	100

Table 4: Mean/average value of variables.

S. no.	Variables	Mean/average	
		Group A	Group B
1	Age (years)	74	69
2	Interval between injury and surgery (days)	5	5
3	Operating time (min)	66	90
4	Blood loss (ml)	191	245
5	FWB (weeks)	8.3	7.9
6	Time for union (weeks)	13.3	12.2
7	HHS at 9 months	88.34	89.69
8	Mean size of lag screw (mm)	85	85
9	Mean size of anti-rotation screw (mm)	70	70
10	Mean duration of hospital stay in days	7.2	5.4

Effect of therapies

In group A, PFN in intertrochanteric femur fracture with lateral wall fixation (augmentation of PFN in unstable intertrochanteric fracture of femur).

In group B, PFN in intertrochanteric femur fracture without lateral wall fixation (augmentation of PFN in unstable intertrochanteric fracture of femur).

Statistical analysis

Significant difference is observed in PFN in intertrochanteric femur fracture with lateral wall fixation (group A) for HHS at 9 months and neck shaft angle ($p<0.05$).

Comparative analysis

There is a significant difference in PFN in intertrochanteric femur fracture with lateral wall fixation (group A) and PFN in intertrochanteric femur fracture without lateral wall fixation (group B) for HHS at 9 months, neck shaft angle and time for union (in weeks) ($p<0.05$).

However, there is no significant difference in PFN in intertrochanteric femur fracture with lateral wall fixation (group A) and PFN in intertrochanteric femur fracture without lateral wall fixation (group B) for FWB (in weeks).

Case illustration

48/male with H/O RTA, right sided intertrochanteric fracture with subtrochanteric extension.

Figure 1: Pre-op X-ray.

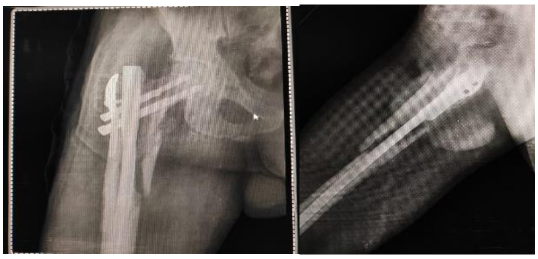

Figure 2: Immediate postoperative X-rays AP and lateral views.

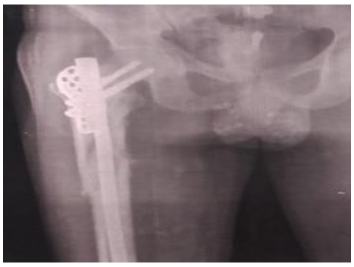

Figure 3: 3 months postoperative X-ray.

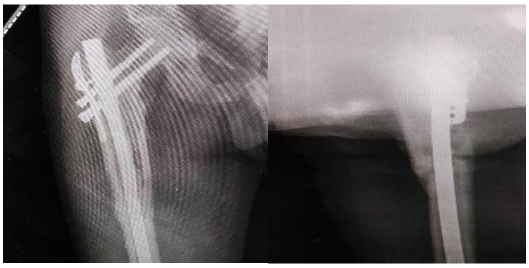

Figure 4: 9 months postoperative X-ray with radiological union.

Figure 5: Clinical radiographs of patient with sitting cross leg, squatting, active SLR, internal and external rotation and flexion.

Table 5: Complications.

S. no.	Complication	PFN with TSP	PFN
1	Superficial wound infection	4	2
2	Deep wound infection	1	1
3	Urinary tract infection	2	2
4	Varus collapse with shortening of >1 cm	2	6
5	Persistent thigh pain	0	2
6	Persistent hip pain	3	0
7	Delayed union	0	2
8	Peri –implant fracture	0	0
9	‘Z’ effect	0	2
10	Reverse ‘Z’ effect	0	1
11	Varus collapse	2	6

2 patients suffered from loosing of greater trochanter screw 8 weeks and they were followed up for another 8 weeks of duration till radiological union to occur then the screws were removed under spinal anesthesia.

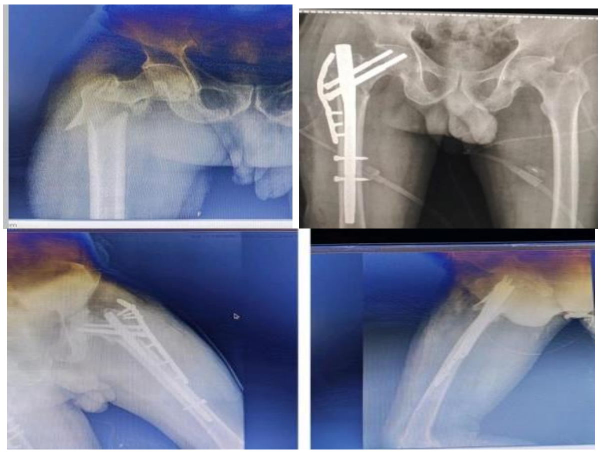

Figure 6: Complications in PFN with lateral wall plating group.

DISCUSSION

Currently, intramedullary nailing is the main method of treating unstable intertrochanteric fractures. Intertrochanteric fractures can be divided into three types based on the integrity of the lateral wall: lateral wall stable type, which is equivalent to the three subtypes of AO/OTA 31-A1 type, and lateral wall unstable type, equivalent to AO/OTA type 31-A2.2 and 31-A2.3, is an unstable antegrade intertrochanteric fracture. At present, the lateral wall unstable type of intertrochanteric fracture still has a high failure rate and complication rate. Gotfried proposed in 2004 that the complete lateral wall of the femur can provide support and pressure for the femoral head and neck bone fragments, resist the outward movement of the head and neck bone fragments, block the medial movement of the distal femoral shaft, and avoid displacement of the fractured end. The reconstruction of the lateral wall is beneficial to resist the varus and rotation of the femoral head and neck bone fragments, is conducive to the stability of intramedullary nailing for intertrochanteric fractures, and significantly reduces the failure rate of internal fixation. Therefore, for intertrochanteric fractures with an incomplete lateral wall, reconstruction of the lateral wall is significant. The commonly used reconstruction methods for the lateral wall are: steel wire or titanium cable binding combined with PFNA fixation. This method is easy to operate, minimally invasive, and economical, and can effectively maintain fracture reduction. However, there is more soft tissue stripping and insufficient stability. Combined with long PFNA fixation, it is a good method for treating subtrochanteric fractures. Additional reconstruction plate to reconstruct the lateral wall. This method is simple to operate, good in stability, and firm in fixation, which can reduce the occurrence of postoperative fracture displacement and improve the function of the affected limb. However, there is more soft tissue stripping, increased bleeding, and increased costs. The proximal greater trochanter plate reverse-DFLCP was used for fixation. However, recent studies have found that its failure rate is high due to the large amount of soft tissue stripping and extramedullary fixation.

The PFN is a static compression fixation method commonly used to treat fractures. During walking, dynamic compression of the fracture end can better stimulate its growth. However, incomplete lateral wall can cause complications like screw withdrawal in PFN. Surgeons must prioritize fracture reduction when using PFN, as poor reduction quality can increase the incidence of internal fixation failure. Lack of medial and lateral support is a key factor for PFN failure in treating AO/OTA 31-A2 fractures. This study shows that reconstruction of the lateral wall using additional locking plates can prevent excessive sliding of PFN, provide lateral support, stabilize internal fixation, and promote fracture healing. In this study, group A underwent lateral wall reconstruction using locking plates to fix the fracture fragments. Although operation time and intraoperative blood loss were higher than in group B, the incidence of complications was lower. Due to reliable lateral wall reconstruction, early ground movement and fracture healing time were significantly reduced, postoperative internal fixation failure rate was lower, and clinical treatment was satisfactory. Using small locking plates combined with PFN for lateral wall reconstruction after reduction on the traction bed or side lying can minimize damage to the blood supply of the proximal femur during operation, facilitating postoperative rehabilitation and shortening recovery time.

PFN alone is a type of static locking fixation that can provide better stability against rotation and axial compression, allowing patients to exercise early and restore hip joint function. However, the results of the study showed that group B, which underwent PFN fixation alone, had a longer fracture healing time, longer ground activity time, poorer hip joint function, and a higher incidence of complications compared to group A, which underwent reconstruction of the lateral wall combined with PFN fixation. In summary, both methods are effective for the treatment of AO/OTA 31-A3.2 intertrochanteric fractures, but the latter has a lower failure rate of internal fixation, allows for earlier ground movement, and results in better hip joint function in the short term.

Age and sex of patient

In this study clinical data of 54 patients with AO/OTA 31-A3.3 intertrochanteric fractures were retrospectively analyzed. They were divided into group A (locking plate MIPPO reconstruction of the lateral wall combined with PFNA internal fixation, 24 cases) and group B (closed reduction and intertan intramedullary nail internal fixation alone, 30 cases). In group A there were 10 males and 14 females. All were aged 60 to 85 years, with an average of 72.6 years. In group B: there were 12 males and 18 females, all were aged 60 to 85 years, with an average of 70.6 years.[37]

In this study, 358 patients with proximal femur fracture AO/OTA type 31A2 and 31A3 treated with PFNA or DHS+TSP and followed for ≥10 months postoperatively were included. They were divided into 2 groups; group A patients were treated with DHS + TSP and group B patients were treated with PFNA alone. Mean age, years (range) in group A was 79.6 (35-97) and mean age, years (range) in group B was 77.4 (26-95). There were 160 females and 74 males in group A and 72 females and 52 males in group B.[38]

Thirty-two patients of unstable trochanteric fractures were studied with a mean age of 59.3 years (range: 55 - 80 years) with eighteen males and fourteen females were included in the study.[36]

In present study, 52 patients with unstable intertrochanteric femur fracture were studied prospectively and were divided into 2 groups randomly of 26 each; group A consisted of PFN alone and group B consisted of PFN with lateral wall plating.

Age

Most of the patients were in the age group of 61–80 years in both the groups. In group A (PFN alone) there 12 patients out of 26 in the age group of 61-80, 10 patients out of 26 were more than 80 years of age and 4 patients out of 26 were in the age group of 41-60 years. In group B (PFN with lateral wall plating) there were 14 patients out of 26 in the age group of 61-80, 6 patients out of 26 were more than 80 years of age and 5 patients out of 26 were in the age group of 41-60 years and 1 patient out of 26 was between 25-40 age group.

Sex

In our study in group A there were 15 males and 11 female patients. In group b there were 17 male and 9 female patients.

Mode of trauma

In group A fall from height in 9 cases, fall in 7 cases, traffic accident in 8 cases were the mode of injury. In group B 10 cases of falling from height, 8 cases of fall injury, 12 cases of traffic accident injury were the mode of injury.[37]

Fall from height was the most common mode of injury, accounting for 60% of the cases in middle aged and elderly patients, with the remainder sustaining injury in road traffic accidents in younger age groups.[36]

In present study, fall from height was the most common mode of injury in our study especially in old age whereas road traffic accident was the cause of fracture in younger population.

Side of fracture

In group A there were 13 cases on the left side and 11 cases on the right side and in group B there were 14 cases on the left side and 16 cases on the right side.[37]

Twenty-two cases of right side involvement and ten patients of left side involvements are included in the study.[36]

In present study, in group B, 15 patients had right and 11 patients had left side fracture. In group A 14 had right and 12 patients had left side fracture.

Interval between trauma and surgery

In group A, the time from injury to operation was 1-3 days, with an average of 2.3 days. Similarly, in group B the time from injury to operation was 1-3 days, with an average of 2.5 days.[37]

Average delay from time of injury to fixation was three-days (range: 2-10 days), which was mostly due to delay in reporting to the hospital.[36]

In present study, in both the groups, patients were operated within 5 days on an average. This time was needed anaesthetic evaluation and implant availability.

Intraoperative time and blood loss

The operation time and intraoperative blood loss in group A were significantly longer than those in group B.[37]

Average operating time (in min) in group A was 104.58±16.87 and in group B was 89.67±14.02.

Average intraoperative blood loss (in ml) in group A was 124.17±17.43 and in group B was 89.67±14.02.

The operation time was significantly shorter in the DHS+TSP group than that in the PFNA group (84.0 versus 96.4 min, respectively; $p<0.05$). Although there were no significant between-group differences in intraoperative blood loss and blood replacement, less postoperative decrease in hemoglobin was noted in the DHS+TSP group as compared to PFNA group (−1.29 versus −1.88 mg/dl, $p<0.05$).[38]

Mean duration of surgery was 75 min (45-80 min) in all the patients.[36]

Mean intraoperative blood loss was 180 ml (110-220 ml) and mean postoperative drainage in first 48 hours was an average 80 ml (60 to 110 ml).

Patients with less than 10 gm% of hemoglobin received blood transfusion.

In present study, mean operating time in group B was 90 minutes and in group A was 66 minutes. Mean blood loss in group B was 245 ml and in group A was 191 ml.

Full weight bearing and radiological union time

The time to ground and fracture healing after operation were significantly shorter than those in group B, and the differences were statistically significant (p<0.05).[37]

Time to weight bearing (days) was on average 5.83±1.01 in group A and 6.90±1.40 in group B.

In the postoperative radiographic evaluation, 161 out of 171 i.e. 94.2% of the DHS+TSP group and 66 out of 70 i.e. 94.3% of the PFNA group reached osseous union without implant failure in A2 type fractures and 61 out of 63 i.e. 96.82% of the DHS+TSP group and 50 out of 54 i.e. 92.6% of the PFNA group reached osseous union without implant failure in A3 type fractures.[38]

The clinico-radiological consolidation of the fracture was observed in all cases at an average of 12.6 weeks (12-18 weeks).[36]

In present study, all patients in group A were allowed to full weight bearing on an average of 7.9 weeks and patients in group B were allowed full weight bearing on an average of 8.3 weeks.

Complications

In group B, following complications were observed, deep infection – one case, 2 cases of screw cut-out, 1 case of screw withdrawal, 1 case of nonunion, one case with limb length discrepancy and no incidence of deep venous thromboembolism were seen. with a complication rate of 16.7%; and in group A, following complications were seen, 1 case of screw withdrawal, one case of nonunion and one case of limb length discrepancy and no incidence of deep venous thromboembolism were seen. There was no significant difference in the incidence of complications between the two groups (χ^2=2.109, p=0.146).[37]

No between-group differences in the fracture union rate (p=0.627), failure of osteosynthesis rate (p=0.967), and reoperations (p=0.798) were noted. Ten patients in the DHS+TSP group suffered from failure of osteosynthesis, which included nine screw cutouts. In the PFNA group, three patients suffered from blade screw cutout. One case of fracture of nonunion was observed in both the groups. Similarly, the patients in the DHS+TSP group suffered from more residual pain (p<0.05) than those in the PFNA fixation group, but there was no significant difference in implant irritation (p=0.835). In the DHS+TSP group, 11 patients (nine with A2 type fractures and two with A3 type fractures) showed greater trochanteric tip avulsion fracture or bone absorption in follow-up radiography.[38]

There were some local as well as some systemic complications. Four patients developed local complications including lateral migration of neck screws (n=2), One case with infection (n=2). No case of nonunion or implant breakage was observed. Three of the patients complained of persistent pain in the hip region because of impingement of the proximal screw which was scheduled for hardware removal. Two patients had moderate persistent pain due to varus malunion. The average sliding of the screws of PFN in this study was observed to be 2.8 mm (2-5 mm). Cases with good anatomical reduction and fixation did not have limb length discrepancy. Four cases had less than anatomical reduction observed in the immediate postoperative period resulting in 6-7 mm of shortening, but none of these cases required a shoe raise. Identifiable rotation of the proximal fragment on X-rays was not observed in any of our cases. No case of deep venous thromboembolism or pulmonary embolism was seen.[36]

In present study, 4 patients in group B and 2 patients in group A had superficial wound infection. 2 patients in each group had urinary tract infection. One patient in both the groups had deep infection which was controlled by intravenous antibiotics and regular wound checks. 3 patients in group B had persistent hip pain. 2 patients in group A had persistent thigh pain. 2 patients had loosening of greater trochanter screw group B. 2 patients had varus collapse with shortening <2 cm (1.3 cm and 1.5 cm) in group B whereas 6 patients had varus collapse and shortening in group A. One patients in group B we had difficulty in placing anti-rotation screw and only lag screw was placed. 2 patients in group B had lag screw back out (z effect) and in one patient there was lag screw cut-out into the joint (reverse z effect). All the 3 cases were followed up with screw removal after around 8 months postoperative period.

Delayed union at fracture site was found in 2 cases operated in group B and these patients denied any further intervention and one patient in group B had developed abductor lurch in follow up period. There was shortening of 1.5–2 cm in two cases of PFN with lateral plating due to carus collapse whereas excessive shortening (>2 cm) was seen in around 6 cases of PFN alone due to varus collapse. No case of deep venous thromboembolism or pulmonary embolism were seen in both the groups.

Functional outcome

At 12 months after operation, the pain, function, deformity, range of motion and total scores of the Harris score in group A were significantly better than those in group B, and the difference was statistically significant (p<0.05).[37]

Among them, the qualified rate of group A was 95.83% (23/24), and that of group B was 76.67% (23/30).

There was a significant difference in the qualified rate between the two groups (χ^2=3.881, p=0.049).

Comparison of Harris scores between the two groups at 12 months after operation.

For functional outcome evaluation, the EuroQoL-5D (EQ-5D) questionnaire was used to evaluate the patients' quality of life and functional status preoperatively and at the last follow-up. The EQ-5D questionnaire assesses mobility, self-care ability, level of activities, pain/discomfort, and anxiety/depression. Each of the dimensions was assigned one of three levels (no problems, some problems, and severe problems). The EQ-5D index score is calculated from these answers and gives a maximum score of 1.0, which indicates a very good quality of life, and the lowest is a score of 0, which is equivalent to death.[38]

In postoperative follow-up, no significant between-group difference was noted in the EQ-5D index score and functional status changes. We separately assessed the patient's mobility status according to the “mobility” dimension of the EQ-5D questionnaire. We found that both groups of patients suffered from deterioration of their mobility status after surgery, but no significant between-group difference was noted.

The average scoring of patients according to Salvati and Wilson criteria was 34 to 36 in twenty-eight patients [87.5%] and 22 to 24 in two patients [6.25%] and 20 in two patients [6.25%].[36]

Normal walking was resumed in 28 patients, four patients needed a walking aid for long distances. The excellent results are in 28 patients, good in two patients and fair in two patients. The excellent to good results are seen in 93.75% (30 patients) in our series.

In present study, at 9 months after operation, the pain, function, deformity, range of motion and total scores of the Harris score were evaluated in both the groups for functional outcome assessments. In group B, we had 10 excellent results and 16 good results. In group A, we had 12 had excellent results and 14 good results. Statistically significant difference was observed between the PFN in intertrochanteric femur fracture without lateral wall fixation (group A) and PFN in intertrochanteric femur fracture with lateral wall fixation (group B) for HHS at 9 months with better functional outcome in cases of lateral wall fixation.

CONCLUSION

PFN is still most widely used implant for these cases. But in unstable fractures due to posteromedial and lateral wall communition it has the disadvantage of recurring varus collapse and screw cut out. It also has a disadvantage of having only a single point fixation in head and neck. Advantages of augmentation of PFN with lateral wall plating are the to reinforce fixation and reduce medialization and shortening of the femoral shaft due to buttress effect to posteromedial cortex comminution, reduced rate of varus collapse, rotational and axial stability due to two-point fixation and earlier fracture healing.

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