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SUBTROCHANTRIC FEMORAL FRACTURE AND DYNAMIC CONDYLAR SCREW- INSTITUTIONAL STUDY

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Abstract:

Subtrochanteric fracture accounts for 10-15% of all fractures, 10-34% of all hip fractures and 7-10% of proximal femoral fractures. The main aim of subtrochanteric femur fracture management is restoration of optimal function, early rehabilitation in the shortest time by the most reliable and the safest method in our hand. This prospective study aimed to assess the functional outcome of subtrochanteric femur fractures fixed with dynamic condylar screw. Patients were selected as per our inclusion criteria and follow up visits were planned at the interval of 4 weeks for a minimum of 10 months. Union was seen within 20 weeks in 15 patients (68.2%) and within 28 weeks in 5 of the patients (22.7%) another 2 patients (9%) took average 2 weeks for union. Use of DCS for fixation of subtrochanteric femur fracture gives variable functional outcome especially in Seinsheimer type IIIA subtype. It took longer operative time, more blood loss which accounts for higher infection rate and more time to union, need to be randomized study in large study group to analysis outcome of DCS in subtrochanteric femur fracture.

Keywords: *Sub trochanteric femur, interlocking nail, dynamic condylar screw, compression plate.*

Introduction

Fractures of the proximal femur are relatively common injuries in adults. The incidence of fractures of the proximal femur is increasing.¹ These fractures are burden to both society and individual. They may be caused by either low or high energy trauma.² Subtrochanteric fractures typically occur in the proximal femur from the inferior aspect of the lesser trochanter to a distance of about 5 cm distally. Subtrochanteric fracture accounts for 10-15% of all fractures, 10-34% of all hip fractures and 7-10% of proximal femoral fractures. Subtrochanteric fractures are difficult to treat because most fractures are unstable and cortical diaphyseal bone is involved which has poor vascularity & poor healing capacity as compared to cancellous bone of trochanteric area. There is high stress in this area and powerful muscles pull acting in different directions therefore nonoperative treatment often fails. Earlier,³⁻⁵ treatment options were few and less effective as compared to presently available various modalities of treatment. Early forms of treatment included casting, splinting and traction. Now the subtrochanteric fractures are best treated surgically in most cases. The treatment has evolved and changed over a period of time, from conservative to operative, from extramedullary devices to intramedullary devices, from open reduction and fixation to newer minimally invasive techniques. Even with the well developed armamentarium of fixation devices available with the modern day trauma surgeon, the amount of spatial complexity seen in these fractures frequently challenges even the best. The main aim of subtrochanteric femur fracture management is restoration of

optimal function in the shortest time by the most reliable and the safest method in our hand. The treatment modalities in vogue today are extramedullary devices like dynamic hip screw, dynamic condylar screw, locking compression plate, condylar blade plate and intramedullary devices like Gamma Nail, interlocking intramedullary nail, proximal femoral nail.⁶⁻¹⁰ Among the extramedullary devices, condylar blade plate insertion is technically demanding, so this study is undertaken to determine the functional outcome of fixation in series of subtrochanteric femur fracture with dynamic condylar screw.

Material And Methods

This prospective study aimed to assess the functional outcome of subtrochanteric femur fractures fixed with dynamic condylar screw was conducted. Patients were selected as per our inclusion criteria like normal femoral anatomy which allowed osteosynthesis without compound

subtrochanteric femur fractures in skeletally mature patients. Follow up visits were planned at the interval of 4 weeks for a minimum of 10 months. On each visit, clinical examination was done and radiographs were procured and data regarding infection, pain, activity of daily living, union, screw back out and implant failure were recorded.

Observations And Results

This prospective study was carried out between January 2015 to December 2016. During the study period, out of all the patients of subtrochanteric femur fracture admitted, those who fulfilled the inclusion criterion and consented for the study were enrolled. 4 patients were lost to follow up so the final analysis comprises of 22 patients. The mean age of the patient was 43.3 years with male to female ratio of 2.1: 1. In present study, road traffic accident (54.5 %) was the most leading cause of injury. In older age group, the usual mode of trauma was trivial and fall on ground (31.8 %).

Table No. 1
Age And Sex Incidence

Age group in years	Number of patients		Total number of patients	Percentage
	Male	Female		
<=30	2	1	3	13.6
31 – 45	7	3	10	45.5
46 – 60	3	3	6	27.3
>60	3	0	3	13.6
Total	15	7	22	

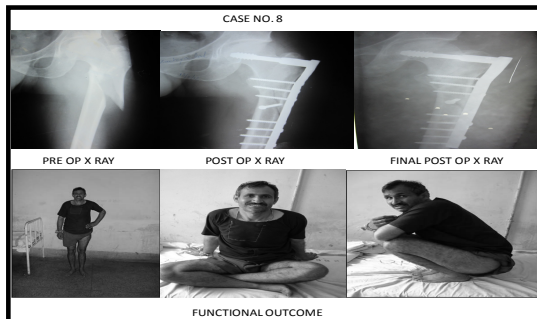
Table No. 2
Patient Distribution According To Fracture Classification

Seinsheimer Classification	Number of patients	Seinsheimer Classification	Number of patients
Type I	0	Type IIIA	14
Type IIA	0	Type IIIB	3
Type IIB	2	Type IV	1
Type IIC	2	Type V	0

The most common fracture in the present study as per Seinsheimer Classification was Type IIIA (63.6%). The mean duration between injury & surgery was 9.3 days of the 22 patients. Five patients (22.7%) had associated bony injury. Out Of the 22 patients, 5 patients had hypertension (22.7%)

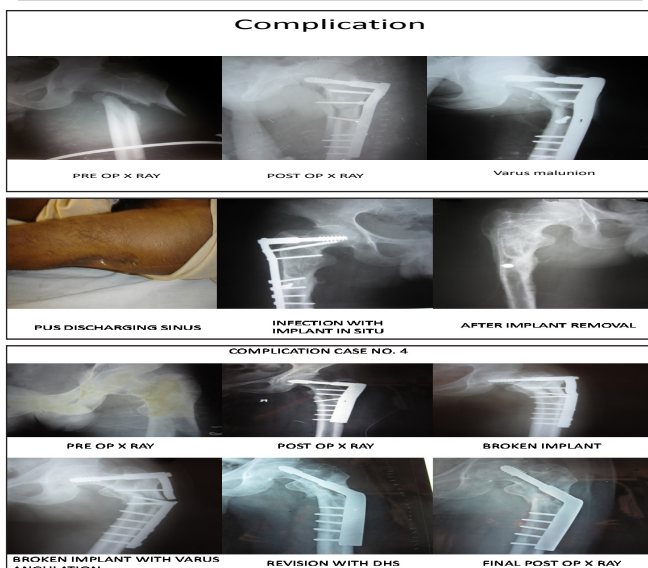
and 3 patients had diabetes mellitus (13.6%).The mean duration of surgery was 40 minutes. All the 22 patients were followed up for an average period of 11.2 months (Range: 10 months to 16 months). At final follow-up, 6 out of 22 patients (27.3%) had occasional mild to moderate pain for which no

medication was required. 8 patients (36.35%) had mild to moderate pain daily which necessitated regular use of analgesics .patients (36.35%) report no pain at final follow up.



Complications
Table No.3

S. No.	Complications	Number of cases
1	Superficial Infection	3
2	Deep Infection	1
3	Deep Vein Thrombosis	0
4	Bed Sores	0
5	Non Union	1
6	Various Deformity	1
7	Broken Implant	1
8	Chest Infection	0
9	Superior Cut out of the screw	0
10	Screw Backing out	2
11	Fracture femoral Shaft at the distal end of the plate	0



Union was seen within 20 weeks in 15 patients (68.2%) and within 28 weeks in 5 the patients (22.7%). In 1 patient it took 32 weeks (4.5%) and in 1 patient it took 40 weeks (4.5%) to unite. Average time to union was around 21.8 weeks.

Time To Union In Weeks:-
Table No. 4

Weeks to Union	Number of patients
Up to 20 weeks	16
21 to 28 weeks	4
29 to 36 weeks	1
After 36 weeks	1

Result according to fracture type

In present study there were no patients with Seinsheimer type I, IIA and type V. In type IIB there were 2 patients. In type IIC there were 2 patients. In type IIIA there were 14 patients. In type IIIB there were 3 patients. In type IV there was only 1 patient.

Table No 5
Final Results Using The Harris Hip Score

Harris Hip Score	Result	Number of Patients
Less than 70	Poor	3
70 – 79	Fair	4
80 – 89	Good	14
> 90	Excellent	1

Discussion

Average age of patients in present study was 43.3 years (range 28 – 68 years). The recorded average age of the patients is lower as compared to the western literature.11,12 In the present study 15 patients (68%) out of 22 patients were males and 7 were female patients (32%). Males sustained these injuries more frequently as compared to females. The available literature also shows higher male predominance. In present study RTA (54.4%) was the principal mode of trauma. The rest of the patients had injury following trivial trauma and fall (31.8%) which was common in elderly patients. Rest (13.7%) of patients suffered from fall from height. In the series of R. V. Velasco et al13 (42 %) suffered

from RTA and in rest (58%), injury was caused either due to trivial and fall from height. RTA was principal mode in present series due to undisciplined traffic in our country.

Table No. 06
Comparison of fracture pattern in different series as per Seinsheimer classification

Seinsheimer Classification	Seinsheimer study ¹⁷ (1978)	Dobozi Study ¹⁸ (1986)	Roshan D. Haria Study ¹⁹ (2000)	Present series
I	01	00	00	00
II A	01	05	04	00
II B	07	19	08	02
II C	01	06	04	02
III A	18	13	09	14
III B	04	08	11	03
IV	07	08	28	01
V	08	20	11	00
Total	47	79	75	22

The most common fracture pattern in present study is Seinsheimer type IIIA. In Seinsheimer study¹⁴ it was type III A, in Dobozi study¹⁵ it was type V and in Roshan D. Haria study¹⁶ it is IV. So different literatures describe different types of common fractures. Present study has similarity with the Seinsheimer study. The Injury operation interval in our study was 9.2 day as compare to other western study, was more due to other waiting patients, delay in arrangement of implants, our being a and few elderly patients who had to undergo more detailed preoperative work up.

At final follow-up, 6 out of 22 patients (27.3%) had occasional mild to moderate pain for which no medication was required. 8 patients (36.35%) had daily mild to moderate pain which necessitated regular use of analgesics. So at final follow up (63.65%) had complaints of pain. 8 patients (36.35%) reported no pain at final follow up. Ahrengart et al in¹⁶ his series had pain in 26% patients

and Saudan et al¹⁷ had pain in 21% patients at final follow up. Compared with available literature, we had higher percentage of patients complaining pain at final follow up. Sadowski et al¹⁸ reported 31% rate of implant failure with the Dynamic condylar screw in 19 patients. Haidukewych et al¹⁹ retrospectively analyzed results of fixation with angled blade plate, dynamic condylar screw and sliding hip screw in forty seven patients (AO/OTA type 31A3.1 to 31A3.3). In 2001 they reported implant failure rates of 13%, 30% and 56% respectively. The implant failure (13.6%) in present series consisted of backing out of screw in 2 patients and broken plate in 1 patient. Existing literature has wide variation in the magnitude of implant failure. The reasons for this are multi factorial including poor implant quality and poor patient compliance.

In western study Yong et al and Rahme et al^{20,21} infection rate was 3.5%, and we had 3 case of superficial infection and 1 case of deep infection.

The rates of infection with open surgery for unstable subtrochanteric and intertrochanteric fractures have stayed consistently around 3 to 5% in various studies. In present series we had higher rate of infection (18.1%) that can be contributed to poor infrastructure of Operation theatre, poor hygiene as compared to western world and more injury operation interval and more duration of surgery.

In present series average time to union was around 21.8 weeks. In the series of Kim SY et al²² he reported an average union time of 20 weeks. The average time to union was higher in present series. It may be due to poor nutritional status of patients in our country.

In present series 1 patient (4.5%) had non union as compared to Warwick et al²³ who had 2.8% of non union, Kulkarni and Moran et al²⁴ who had 22.4% of non union and Nungu et al¹¹ who had 20% non union. So the rate of non union was comparable with the available literature.

At the final follow up, the average Harris hip score was 81 as compared to Rohilla et al²⁵ who had mean score of 88. In fracture type IIB, results were good in 1 patient (50%) and poor in 1 patient (50%). In fracture type IIC, result was good in 1 patient (50%) and fair in 1 patient (50%). In fracture type IIIA, result was excellent in 1 patient (7.1%), good in 9 patients (62.3%), fair in 3 patients (21.4%) and poor in 1 patient (7.1%). In fracture type IIIB, result was good in all 3 patients (100%). In fracture type IV, result was poor in 1 patient (100%). In present series the results were- poor in 3 patients (13.6%), fair in 4 patients(18.2%), good in 14 patients(63.6%) and excellent in 1 patient(4.5%). Rohilla et al²⁵ had Excellent results in 28% and Good

in 72%. He had none patients with poor or fair results. Celebi et al²⁶ in his series of 21 patients had excellent result in 14 patients (66.7%), good in 7 patients (33.4%) and none with fair or poor results.

Summary & conclusion

Use of DCS for fixation of subtrochanteric femur fracture gives excellent to good functional outcome especially in Seinsheimer type IIIA subtype. DCS fixation has a longer operative time, more blood loss which accounts for higher infection rate and more time to union. DCS fixation has a higher complication rate. Though it is a non randomized study with small sample size and short follow up, we recommend analysis with randomized trial in enough sample size for use of DCS for subtrochanteric femur fracture.

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