

Original Research Article

Prospective study of prognosis of intertrochanteric fractures with lateral wall involvement as compared to intertrochanteric fractures with intact lateral wall

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ABSTRACT

Background: Intertrochanteric fractures with fracture lateral wall (FLW) are biomechanically unstable fractures.

Methods: 40 patients who met inclusion criteria underwent surgery. Post-operatively patients were followed up for a minimum period of 24 weeks. Radiological and functional assessment was done post-operatively. Endpoints of fracture were studied thoroughly.

Results: Secondary lateral wall fractures were common than primary lateral wall fractures. Functional outcome was found to be poor in FLW than intact lateral wall (ILW) group ($p=0.01$). HHS of ILW fracture was 70, while in FLW it was 46. Displacement was found to be a better radiological parameter to assess reduction quality ($p=0.02$) than neck shaft angle. Implant position with Cleveland method was found to be a better predictor of fixation quality than tip apex distance. There were 6 (15%) mechanical failures. Screw cut out (3 cases) found to be most common mechanical complication (7.5%). There were four failures (33%) in FLW. Secondary lateral wall fractures were found to have poor prognosis than primary lateral wall fractures. A2.3 was found to have more chance of conversion to A3 due to thinned out lateral wall. Many of them happened when DHS was the implant of choice (60%).

Conclusions: Functional outcome of FLW is poor than ILW. Secondary lateral wall fractures have worse prognosis than primary lateral wall fractures. Fragment specific fixation is difficult in secondary lateral wall fractures as compare to primary lateral wall fracture, due to higher comminution.

Keywords: Primary lateral wall fractures, Secondary lateral wall fractures, Intact lateral wall, Fracture lateral wall

INTRODUCTION

Intertrochanteric fracture with lateral wall involvement is unstable fracture.¹ Intertrochanteric fractures with lateral wall involvement are anatomically defined as those fractures including lateral femoral cortex distal to the vastus ridge.² Lateral wall fracture is one of the postulated causes of reoperations.² Fracture lateral wall can occur preoperatively at presentation or preoperatively.² The importance of an intact lateral

femoral wall for postoperative fracture stability has not been investigated in a large scale.² Fracture impaction is the key to success for healing of fracture. Lateral wall acts as a buttress while compression occurs at the fracture site during weight bearing. Thus the support from intact lateral wall is crucial.² There are various factors responsible for healing of unstable fracture like reduction and fixation quality of implants to neutralize all deforming forces.²⁻⁴ Objective of study is to compare

radiological and functional outcome of intertrochanteric fracture with or without lateral wall involvement.

METHODS

This study is a prospective observational study conducted at Department of Orthopedics, Apollo Hospitals, Chennai, Tamil Nadu, India during a period from November 2013 to December 2015. 40 cases of intertrochanteric fracture were considered for this study. Choice of implant was randomly chosen. All cases enrolled were managed with surgery (either PFNA or DHS). Of them, 22 (55%) were male and 18 (45%) were female patients. The age group varied from a minimum of 22 years to a maximum of 87 years (avg. age 66.4 yrs). The minimum follow up period was 24 weeks.

Inclusion criteria

Patients who is willing to participate in study.

Exclusion criteria

Patients who are medically unfit for surgery, head injury patients, pathological fracture (excluding osteoporosis), polytrauma patient and patients with compound fractures.

Sample size

To detect a difference of failure rates between fracture lateral wall (FLW) and intact lateral wall (ILW), with two tailed distribution, level of significance at 5%, power of 80% and allocation ratio of 2:1, the required minimum sample size would be 12 (FLW) and 24 (ILW) in each arm. We have met with the minimum required criteria of sample size with total 40 patients.

Preoperative protocol

Every patient presented in emergency with this fracture underwent radiological evaluation. Fractures were classified according to AO classification.⁵ All cases were enrolled into two groups, A1 and A2 included in intact lateral wall (ILW) and A3 in fractured lateral wall (FLW). FLW further has two categories. Intertrochanteric fractures with involvement of lateral wall at the time of presentation were grouped as primary lateral wall fracture (PLW). Those which had the lateral wall fracture intra-operatively were grouped as secondary lateral wall fractures (SLW). Following which patients were assessed and stabilized with temporary skin traction. Patient were explained about fracture and need for surgery and its associated complications. Informed surgical consent was taken.

Intra-operative protocol

Appropriate anaesthesia was given. Positioning was done with fracture traction table for all the patients. Initially closed reduction was attempted in all cases. If closed

reduction failed, percutaneous minimal invasive methods with reduction clamp were tried. Last resort of reduction was open method.^{4,9}

Implant

Choice of implant was on random basis: dynamic hip screw (DHS)-4 holed plate, lag screw with constant 135 degree angle and proximal femoral nail antirotation-II (PFNA-II)-long nail and fixed 135 degree helical blade.

Out of 40 patients, 11 (ILW-7, FLW-4) were managed with PFNA-II and 29 (ILW-21, FLW-8) were managed with DHS.

Operative procedure

Proximal femoral nailing antirotation

In supine position, on fracture table, affected leg is adducted 10-15 degree to get unimpeded access to medullary cavity of femur. Closed reduction of the fracture under image intensifier control was done. Determine the diameter of nail. Make a 5 cm incision approximately 5 to 10 cm proximal from the tip of the greater trochanter. Make a parallel incision of the fasciae of the gluteus medius and split the gluteus medius in line with the fibers. In AP view, the proximal femoral nailing antirotation (PFNA) entry point is usually on the tip or slightly lateral to the tip of the greater trochanter. 3.2 mm Guide Wire must be inserted on the tip or slightly laterally of the greater trochanter at an angle of 6. Insert the guide wire into the medullary cavity to a depth of 15 cm. Use 17 mm drill bit for proximal femur with 20 mm sleeve over 3.2 mm guide wire. Use image intensifier control to insert the PFNA. Carefully insert the PFNA manually as far as possible into the femoral opening. Slight twisting hand movements help insertion. The correct PFNA insertion depth is reached, as soon as the projected PFNA blade is positioned in the lower half of the femoral neck. Mount the appropriate 135° Aiming arm. Insertion of guide wire under c arm, confirm it under AP and translateral X-ray. Drill 11 mm drill for blade placement. Place helical blade with tapping over the outside end with hammer. Lock the blade with screwdriver. Insert static and dynamic distal locking screw.

Dynamic hip screw fixation

Patient Positioning was done with fracture table. Unaffected leg flexed and abducted. Fracture reduction was done with Traction. Skin incision was given from tip of trochanter till 10 cm distal over shaft of femur. Fascia lata was incised along the skin incision. Vastus lateralis was elevated. 135 degree guide handle was placed over lateral femoral shaft 2 cm distal to greater trochanter flare. Guide wire was drilled through distal segment of fracture and direction of wire and angle of anteversion confirmed under C-arm. Measure the lag screw length.

Triple reamer was used to ream till appropriate measured length. Tapping is done for threads of lag screw. Lag screw placement done with T handle. 4 holed plate with barrel fixed with cortical screw to the femoral shaft. Duration of surgery is one of parameter was defined from start of incision till end of wound closure.

Post-operative protocol

Post-operatively, patients underwent radiological evaluation for assessment of step down of fracture type (A2 to A3), reduction and fixation quality. In our series, primary and secondary lateral wall fractures were included into FLW group so as to ensure that the role of lateral wall in the outcome of trochanteric fractures was being assessed uniformly. Thus, A1 and A2 were classified under one group called Intact lateral wall (ILW) and primary and secondary lateral wall involvement were grouped under Fractured lateral wall (FLW).

Depending on fracture pattern according to AO classification, age of patient, Quality of reduction and fixation, patients were mobilized within 12 to 36 hrs from the surgery. Patients were discharged with appropriate oral analgesics.

Post-operative mobilization

Out of 40 patients, 29 (ILW-24, FLW-5) were mobilized as full weight bearing with walker support. Nine (ILW-4, FLW-5) were mobilized with partial weight bearing with walker support. One (FLW) was mobilized with non-weight bearing with walker support.

Follow up plan

After discharge patient was followed at 2, 6, 12 and 24 weeks from surgery.

Parameters used to study quality of reduction

Neck shaft angle

Angle between neck and shaft of femur.^{4,7,9,11}

Displacement

It is distance between two main fragments of intertrochanteric fracture. It should be <4 mm.^{4,7,9,11} In my study, displacement was the gap measured at posteromedial cortex in antero-posterior view of X-ray.

Parameters to quality of fixation

Tip apex distance

The tip apex distance (TAD) is the sum of the distance in millimeters from the tip of the screw to the apex of the femoral head on antero-posterior and lateral

radiographs.^{6,8,10} A tip apex distance <25 mm is protective of the screw cutting out of the femoral head.^{6,8-10,12} Baumgaertner et al first time described how to correctly measure on x ray film by taking magnification into consideration. Position of screw away from centre increases tip apex distance.^{7,8,10}

Position of lag screw

It is described by Cleveland and Bosworth method of nine Quadrants.^{6,8-10,11} For this both AP and translateral X-ray views of hip joint are required.

Compression at the fracture site is measured by sliding distance. Functional assessment is done by Harris hip score.

Statistical analysis

We used standard analytical tests to evaluate our data. All the continuous variables were assessed for the normality using Shapiro-wilk's test. If the variables follow normal distribution, they were expressed as mean±SD otherwise median (interquartile range). All the categorical variables were expressed as percentage or proportions. So comparison of continuous variables was done by either T test or ANOVAs test, if the variables were normally distributed. Comparison of nonnormal distributed continuous variables, if any, was done by Mann/Whitney U test or Kruskal Wallis H test based on number of groups available. Comparison of Categorical variables was done by Chi Square test or Fisher's exact test based on number of observation. Data entry was done in MS excel spread sheet. Data validation and analysis was carried out by SPSS version 16:0. All p values less than 0.05.

End points

- Union/ nonunion of fracture.
- Screw cut out: due to decrease in cervico-diaphyseal angle (NSA going into varus and screw with exit through head of femur).¹⁰
- Screw cut through: it is protrusion of blade or screw through centre of the head into joint without displacement of fracture. This can occur due to weak subchondral bone or screw barrel mismatch.¹⁰
- On X-ray it is seen as protrusion of blade or screw by 1 mm from femoral head.^{11,12}
- Screw pullout.

RESULTS

Comparison between ILW and FLW (demographic, fracture classification and ambulation variables)

Most of the patients were of elderly age group (mean age of 66 years).

There is negative correlation of age and harris hip score at 24 weeks in both groups and it is significant (p=0.02). There is no correlation of gender with functional outcome among ILW and FLW. Gender does not play role in final functional outcome. In this series, Right lower limb was more commonly involved than left in both groups. According to AO classification, A2 is the most common type of Intertrochanteric fracture. Primary lateral wall fracture is least common. In our series, there are only

10% primary lateral wall fractures. Secondary lateral wall fractures are 20%. There were 24 cases of A2 preoperatively. Out of which 8 got converted to fracture lateral wall. This table reveals that A2 (mainly A2.3) is very prone to get converted to A3. On comparison of preoperative ambulatory status to final functional outcome, Harris hip score is better among cases with better preoperative ambulatory status (Table 1).

Table 1: Comparison between ILW and FLW group.

Variables	ILW	FLW
	N (%)	N (%)
Age (yrs)	67.3	66.6
Gender		
Male	18 (64.3)	4 (33.3)
Female	10 (35.7)	8 (66.7)
Limb		
Right	18 (64.3)	8 (66.7)
Left	10 (35.7)	4 (33.3)
Pre-operative diagnosis	36 (90)	4 (10)
Postoperative diagnosis	28 (70)	12 (30) (Primary – 4, Secondary- 8)
Implant		
DHS	21 (75)	8 (66.7)
PFNA2	7 (25)	4 (33.3)
Postoperative ambulation		
Full weight bearing	24 (85.7)	5 (41.7)
Partial weight bearing	4 (14)	5 (41.7)
Non weight bearing	0	1 (8.3)
No ambulation	0	1 (8.3)
Duration (surgery)	0.46hr	0.36hr

There is correlation of implant type with final functional outcome but not significant according to bivariate analysis. There were 17 cases of type A2 managed with DHS in intact lateral wall group. Of them, 7 had conversion to fracture lateral wall, all of which were A2.3. Of them, 3 had failure. So, type A2.3 managed with Dynamic hip screw had maximum conversion rate to secondary lateral wall fracture postoperatively and higher failure rate.

Most of patient in both groups were mobilized with full weight bearing with walking aid. There is no significant correlation of duration of surgery and final functional outcome.

Radiological parameters

Quality of reduction

Displacement: In ILW there is negative significant correlation. Correlation was found to increase at each follow up (p=0.02). In FLW, similarly there is negative significant correlation in FLW group which found to be increase significantly at each follow up. Displacement in mechanical failures is significantly increasing with each

follow up which means that FLW is unstable and has poor prognosis (Figure 1).

Neck shaft angle (NSA): Varus Neck shaft angle reduction had poor results. Initial reduction of varus collapse in intertrochanteric fracture is very important to avoid future mechanical complication like screw cut out.

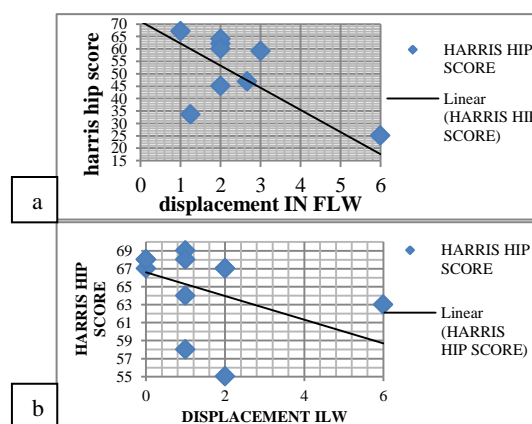


Figure 1 (a and b): Correlation with final functional outcome in ILW and FLW.

On x axis displacement at 0 weeks and on y axis harris hip score.

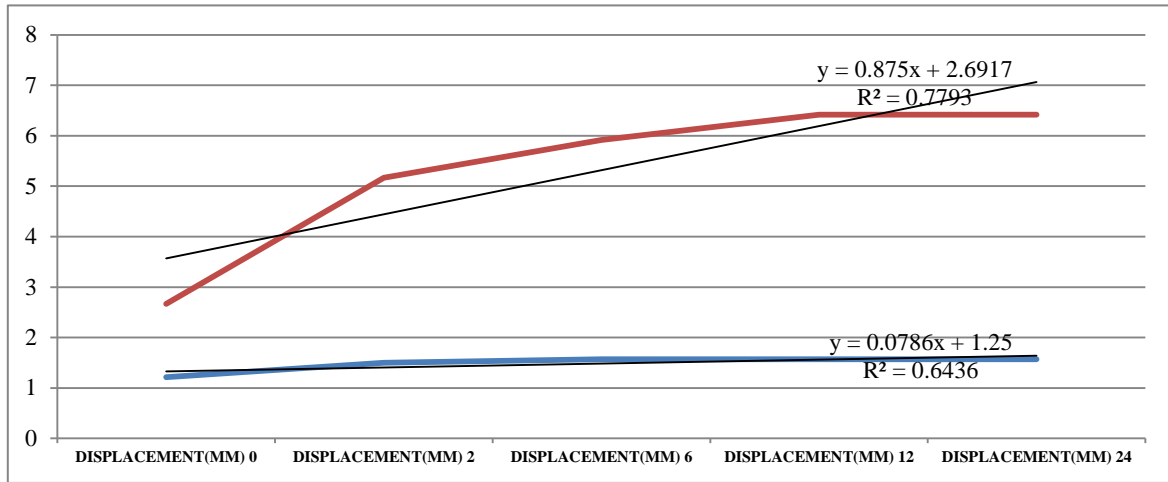


Figure 2: Trend line of displacement in ILW and FLW.

Red line: FLW; Blue line: ILW. On x axis follow up duration and on y axis displacement.

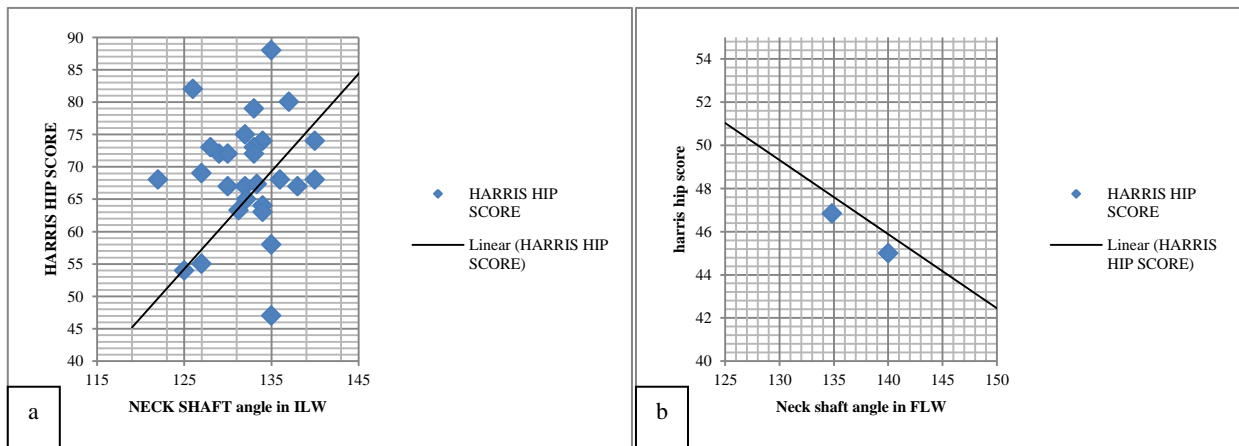


Figure 3 (a and b): Correlation of NSA at 0 weeks with final functional outcome in both groups.

On x axis neck shaft angle at 0 weeks and y axis harris hip score. The score is better among patient with reduction between neck shaft angle 120-140.

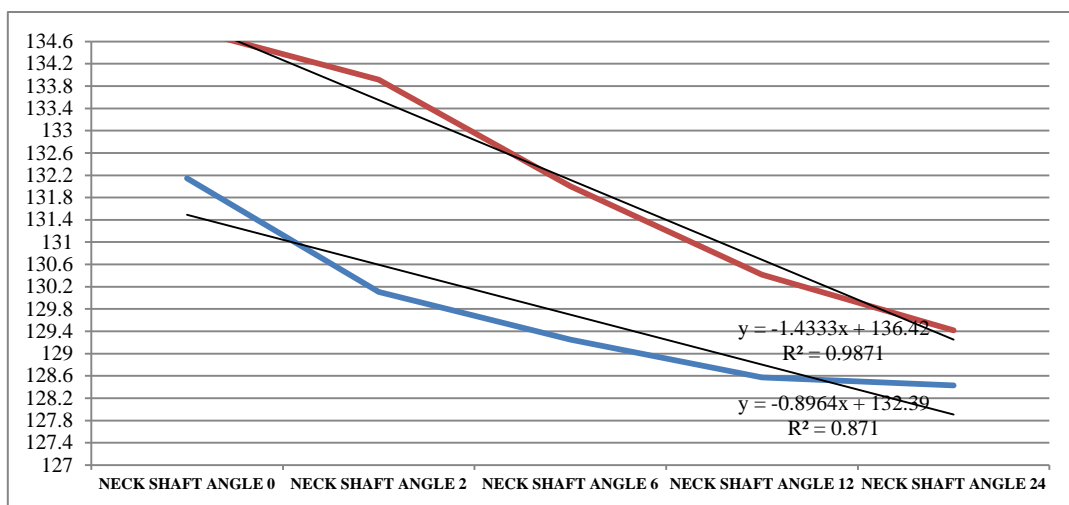


Figure 4: Trendline NSA in ILW and FLW.

Red line: FLW; Blue line: ILW. On x axis follow up period and on y axis is neck shaft angle. There is positive correlation but not significant in both ILW and FLW (p=0.4).

Quality of fixation

Assessed by Position of implant (POI) and tip apex distance (TAD).

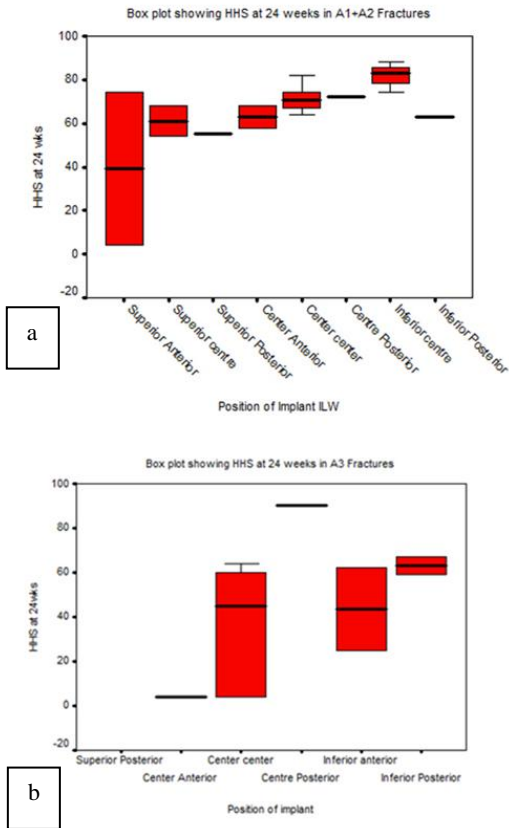


Figure 5 (a and b): Implant in femoral head in ILW and FLW group.

Position of implant Cleveland zone are nine in number: There is positive correlation of POI in ILW and FLW with final harris hip score (p=0.02). Position of implant in inferior-Centre Cleveland zone was found to better functional outcome in ILW group. Centre-posterior, inferior-posterior position of screw in femoral head also was found to have good final functional outcome. Centre-posterior Cleveland zone was found to have better functional outcome in patients with FLW group. Superior placement of screw had poor functional outcome and had more chances of failure in future.

Tip apex distance: Correlation of TAD with final functional outcome in ILW and FLW variable. TAD is not correlating with HHS and is insignificant (p value=0.3). Trendline of TAD in ILW and FLW on graphic representation.

Sliding distance

It was measured at 6, 12, 24 weeks. Sliding distance among type of fracture like ILW and FLW is variable and insignificant. However sudden increase in sliding distance in early follow up was common in FLW which make it more unstable and prone to implant failure in future.

Functional outcome with Harris hip score

Harris hip score (HHS) correlation with fracture type (ILW and FLW) significant and its correlation were found to be increasing with follow up (p=0.01). Harris hip score is better among ILW in comparison to FLW. Behaviour of HHS in different fracture types on follow up is presented in figure 7.

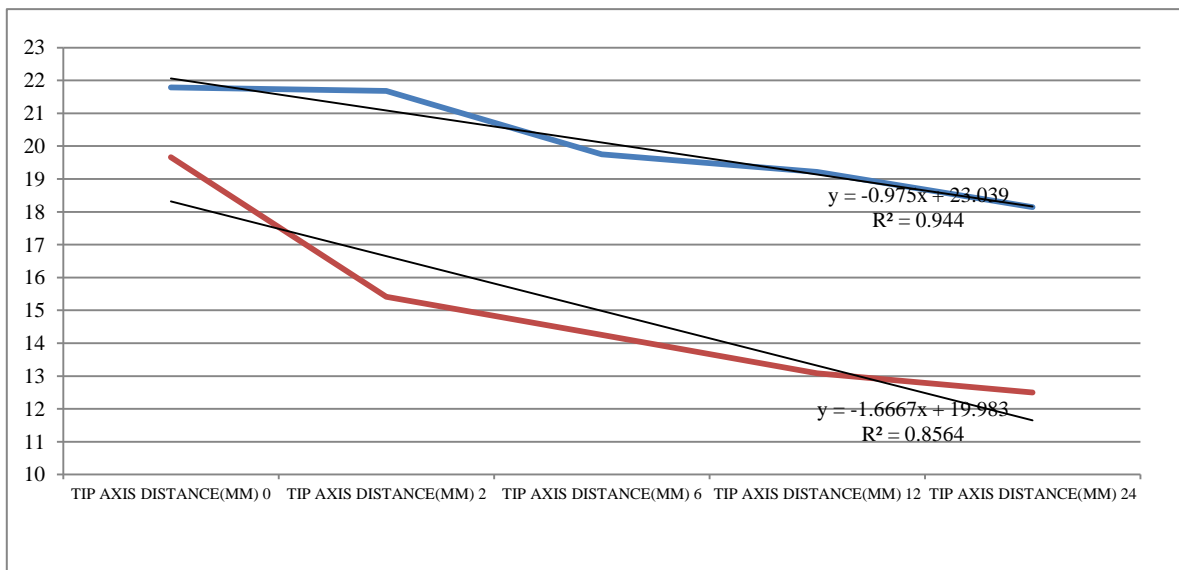


Figure 6: Trendline in both ILW and FLW group.

On x axis follow up period and on y axis tip apex distance. Red line: FLW; Blue line: ILW.

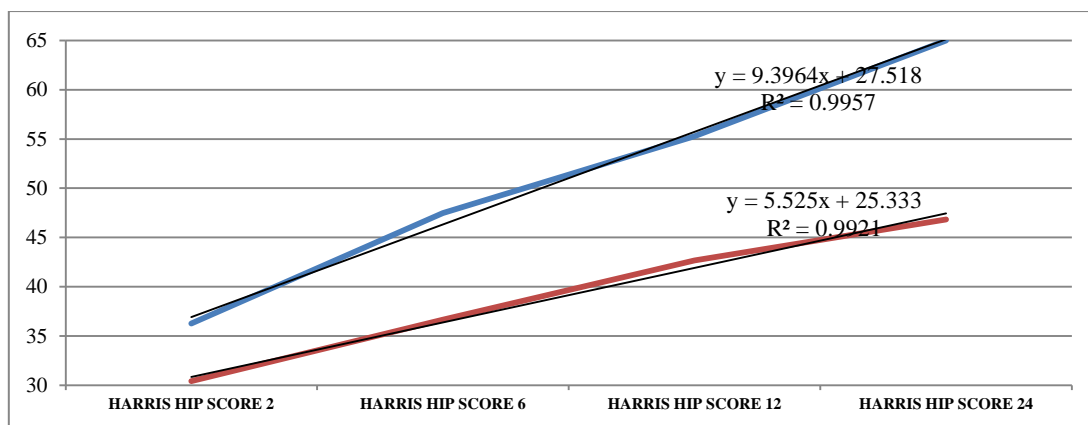


Figure 7: Trendline of functional outcome in ILW and FLW group.

On x axis follow up period and on y axis Harris hip score. Red line: FLW; Blue line: ILW.

Table 2: Endpoints of all 40 cases: all groups and their subgroups.

End point	Intact lateral wall (ILW)	Fractured lateral wall (FLW)	Total (ILW+FLW)	Primary Lateral wall	Secondary Lateral wall	Total (PLW+SLW)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Screw cut out	1 (3.6)	2 (16.7)	3 (7.5)	0 (0)	2 (25)	2 (16.7)
Screw cut through	0 (0)	1 (8.3)	1 (2.5)	0 (0)	1 (12.5)	1 (8.3)
Screw pull out	1 (3.6)	0 (0)	1 (2.5)	0 (0)	0 (0)	0 (2.5)
Non-union	0 (0)	1 (8.3)	1 (2.5)	0 (0)	1 (12.5)	1 (8.3)
Healed	26 (92.8)	8 (66.7)	34 (85)	4 (50)	4 (50)	8 (66.7)
Total failure/total patients in particular group	2/28 (7.2)	4/12 (33.3)	6/40 (15)	0/4 (0)	4/8 (50)	4/12 (33.3)

Endpoints of the study

Most common cause of failure was screw cut out. Most of failures were belongs to fractured lateral wall group (mainly secondary A3 group). Secondary lateral wall fractures had more failures than primary lateral wall fractures (Table 2).

There were total 12 patients in the fracture lateral wall group. There were 8/12 secondary lateral wall fractures. Other 4 patients were primary lateral wall fractures.

There were 4/12 failure in total lateral wall fracture, all of which were in secondary lateral wall group. There was no failure in primary lateral wall fracture. There were 2 failures in Intact lateral wall group. Screw cut out was found to be the most common mechanical complication. On correlation of fracture type and final functional outcome SLW group fractures had significantly poor outcome in comparison to PLW group within fractured lateral wall patients.

DISCUSSION

Incidence of type A3 fractures is 2.2% of all hip fractures and 3-5% of all petrochanteric fractures.^{4,12} These

fractures are biomechanically unstable.^{2,13,14} Previous similar studies with larger sample sizes suggest that lateral wall fractures consistently have poor prognosis than intact lateral wall fractures. So we decided to study the prognosis of lateral wall fractures following surgical intervention regardless of the type of implant.

Fracture impaction is the key to healing of Intertrochanteric fractures. Lateral wall act as buttress to the proximal fragment during this process.^{2,13-19} However, in lateral wall fractures, line of fracture is parallel to the sliding vector of fragments (high shear forces). This disturbs the fracture healing process.

As noted earlier compromise of the lateral wall is quite common during the surgery (Secondary lateral wall fractures). In our series we are convinced that this could be reduced to a minimum with a proper surgical technique and correct choice of implant. According to Palm et al, incidence of fracture lateral wall is 3%. Incidence of primary fracture lateral wall out of total fracture lateral wall is 26%. Incidence of secondary lateral wall fracture out of total fracture lateral wall is 68%.² In their study, Secondary lateral wall fractures were classified as part of A2. This may not give a clear picture of prognosis of lateral wall fracture as a whole. So, in our series, Secondary lateral wall fractures were

included in fracture lateral wall group (FLW). Mostly A2 (2.2, 2.3) fractures get converted to A3 peroperatively. Lateral wall fractures are prone to fail during follow up even after good quality of reduction and fixation as compare to intact lateral wall fractures.^{16,17}

According to Kochar et al, Type 2.3 is very unstable and vulnerable to lead to compromised lateral wall.^{2,17} Even in our series, 33% (8 cases) of A2 fractures, got converted to secondary lateral wall fractures peroperatively, of which around 90% (7/8 cases) belonged to A2.3 group. Conversely, 67% of all A2.3 fractures got converted to A3 peroperatively. So in A2.3, lateral wall is weak to withstand vigorous peroperative manipulation and fixation method.

In our prospective study, average age group is 66 years which is comparable to other similar studies.² In our series, most cases are of elderly age group. However younger patients had better final functional outcome. There is no relationship of sex of patient with outcome of Intertrochanteric fracture in all AO types in our study. In correlation to similar studies with larger sample size, there is no significant correlation between sex and outcome of fracture.^{9,12,19}

The average duration of surgery was 43 minutes and it did not correlate to final outcome.² These results are comparable to other studies. According to Aguado-Maestro et al, average duration of surgery is 46 minutes.⁸ According to similar studies with larger sample size, Primary lateral wall fracture is least common out of total Intertrochanteric fractures. Incidence of secondary lateral wall fractures is higher than primary lateral wall fractures.^{2,9,17} Our series revealed similar picture. In our study, 12/40 (30%) had lateral wall fractures. Only 4 (10%) cases were primary lateral wall fractures. Secondary lateral wall fractures were 8 (20%). According to Palm et al, Dynamic Hip screw is poor method of fixation in type A2.3 and A3 fractures as compare to intramedullary fixation device.^{2,5,9,16-19} In our series of cases, the prognosis is good in intact lateral wall fractures (A1 to A2.1) regardless of implant. However in compromised lateral wall fractures (A2.2 and above) especially secondary lateral wall fractures, dynamic hip screw is associated with poor prognosis. In this prospective study, there were six failures. Out of six, four failures in fractured lateral wall. Most failures were among secondary lateral wall fractures (mainly type 2.3) managed with dynamic hip screw.

According to various studies, neck shaft angle and displacement can be used as methods to assess quality of reduction in Intertrochanteric fractures. Displacement or neck shaft angle cannot be used alone to assess quality of reduction. Together NSA and displacement gives better idea of reduction.^{2,6,8,9,20} In our study, displacement was found to be a better measure of quality of reduction

($p=0.02$). There were 4 patients who had initial postoperative displacement more than 4 mm. Out of these four patients with poor quality of reduction, three had failure of reduction. Good cortical contact has better outcome.

In our study, neck shaft angle is not correlating with final functional outcome ($p=0.4$). However in initial immediate postoperative assessment, NSA within 120-140 had better outcome. According to Kirstin De Bruigin, Fractures have better outcome if NSA is reduced within 15 degree of individual normal NSA.

For better outcome of Intertrochanteric fracture better quality of fixation is as important as reduction. There are two methods described for this: 1) tip apex distance, 2) position of implant. Tip apex distance measurement method is described by Baumgaertner.^{6, 8,20} There are two methods for assessment of position of implant: 1) Parker's method.²¹ 2) nine quadrants of Cleveland and Bosworth.⁸ Out of these, more acceptable one is Cleveland method.^{6,8,20,22}

In our study, position of implant was better measure to assess quality of fixation ($p=0.01$). Cleveland method of nine quadrants to assess quality of fixation has significant correlation with final functional outcome. In our study, maximum fractures were reduced in centre- centre position. But positions like inferior-centre, inferior-posterior had better functional outcome in both ILW and FLW groups. According to literature, inferior placement is best position of implant.^{8,22}

In our study, tip apex distance is not correlating with final functional outcome ($p=0.3$). It revealed that position of implant is much more important than maintaining tip apex distance. There was strong support of tip apex distance as predictor of prognosis in previous literature. This may be supported if tip apex distance was measured only in cases with superiorly placed lag screw of femoral head. Because in our series as well as literature data, inferior placement of position of screw was found to have better final functional outcome in all type of Intertrochanteric fracture. So tip apex distance in these cases will be high. According to Herman et al, position of implant to assess quality of fixation has greater importance than TAD.²²

In our study, final functional outcome is poor in FLW group than ILW patients even after good quality of reduction and fixation ($p=0.01$). Further in FLW patients, secondary lateral wall fractures had poorer prognosis as compare to primary lateral wall fractures. As per our series, it is hypothesized that due to relatively higher comminution in secondary lateral wall fractures than primary lateral wall fractures; fracture fragments are less amenable for fragment specific fixation in secondary lateral wall fractures.

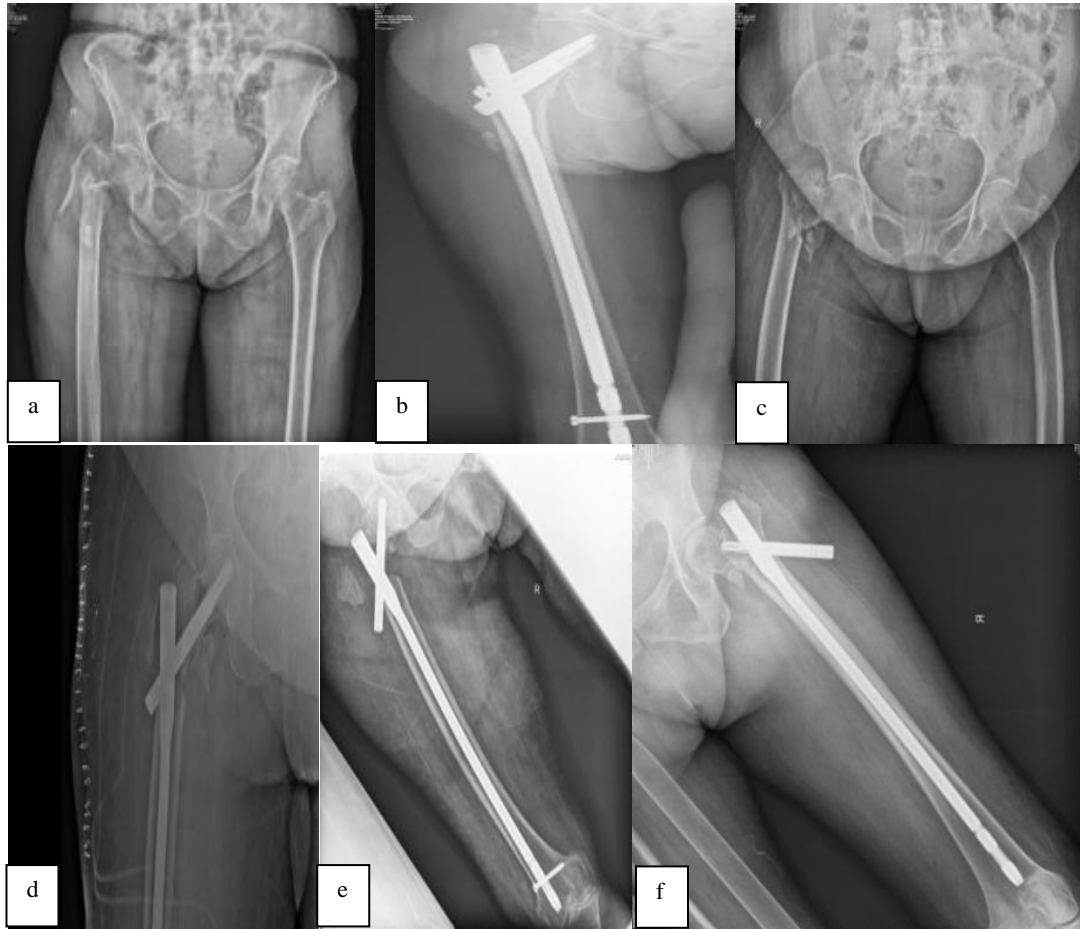


Figure 8: (a and b) Pre-operative and final healed fracture at 24 weeks of A3 fracture respectively, (c-e) pre-operative A2.3 which got compromised lateral wall postoperatively, (e) follow up X-ray at 24 weeks, there is absorption of comminuted fragments. In both cases, we can see that comminution in primary lateral wall fracture is relatively less than secondary lateral wall fracture and (f) screw pull out in one case due to reinsertion of helical blade.

There are many complications associated with intertrochanteric fracture like mechanical and non-mechanical. There were no non-mechanical complications like infection, hematoma formation in our series. Mechanical complications are screw cut out, screw cut through, screw pull out. Screw cut out is most common out of these.^{9,12} According to Aguado-Maestro et al, incidence of mechanical complication is 7% and screw cut out account for 3%.^{9,12} In our study, most common complication in intertrochanteric fracture is screw cut out. There were three cut outs in six failures (out of 40 patients). There were six failures among 40 cases. The main cause of failure was lateral wall involvement.

There were two atypical failures. One was in A1.1 type. This patient was managed with PFNA-II implant. The cause of failure in this patient was due to reinsertion of helical blade of different size due to length error. Helical blade gets hold in cancellous bone of femoral head and neck by impaction while insertion. Re-inserted helical blade does not have good hold to cancellous bone. This can lead to weakening of pull out strength. Due to this,

screw had pull out during mobilization within 2 weeks of follow up (Figure 8f).

The other failure was in Type A2.1. In this patient, the cause of failure was due to poor quality of fixation with superior placement of screw. Due to this, it led to screw cut out early during follow up. There was no mortality in our series during follow up.

CONCLUSION

Final functional outcome of FLW is poor than ILW among the Intertrochanteric fractures. Screw cut out is the most common mechanical complication associated with internal fixation of Intertrochanteric fracture. Screw cut out is more common in FLW (SLW>PLW subgroup) group. Displacement is better method of assessment of quality of reduction. Position of implant has greater importance than tip apex distance to assess quality of fixation. SLW fractures (subcategory of fracture lateral wall) has worse prognosis than PLW (subcategory of FLW). Sex does not play much role in final functional

outcome. Patients having better pre-injury ambulation has better final function outcome.

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Ethical approval: The study was approved by the institutional ethics committee

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