



SUPRACONDYLAR FRACTURE;

Functional outcome of femur fixed with dynamic condylar screw

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ABSTRACT... Objective: Management of supracondylar femur fracture is complex. The objective of this study was to assess the functional outcome of our patients managed with dynamic condylar screw fixation. **Methods:** This descriptive case series was carried out in the department of Orthopedic Surgery, Dow University of Health Sciences / Civil Hospital Karachi from 6th October, 2012 to 5th April, 2013. All the patients with Type A supracondylar fractures of femur diagnosed clinically and radiologically presenting within two weeks of injury were included. Patients with systemic injuries were excluded. Final functional outcome were assessed by Schatzker and Lambert Criteria. **Results:** A total of 97 patients were included in this study. The average age of the patients was 38.36 ± 9.45 years (years + SD) and average duration of fracture was 6.10 days. Male to female ratio was 2.03: 1. Two third of patients (67.01%) were injured by road traffic accident, 28.87% suffered fall from height and 4.12% had slips. Acceptable outcome (Excellent and Good) at three months was observed in 86.6% (84/97) patients while unfavorable outcome (Moderate and poor) were observed in 13.4% (13/97) cases. Outcome was better in patients below 50 years of age ($p=0.0005$). **Conclusions:** Dynamic condylar screw appeared to be an easy, less technically demanding and effective method for stabilization of supracondylar femur fractures. Younger age group (age <50yrs) had better functional outcome.

Key words: Supracondylar femur fracture; dynamic condylar screw; functional outcome

Article received on:
05/04/2014
Accepted for Publication:
05/07/2014
Received after proof reading:
16/08/2014

Article Citation: Chachar MB, Ghulam Mustafa KK, Solangi NA, Supracondylar Fracture; Functional outcome of femur fixed with dynamic condylar screw. Professional Med J 2014;21(4): 644-648.

INTRODUCTION

Supracondylar femur fractures are complex injuries, difficult to manage and associated with potential complications¹. These fractures show bimodal distribution, trauma being the common cause in young individuals while osteoporosis in the elderly population. Although managed conservatively in the initial era but with improvement in the available implants and surgical techniques, operative treatment is now considered as a standard treatment option². Internal fixation allows early ambulation and range of motion which avoids knee stiffness³. There are number of options available for fixation of these fractures, including distal femur locking plate⁴, dynamic condylar screw (DCS) and retrograde intramedullary supracondylar nail⁵. All types of fixation devices have been utilized efficiently and

have their own merits and demerits. Soft tissue care during surgical exposure plays an important role and preserves blood supply to the fractured segments¹. Kao et al⁶ compared minimally invasive fixation of supracondylar femoral fractures by using dynamic condylar screw and less invasive stabilization system and reported comparable results with good outcome and few complications.

Christodoulou et al⁷ compared intramedullary nail with dynamic condylar screw for fixation of femur supracondylar fracture and reported comparable results however intramedullary nail had short operating time with little blood loss. In our hospital these fractures are managed with dynamic condylar screw. The aim of this study was to evaluate the outcome of these fractures managed

with dynamic condylar screw at our hospital.

METHODS

It was a descriptive case series, carried out in the department of Orthopedic Surgery, Dow University of Health Sciences / Civil Hospital Karachi from 6th October, 2012 to 5th April, 2013. Sample size was calculated and it turned out to be 97. The cases were selected by non probability consecutive sampling. We included all the patients, of both genders, 20-60 years old, having non pathological, closed Type A supracondylar fractures of femur diagnosed clinically and radiologically. Only the patients presenting within two weeks of injury were included.

The patients having active infection anywhere in the body or any associated systematic Injury (Head injuries & abdominal injury) were excluded.

After taking informed consent from the patients regarding study and surgery was admitted in ward and operated on elective list. Procedure in all the cases was performed by experienced surgeons under spinal anaesthesia.

Lateral approach was undertaken and an appropriate length lag screw after proper reaming and tapping was inserted over guide wire. Once the lag screw was in place, side plate was applied. Final positioning was checked on table and wound was closed in layers after placing a suction drain. Broad spectrum antibiotics were given to all patients just before induction and continued up to 3 days post surgery. Analgesics were given according to need. Post operative rehabilitation was similar in all the patients with active and passive range of motion starting on 1st postoperative day and non weight bearing mobilization was allowed in 1st week with crutches. Patients were discharged after 1 week of surgery and were then followed up in outpatient department. After 12 days of surgery stitches were removed. Final functional outcome were assessed by Schatzker and Lambert Criteria (Table-I) at the end of 3rd month of surgery and good to excellent results were recorded as acceptable⁷. All the data were recorded on pre-

designed proforma.

Data analysis was done on statistical software packages (SPSS 18.0). Clinical characteristics were summarized in terms of frequency and percentage for categorical / qualitative variables like gender, mode of injury, site and acceptable functional outcome (good to excellent yes/no). Continuous / quantitative variables (age, time interval between trauma and surgery, duration of fracture) were analyzed using mean and standard deviation. Stratification was done with regards to age, gender and duration of fracture to control the effect modifiers. Chi square test was applied to see any statistically significant difference and P-value = 0.05 was taken as significant.

RESULTS

A total of 97 patients having closed Type A supracondylar fractures of femur diagnosed clinically and radiologically were included in this study. Approximately half of the patients were between 31 to 40 years of age. The average age of the patients was 38.36 ± 9.45 years (years + SD); similarly the average duration of fracture was 6.10 days. More patients were male i.e. 65 (67.01%) and 32 (32.99%) were female with male to female ratio 2.03: 1. Regarding mode of injury, approximately two third i.e. 67.01% were injured by road traffic accident, 28.87% suffered fall from height and 4.12% had slips. Most of the surgical procedures were performed within 5 days while 27.84% patients were operated in 5 to 10 days and 21.65% were done 10 days after fracture.

Functional outcome in patients with supracondylar femur fractures fixed with dynamic condylar screw is presented in figure 1. Excellent outcome was observed in most of the patients and good and poor outcome was seen in fewer cases. Acceptable outcome (Excellent and Good) at three months was observed in 86.6% (84/97) patients while unfavorable outcome (Moderate and poor) were observed in 13.4% (13/97) cases.

Rate of acceptable outcome of supracondylar femur fractures fixed by dynamic condylar screw was significantly high ($p=0.0005$) in below 50

years of age as seen in Table-II. However favorable outcome was not statistically significant among the two genders; 89.2% in male and 81.3% were observed in female. Acceptable functional outcome with respect to duration of surgery from fracture is again not statistically significant (Table-III).

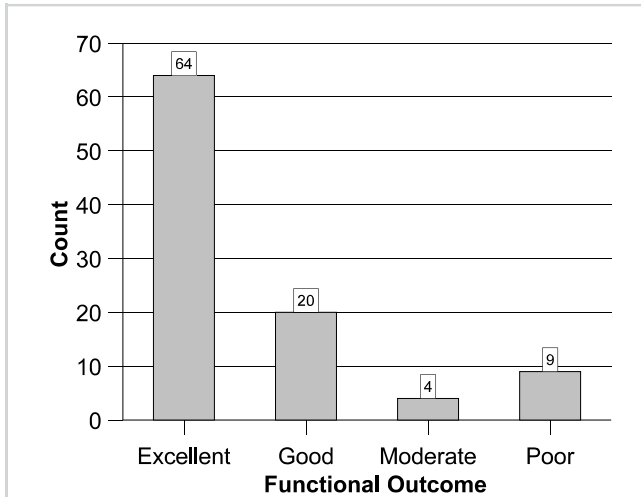


Fig-1. Functional outcome of supracondylar femur fractures fixed by dynamic condylar screw (n=97)

DISCUSSION

Dynamic condylar screw fixation for supracondylar femur fracture appeared to be an effective technique with most of our patients having acceptable outcome after surgery. Supracondylar fractures of the femur are often difficult to treat and these remain difficult surgical challenge even for the experienced surgeons because these require careful management to obtain good cosmetic and functional results. The difficulty arises from the fact that the surgeon needs to counter-balance the powerful muscles forces around the fracture with close management. In recent years great advances

have been made in the understanding and techniques of internal fixation. Over the time different types of implants have been used for the fixation of these fractures. Dynamic condylar screw (DCS) was found to be less technically demanding and provided good to excellent results as compared to other implants⁸⁻¹¹.

The dynamic condylar screw is technically easier to apply, and allows more freedom in the coronal and sagittal planes because the plate and screw are in separate pieces⁸.

The DCS is an effective method of treating supra condylar fracture of the femur with a wide range of advantages. However, extensive soft tissue dissection can lead to infection and frequent need for bone grafting. Indirect reduction and bridge plating with DCS can produce favorable results in complex distal femur fracture¹².

In our study the average age of the patients was 38.36±9.45 years. Out of 97 patients 65 (67.01%) were male and 32 (32.99%) were female with male to female ratio 2.03: 1. In our study there was male preponderance due to more exposure of more males to trauma. Also working age group (31-40 years) peoples which are involved in outdoor activities got such fractures. As in this country and in other Muslim countries the male to female ratio is high as compared to western studies because of less active participation of females in outdoor activities in those societies. In Hakeem et al¹¹ study out of 31 patients 23 were male, and 8 were Female with male to female ratio 3:1.

<p>Excellent</p> <ul style="list-style-type: none"> <input type="checkbox"/> Full extension <input type="checkbox"/> Loss of flexion <10° <input type="checkbox"/> No varus or valgus deformity <input type="checkbox"/> Perfect joint congruency <input type="checkbox"/> No pain 	<p>Good (any one of the following)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Loss of length not >1.2cm <input type="checkbox"/> Varus of valgus deformity <10° <input type="checkbox"/> Flexion loss of not >20° <input type="checkbox"/> Minimal pain 	<p>Moderate (any two of the following)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Loss of length not >1.2cm <input type="checkbox"/> Varus of valgus deformity <10° <input type="checkbox"/> Flexion loss of not >20° <input type="checkbox"/> Minimal pain 	<p>Poor (any of the following)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Flexion <90° <input type="checkbox"/> Varus of valgus >15° <input type="checkbox"/> Joint incongruency <input type="checkbox"/> Disabling pain
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Table-I. Schatzker and Lambert criteria

Age Groups (Years)	Acceptable outcome		Total
	Yes	No	
20-30 years	23	-	23
	100%	-	
31 to 40 years	44	-	44
	100%	-	
41 to 50 years	13	5	18
	72.2%	27.8%	
51 to 60 years	4	8	12
	33.3%	66.7%	

Table-II. Acceptable functional outcome of supracondylar femur fractures fixed by dynamic condylar screw by age groups

Chi-Square test; p=0.0005

Duration	Acceptable outcome		Total
	Yes	No	
Within 5 days	46	4	49
	91.8%	8.2%	
5 to 10 days	23	4	27
	85.2%	14.8%	
> 10 days	16	5	21
	76.2%	23.8%	

Table-III. Acceptable functional outcome of supracondylar femur fractures fixed by dynamic condylar screw by duration

Chi-Square test; p=0.0005

In present study road traffic accident was the most common mechanism for injury (67.01%) followed by fall from height (28.87%) and 4.12% of the patients slipped on the floor. Marya et al¹³ reported road traffic accidents (92%) as the commonest cause for femoral fractures while in another study¹⁴ 82% of femoral fractures resulted as a result of road traffic accident. Shahabuddin¹⁵ reported 45.71% of cases due to road traffic accident, followed by 28.57% cases due to fall from height, and 25.71% cases due to firearm injury. In another

study from India Sudheer et al¹⁶ reported 77.5% of the patients presented with road traffic accident.

In present study functional outcome in patients with supracondylar femur fractures fixed with dynamic condylar screw excellent outcome was observed in 65.98% cases, good outcome was 20.62% and moderate and poor outcome was 13.4%. Acceptable outcome (Excellent and Good) was observed in 86.6% (84/97) patients while unfavorable outcome (Moderate and poor) were observed in 13.4(13/97) cases. Similar result was also observed in Hakeem et al¹¹ study, in that study excellent outcome was 58%, good 19.3%, fair 12.9% and poor was 9.6%. Khan reported in his study that excellent results were achieved in 60%, good in 20%, moderate in 17% and poor in 3% of fractures fixed with dynamic condylar screw¹⁷. The dynamic condylar screw is an impressive method of treatment of these fractures with advantages of early active knee motion, full range of movement preserved, stable internal fixation and maintenance of joint congruity⁸. Dynamic condylar screw is easier to fix and provides more stability and allows early mobilization as compared to other fixation devices.

Limitation of our study was unavailability of a comparison group. This study may help in future research work in order to compare this technique with other modalities available for this fracture type.

CONCLUSIONS

Dynamic condylar screw appeared to be an easy, less technically demanding and effective method for stabilization of supracondylar femur fractures. However care to be taken to preserve soft tissue envelop in order to achieve acceptable outcome. Younger age group (age <50yrs) had better functional outcome. DCS can be used in subsequent patients with supracondylar fracture of femur.

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