

Functional outcome of surgical management of intetrochanteric fracture treated with dynamic hip screw and augmented with stainless steel wire - A prospective study

¹Dr. Aakash Vaidya, Junior resident, Department of Orthopaedics, Ashwini Rural Medical College, Hospital & Research Centre, Kumbhari, Solapur, Maharashtra 413006, India.

²Dr. Shrinivas Yemul, Professor, Department of Orthopaedics, Ashwini Rural Medical College, Hospital & Research Centre, Kumbhari, Solapur, Maharashtra 413006, India.

Corresponding Author: Dr. Aakash Vaidya, Junior resident, Department of Orthopaedics, Ashwini Rural Medical College, Hospital & Research Centre, Kumbhari, Solapur, Maharashtra 413006, India.

How to citation this article: Dr. Aakash Vaidya, Dr. Shrinivas Yemul, “Functional outcome of surgical management of intetrochanteric fracture treated with dynamic hip screw and augmented with stainless steel wire - A prospective study”, IJMACR- March - 2023, Volume – 6, Issue - 2, P. No. 165 – 171.

Open Access Article: © 2023, Dr. Aakash Vaidya, et al. This is an open access journal and article distributed under the terms of the creative commons attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: The demographics of world population are set to change, with more elderly living in developing countries. The highest hip fracture rates are seen in North Europe and the US and lowest in Latin America and Africa. Asian countries show intermediate hip fracture rates. With rising life expectancy throughout the globe, the number of elderly individuals is increasing in every geographical region, and it is estimated that the incidence of hip fracture will rise from 1.66 million in 1990 to 6.26 Million by 2050. Intertrochanteric fractures of femur are common in old age group. Unlike fractures of neck of femur, there are less complications like, avascular necrosis of head and its sequelae of osteoarthritis

Aim: To study the functional outcome of surgical management of intetrochanteric fracture treated with dynamic hip screw and augmented with ss wire

Material and Methods: A prospective study was done on patients with Intertrochanteric Fracture coming to orthopedic department at tertiary health care center for a duration of November 2020 to November 2022. Total 20 patients, were included in this study. Patient were followed from 6 weeks to 6 months on OPD basis at intervals of 6 weeks, 12 weeks, 6 months and was evaluated. Findings were recorded in the proforma and entered in Microsoft Excel 2010. Data analysis was done with the help of SSPS Software version 20.0.

Results: The 57.23 mean age was observed. Male cases were predominantly higher than female cases. Most of the cases were observed with A2 type AO classification.

Most of the cases were observed without any associated injury. 1.52-hour mean surgery time was observed. More than 300 ml mean blood loss was observed among study participants. Near about 30% cases were observed with post op complications. 18.93 weeks mean time was observed for bony union. At 6th months clinically and functionally significant improvement was observed among the participants.

Conclusion: DHS is the GOLD STANDARD implant for treating intertrochanteric. Fractures, DHS alone cannot achieve the same results in unstable Intertrochanteric fractures due to complications like excessive medialization of The femoral shaft, screw cut-out, limb shortening, and proximal or lateral Migration of the greater trochanter. DHS supplemented with cerclage wiring helps achieve anatomical reduction, imparts stability, and produces outstanding results in unstable intertrochanteric Fractures with one intermediate fragment (AO type – 31A2.2) and two or more Intermediate fragments (AO type – 31A2.3).

Keywords: Intertrochanteric Fracture, Dynamic Hip Screw, Stainless Steel Wire, Ao Classification.

Introduction

More old people will live in emerging nations, which will impact the demography of the Global population. North Europe and the US have the greatest incidence of hip Fractures, whereas Latin America and Africa have the lowest rates. Hip fracture rates in Asia are in the middle. The number of senior people is growing in every part of the world as life expectancy Increases, and it is predicted that the incidence of hip fracture would increase from 1.66 million in 1990 to 6.26 million by 2050. Femur intertrochanteric fractures are frequent in the elderly. Contrary to femur neck Fractures, avascular necrosis of the head and its osteoarthritis sequelae are

lessCommon problems. Although trochanteric fractures may heal without surgery, Malunion with coxa vara deformities that shorten the limb and cause a limp are Frequently observed. Up until the introduction of surgical treatment involving the useOf various implants in the 1950s, hip fractures were treated using conservative Methods based on traction and bed rest. Various surgical procedures with various Implants have been documented for the treatment of intertrochanteric fractures due to These factors, as well as the negative effects of extended immobilization in Conservative therapy.

Early mobilization is the main treatment objective in order to prevent secondary Complications, and dynamic hip screws and great trochanteric fixation (Stainless steel Wiring) are two surgical procedures that can accomplish this because they allow for Early weight bearing and have fewer complications than other implants. This study examines the effectiveness of increased trochanteric fixation and a dynamic Hip screw with augmentation of Stainless Steel wiring in the treatment of intertrochanteric Fractures.

Objective: To evaluate the functional outcome of intertrochanteric fracture and greater Trochanter fracture treated with Dynamic Hip Screw augmented tension Stainless Steel Wiring

To evaluate the post-operative complications of augmented Dynamic Hip Screw in intertrochanteric fracture augmented by Stainless Steel Wiring

Material and Methods

A prospective study was conducted over period of two years from November 2020 to November 2022 in Orthopedic department of Ashwini rural medical college, hospital and research Centre, Solapur. All patients admitted with Intertrochanteric fracture were included in

the study. All cases of pathological fractures, polytrauma patients, RTA. Patients below 40 years were excluded from this study

Data Collection Procedure

Patient was followed from 6 weeks to 6 months on OPD basis at intervals of 6 weeks, 12 weeks, 6 months at the institute and was evaluated.

Clinical Evaluation

During this period in each visit clinical evaluation of pain, lower limb function and range of movements were assessed and recorded. Clinically fracture was considered united when there was no tenderness at the fracture site and full lower limb function is present. Radiologically fracture was regarded as united when there is no visible fracture line. Results were evaluated by the use of Harris hip score based on pain, function, range of motion and anatomy for each case assessed and recorded.

Statistical Analysis

Data was entered in EXCEL sheet and analyzed using SSPS Software version 20.0. Data was presented in the form of tables, charts and graphs and also in terms of mean, SD and percentage; and assessed by ANOVA test. P-value is set at 0.05 at a confidence interval of 95%.

Results and observations

Present study consists of 30 patients with Intertrochanteric fracture.

Table 1: Age Distribution

Age (in years)	No of cases	Percentage (%)
≤ 50	8	26.67
51 – 60	12	40.00
61 – 70	8	26.67
> 70	2	6.67
Total	30	100
Mean ± S.D	57.23 ± 9.28	

The table 1 shows distribution of cases as per age. Most of the cases were seen at 5th decade with mean age of 57.23 years of age.

Table 2: Mode of Injury

Mode of injury	No of cases	Percentage (%)
Fall from height	24	80.00
Heavy object lifting	1	3.33
Road traffic accident	5	16.67
Total	30	100.00

Table 2 shows mode of injury. Fall from height was the most common mode of injury.

Table 3: Gender Distribution

Gender	No of cases	Percentage (%)
Male	27	90.00
Female	3	10.00
Total	30	100.00

Table 3 shows gender observed in the study.

Table 4: Associate Injury

Associated Injury	No of cases	Percentage (%)
Chest	2	6.67
Head	1	3.33
No any	27	90.00
Total	30	100.00

Table 4 shows associated injury in the present study.

Table 5: AO type of fracture

AO Classification	No of cases	Percentage (%)
A1	9	30.00
A2	19	63.33
A3	2	6.67
Total	30	100.00

The Table 5 shows cases presented with AO type of fracture in present study. A2 was the most common type of fracture seen.

Table 6: Blood Loss

Blood loss	No of cases	Percentage (%)
≤ 200	3	10.00
205 – 400	26	86.67
> 400	1	3.33
Total	30	100.00
Mean ± S.D	315.3±64.10	

Table 6 shows Blood Loss

Table 7: Clinical Union (In weeks)

Time to union (in weeks)	No of cases	Percentage (%)
13 – 16	9	30.00
17 – 21	14	46.67
> 21	7	23.33
Total	30	100.00
Mean ± S.D	18.93±2.55	

Table 7 shows the duration needed for clinical union in present study.

Table 8: Surgical Time

Surgery time (Hours)	No of cases	Percentage (%)
≤ 1.30	4	13.33
1.31 – 2	17	56.67
> 2	9	30.00
Total	30	100.00
Mean ± S.D	1.62±0.35	

Table 8 shows the duration needed for Surgery

Table 9: Complications

Post op complications	No of cases	Percentage (%)
Infection	1	3.33
Shortening	6	20.00
Malunion	1	3.33
Displacement	3	10.00
No any	19	63.33
Total	30	100.00

The Table 9 shows post op complications observed in present study.

Table 10: Follow up HARRIS HIP SCORE

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Week6	30	60.00	70.00	64.8333	3.18491
Month3	30	68.00	78.00	72.8333	3.18491
Month6	30	83.00	94.00	89.0667	3.84110
Valid N (listwise)	30				

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Week6	64.8333	30	3.18491	.58148
	Month6	89.0667	30	3.84110	.70129

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Week6 & Month6	30	.855	.000

In the present study at HARRIS HIP score was noted at 6 weeks, 3 months and at 6 months. At 6th month significant improvement in HARRIS HIP score was observed in all the cases with p value <0.0001***.

Discussion

The prevalence of intertrochanteric fracture in older people is rising globally. This is a result of osteoporosis1-3 and people living longer. The majority of fractures result from insignificant trauma. Before the development of the medullary canal, an intertrochanteric fracture is defined as a fracture spanning from the extracapsular basilar neck region to the region along the lesser trochanter. Fractures that have fragmentation in the posteromedial cortex are considered unstable. Orthopaedic practice necessitates making numerous difficult decisions. Non-specific factors like restricted resources, budgetary restrictions, patient noncompliance, etc. have an impact on all decisions. Despite these obstacles, we work to make decisions that are accurate.

Treatment for fractures now aims to maximize limb function as soon as possible rather than just union of the fracture. This anecdote emphasizes that proximal femoral fractures are one of the most frequent fractures: "Humans come into the world through the pelvis and leave the world through the shattered hips." Present study was conducted with the aim of To Study Intertrochanteric fracture fixation using Dynamic hip screw and greater trochanter tension band wiring.

Age

In the present study most of the cases i.e. 40% cases were observed having age from 51 to 60 years followed by 26.67% each cases were observed having age less than 50 years of age and having age from 61 to 70 years of age where 6.67% cases were observed having age more than 70 years of age. 57.23 years mean age was observed during the study period.

In study conducted by Soni A and colleague³⁹ (2021), 70.1 years mean age was observed among the study participants.

Gender

In the present study male cases were predominantly higher than female cases with M: F ratio of 9:1. 90% cases were male cases and 10% were female cases.

In study conducted by Soni A and colleague³⁹ (2021), female to male ratio was 22:18.

Mode of injury

In the present study 80% cases were observed with fall from height, 16.67% cases were observed with road traffic accident and 3.33% cases were observed with heavy object lifting.

In study conducted by Soni A and colleague³⁹ (2021), The mechanism of injury was mostly trivial trauma in the form of slip and fall; 3 cases were observed with road traffic accident and 1 cases with fall from height

AO Classification

In the present study 63.33% cases were observed with A2 classification, 30% cases were observed with A1 classification where 6.67% cases were observed with A2 classification.

In study conducted by Fu CW et al (2020)⁴⁰, 73.07% cases were observed with A2 classification and 26.93% cases were observed with A3 classification.

Side

In the present study 56.67% cases were observed with right side injury where 43.33% cases were observed with left side injury.

In study conducted by Sara H and colleague⁴¹ (2018), 30% cases were observed with right side injury where 70% cases were observed with left side injury.

Associated injury

In the present study 6.67% cases were observed with chest injury as associated injury where 3.33% cases were observed with head injury. 90% cases were observed with no any associated injury.

Surgery time

In the present study 1.52 hours mean surgery time was observed. 56.67% cases were observed having surgery time more than one and half hour but less than 2 hours, 30% cases were observed having surgery time more than 2 hours where 13.33% cases were observed having surgery time less than or equal to one and half hour.

Blood loss

In the present study 315.3ml mean blood loss was observed among the study participants. 86.67% cases were observed having blood loss more than 200 ml and less than 400 ml, 10% cases were observed having blood loss less than or equal to 200 and 3.33% cases were observed having blood loss more than 400ml.

Post op complications

In the present study 36.67% cases were observed with post op infection, 20% cases were observed with shortening, 10% cases were observed with displacement and 3.33% each cases were observed with infection and malunion respectively. 63.33% cases were observed without any post op complications.

In study conducted by Hassankhani EG et al⁴² (2014), 10% each cases were observed with nil cut out and non-union respectively, 25% cases were observed Varus deformity $>15^{\circ}$, 17.5% cases were observed with shortening more than 2 cm, 15% cases were observed with revision.

Time to union

In the present study 46.67% cases were observed having time union from 17 to 21 weeks, 30% cases were observed having 13 to 16 weeks where 23.33% cases were observed having union time more than 21 weeks.

Clinical outcome (Harris hip score)

In the present postoperatively cases were observed for clinical outcome by using Harris hip score. At 6 weeks 64.83 mean Harris hip score was observed among study participants, at 3 months 72.83 mean score was observed where 89.07 mean Harris Hip score was observed at 6th month. Statistically significant difference was observed post operatively. ($p < 0.0001^{***}$)

Functional outcome

In the present study at 3 months 50% cases were observed with ability to sit and stand up and do regular activities without support where at 6 months 93.33% cases were observed were able to do regular activities where 6.67% cases were not observed with regular activities.

Conclusion

18.93 weeks mean time was observed for bony union.

At 6th months clinically and functionally significant improvement was observed among the participants.

Although DHS is the GOLD STANDARD implant for treating intertrochanteric fractures, DHS alone cannot achieve the same results in unstable intertrochanteric fractures due to complications like excessive medialization of the femoral shaft, screw cut-out, limb shortening, and proximal or lateral migration of the greater trochanter.

DHS supplemented with cerclage wiring helps achieve anatomical reduction, imparts stability, and produces outstanding results in unstable intertrochanteric fractures with one intermediate fragment (AO type - 31A2.2) and two or more intermediate fragments (AO type - 31A2.3). A DHS implant that includes cerclage wiring is also reasonably priced.

We reached to the conclusion that DHS enhanced with Tension wiring band in unstable intertrochanteric fractures is a successful procedure with excellent functional and radiological outcomes, and higher rates of rehabilitation

References

1. D. K. Dhanwal, C. Cooper, and E.M. Dennison. Geographic Variation in Osteoporotic Hip Fracture Incidence: The Growing Importance of Asian Influences in Coming Decades. Journal of Osteoporosis. Volume 2010, Article ID 757102, 5 page
2. Falch JA, Lieback A, Slungaard U. Epidemiology of hip fractures in Norway Acta orthopscand 1986 ;56 :12-16
3. Evans, E.M.: Trochanteric fractures, J Bone Joint Surg 1951; 33B: 192-204
4. Tronzo RG. Special considerations in management. OrthopClin North Am 1974;5:571-583.

5. <http://traumainternational.co.in/classifications-intertrochanteric-fractures-clinical-importance/>
/13/1/21 – 2.00 PM.
6. Cleveland M, Bosworth, Thompson FR.
Intertrochanteric fracture of femur a survey a survey of treatment in traction and by internal fixation . J bone joint surg 1947; 29:1049-67.