

Functional Outcome of Dynamic Condylar Screw (DCS) in the Treatment of Unstable Proximal Femoral Fractures in Adult Patients

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ABSTRACT

Objective: To determine the functional outcome of dynamic condylar screw in the treatment of unstable proximal femoral fractures in adult patients.

Methods: This descriptive study was conducted in Department of Orthopedics, Bolan teaching hospital Quetta from January 2017 to December 2018. All adult patients of proximal femoral fractures meeting the inclusion criteria were fixed with dynamic condylar screw (DCS). Post operatively functional outcome was assessed Harris Hip Score.

Results: We operated 147 patients with mean age of patients 54.26 ± 5.14 years. The male to females ratio was 1.94:1. Post operative functional outcome was excellent in 69 (46.4%) patients, good in 58 (39.45%), fair in 12 (8.16%) and poor in 8 (5.44%) patients. Post operatively Harris Hip score was excellent (>90) in 69 (46.94%) patients, Good score (80-89) in 58 (39.45%) patients, Fair score (70-79) in 12 (8.16%) patients and poor score (<70) in 8 (5.44%) patients. Non union was reported in only 3 (2.04%) patients.

Conclusion: Unstable proximal femoral fractures fixed with Dynamic Condylar Screw (DCS) results in excellent and good functional outcome in majority of patients. We therefore recommend DCS as a suitable alternative to intramedullary implants to treat subtrochanteric fractures.

Key words: Dynamic condylar screw, Functional outcome, Unstable Proximal femur fractures,

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INTRODUCTION

Fractures of the proximal femur are one of the most common and the most frequently operated fractures in the human body.¹ Most of the hip fractures occur in people older than 60 years of age, usually caused by low energy trauma e.g trivial falls during daily physical activity. Due to osteoporosis in advance age fixation of these fractures are more likely to fail, malunited or went into non union.² In younger patients, high energy trauma is responsible for such fractures. Failed internal fixation carries a poor prognosis and leads to an increase in the length of hospital stay and healthcare costs.³

Since its introduced in 1970s, Dynamic Hip screw (DHS) has been the mainstay of treatment for fixation of proximal femoral fractures. However it has been

observed that proximal femoral fractures with unstable configurations such as AO (Arbeitsgemeinschaft für Osteosynthesefragen) type A2 or A3 fractures or fractures with broken lateral wall of greater trochanter, reverse oblique fractures, subtrochanteric fractures and comminuted proximal femoral fractures, treated with DHS alone results in various complications such as valgus collapse of neck, screw cutout and poor functional outcome.⁴

Other treatment modalities to treat these fractures are intramedullary implants like Proximal Femoral Nail Anti Rotation (PFNA), Reconstruction Nail (Recon Nail), Russel Taylor Nail, Gamma Nail, and extra medullary devices like Dynamic Hip Screw with Trochanteric Stabilizing Plate (DHS with TSP), AO 95 angled condylar blade plate. The PFNA and Gamma nails are costly and many Orthopedics surgeons are not well acquainted with their application. DCS is a better option in the unstable proximal femoral fracture which exerts vertical forces on weight bearing.² DCS has many advantages. It is a sturdy, stable and strong implant especially when there is a lateral trochanteric cortex blow out and posteromedial subtrochanteric comminution & where

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Intra-medullary Coxa- femoral Implants are likely to fail.^{5,6} The unstable proximal femoral fractures fixed with DCS leads to early healing of the fracture and prompt early restoration of patient mobility.²

Various studies have shown a comparatively better functional outcome(Harris Hip Score) with DCS than with other implants of fixation.^{2,7} Unstable proximal femoral fractures are very common in our society and until time no single specific recommended surgical option is present for this difficult and unstable fractures. The objective of this study was to evaluate the functional results of DCS in unstable proximal femoral fractures using Harris Hip Score.

METHODS

This descriptive study was done at the department of Orthopedics of Bolan Teaching Hospital ,Quetta from 1st January 2017 to December 2018 after approval from hospital ethical committee and consent from the patients. The sample size was 147,using 13.3% proportion of the excellent result, 95% confidence level and 5.5% margin of error with WHO Software. ⁷ A total of 147 patients of either sex and age between 25 to 80 years, AO Type A2(Comminuted inter-trochanteric fractures with fracture extending to involve lesser trochanter) and A3(lateral wall or posteromedial wall fracture, reverse obliquity fractures and fractures extending into sub trochanteric location) fractures of less than 04 weeks duration were enrolled in our study. All patients with pathological fractures, non ambulatory, not fit for surgery and those lost to follow up were not included in our study.

All patients, qualifying the selection criteria were subjected to study and written and informed consent were taken from the patients. Patients were admitted either through Emergency or Outpatient department. Diagnosis and classification of fracture were based on x-ray findings. All the patients underwent surgical intervention using fracture table and image intensifier for reduction and using 4 or 6 hole DCS and appropriate sized lag screw. Patients were kept in ward for 2 days and then were discharge with oral antibiotics, analgesics and calcium supplements. Postoperatively patients were mobilized as soon as possible on crutches allowing toe touch to the ground on affected side for initial 6 weeks and then full weight bearing thereafter. Patients were

followed in OPD at the end of 1st,3rd and 6th month. At each visit, x-ray were obtained and fracture were evaluated. Functional outcome were measured at the end of 6 months follow up duration using Harris Hip Score. The patient's data were recorded on a structured proforma. The software used for the analyzing the data was the Statistical Package for Social Sciences(SPSS) version 18. Numerical values like age and Harris Hip Score were represented by mean and standard deviation while gender and functional outcome were represented by frequency and percentage. The results were presented in tabulated form where necessary.

RESULTS

The total number of patients in our study were 147 with mean age of patients 54.26 ± 5.14 years. Males predominated (n=97, 65.99%) with male to females ratio of 1.94:1. Proximal Right sided femur fracture was the commonest(75.51%,n=111).The age group distribution were 25-45 years (n=45 – 30.62%) , 46-65(n=60,40.81%) and above 65(n= 42,28.57%). Motor bike road traffic accident was the main mechanism of injury followed by other vehicle accident and remaining having fall or other mechanism of injury. Most of the patients having no co morbidity. (table I).

All the patients presented to the hospital with a man of 4.8 ± 1.3 days after sustaining the fracture. The surgery was performed after a mean hospital stay of about 1.5 ± 0.5 days. It took us a mean of 110 ± 15 minutes to complete the surgeries and the average blood loss was 250 ± 35 ml on the table while about 300 ± 90 ml on an average was lost after the surgery. The mean stay in hospital was 2.5 ± 1.5 days while the average follow up period was 9.2 ± 2.5 months. Patients having A2 fractures were 87(59.19%) while those with A3 were 60(40.81%).The mean blood transfusion rate were 1.21 ± 0.50 .Deep infection was noted in only 3 (2.04%) patients and the implants were removed from them. 5 (3.40%) patients with superficial infection were managed conservatively. No leg limb shortening was observed. We documented excellent Harris Hip Score(>90) in 69(46.94%) patients, Good score(80-89) in 58 (39.45%) patients, Fair score(70-79) in 12(8.16%) patients and poor score(<70) in 8(5.44%) patients as shown in table II.

Table I. Demographic characteristics of patients

Characteristics		Frequency (n)	Percent (%)
Sex	Male	97	65.99
	Female	50	34.01
Side of limb fractured	Right	111	75.51
	Left	36	24.49
Mechanism of injury	Motor bike accidents	76	51.70
	Others RTA*	34	23.13
	Fall	26	17.69
	Others	11	7.48
Type of fracture	A2	87	59.19
	A3	60	40.81
Age in years	25-45	45	30.62
	46-65	60	40.81
	>65	42	28.57
Co morbidity	No	98	66.67
	DM*	16	10.88
	HTN*	14	9.52
	IHD*	11	7.48
	Renal	2	1.36
	Others	6	4.08

Abbreviations* ; RTA ;Road Traffic Accidents, DM; Diabetes Mellitus ,HTN; Hypertension

Table II. Intra and Post operative surgical variables

Variable	Mean ± Standard deviation / Frequency (%age)	
Mean hospital stay	2.5 ± 1.5 days	
Mean follow up	9.2 ± 2.5 months	
Mean blood loss	110 ± 15 minutes intraoperative, 300 ± 90 ml post operative	
Mean union time	6.3 ± 1.4 weeks	
Complications	Superficial infection	3 (2.04%)
	Deep infection	5(3.40%)
	Implant failure	0(0.0%)
	Non union	3(2.04%)
Harris Hip Score	Excellent >90	69(46.94%)
	Good (80-89)	58 (39.45%)
	Fair (70-79)	12(8.16%)
	Poor <70	8(5.44%)
Mean blood transfusion rate	1.21 ± 0.50	

DISCUSSION

No consensus has been achieved regarding the ideal implant to treat subtrochanteric fractures and various implants were used for better functional outcome and radiological union.⁸ Compression, tensile, and torsional stresses along with decreased vascularity of the subtrochanteric region have challenged orthopedic surgeons with problems of mal-union and non-union. Moreover, subtrochanteric fracture causes more blood loss than neck femur or intertrochanteric femur fracture.

Incidences of implant failure and poor functional outcome following subtrochanteric fractures of femur are not uncommon.⁹ The DCS is easy to apply than condylar blade plate. It allows correct axial and transitional alignment of the fractured extremity without damaging vascularity of the comminuted fracture fragments.¹⁰ Most of our patients having excellent Harris hip score and only few patients having complications. The overall patient satisfactory score level was high. Shah¹¹ used the dynamic compression screw fixation for the subtrochanteric fracture and

noted early weight bearing and fracture union. There complication included superficial infection, implant failure and limb length discrepancy. Their average hip score was 84 with 50% of their patients had excellent hip score, 30% good score and only two patients showed poor result. Kulkarni¹² did a comparative study of using DCS and PFN for the subtrochanteric fracture. They found that the delayed union, surgery time, non union and infection rate is more with DCS as compared to PFN. The non union were found in 17.5% of the patients with DCS which is much higher than our study. However the mean surgical time was about 64 mins which is lower than our findings. Vashisht¹³ did a comparative analysis of DCS and 95 degree angle blade plate. They found that the radiological union occur more early in DCS group as compared to blade plate. The union time with DCS was 12- 16 weeks which is almost similar to our findings. Similarly the excellent Harris score was found in 93.33% of the DCS group which is much higher than our findings. Neogi¹⁴ found that the average blood loss was 250 ml which is much less than our blood loss. The average hospitalization in their study was 14 days which is several times higher than our findings. They had limb length discrepancy in 5 cases and external rotation in 4 cases. While in our study no such findings were found. In a comparative study of DCS and Gamma nail the authors documented no significance differences in the functional outcome of the two except that the recovery was earlier in gamma nail patients.¹⁵ One meta analysis concluded that the intramedullary implants reduces the operative time as well as the implant failure rates as compared to extramedullary implants.¹⁶ Rohilla¹⁷ having the union time of 16 weeks which is similar to our findings. However they have leg limb discrepancy in 7 patients which is higher than our study. Similarly the Harris hip score was 88 which is higher than our study. Overall, the prognostic factors depends upon the type of fracture, its location as well as physical condition of the patient. The more communication and co-morbidities the more morbidity of the patient.¹⁸

There are few limitations in our study. We did not make a comparison of functional outcome in our population of using intramedullary device as well as dynamic compression screw. Our follow up duration was short and the data of lost to follow up patients was not included in the analysis.

CONCLUSION

Unstable proximal femoral fractures fixed with Dynamic Condylar Screw (DCS) results in excellent and good

functional outcome in majority of patients. We therefore recommend DCS as a suitable alternative to intramedullary implants to treat subtrochanteric fractures.

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Authorship and Contribution Declaration

Hameedullah Kakar, conception and design of the study, acquisition of data,

Amanullah Kakar, interpreted the data, drafted the manuscript, final approval of the version for publication, revised the manuscript critically for important intellectual content