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ASSESSMENT OF FRACTURE UNION IN CASES OF SUBTROCHANTERIC FEMORAL FRACTURES MANAGED WITH DYNAMIC CONDYLAR SCREW

Dr. Syed Hahib Ullah[*1], Dr Zulfaqar Ahmad[2], Dr. Zubair Kareem[3], Dr Rameesha BVH[4]

*[*1,3]Assistant Professor Department of Orthopedic Surgery DG Khan Teaching Hospital, DG Khan*
[2]Quadi Azam medical Bahawal Pur

[*1]drsyedhabib67@gmail.com, [2]drzulfiqarahmednasir@gmail.com, [3]drzubairkarim@gmail.com
[4]rameeshagul12@gmail.com

ABSTRACT

Objective: *To assess the fracture union in cases of subtrochanteric femoral fractures managed with dynamic condylar screw.*

Material and methods: *This was a case series study and was conducted at Department of Orthopedic Surgery, D. G. Khan Teaching Hospital, DG Khan from June 2021 to December 2021. Total 90 patients with closed subtrochanteric fractures (within the 1 week of fracture), having age from 20-70 years either male or female were selected.*

Results: *Mean age of the patients was 39.53 ± 15.08 years. Mean duration of fracture was 4.10 ± 1.99 days. Out of 90 patients with subtrochanteric fracture, union was noted in 71 (79%) patients. In age group 20-45 years, union rate was 53 (85.48%) and in age group 46-70 years and union rate was 18 (64.29%). Union of fracture was seen in 5 (29.41%) patients, 39 (92.86%) patients and 27 (87.17%) patients respectively in Type A, B and C fractures. Union was strongly (P = 0.000) associated with type of fracture. Higher number of union was noted in type B fracture.*

Conclusion: *A higher rate of fracture union was observed in cases of subtrochanteric femoral fractures treated by fixation with dynamic condylar screw system. Findings of present also revealed that fracture union is not associated with gender. But significant association of fracture union with age group, duration of disease and type of fracture.*

Key words: *Dynamic Condylar Screw, Subtrochanteric, fracture, internal Fixation, femur*

INTRODUCTION

Subtrochanteric fractures comprises of 10-34% of all hip fractures. Although different implants are available to internally fix this fracture, due to anatomical & biomechanical reasons, the sub-trochanteric femoral fracture still a challenge for Orthopedic Surgeons.[1] The forces in this area are up to 1,200 pounds/square inch on the medial cortex leading to immense stresses in the area.[2] Besides this the orientation of muscle forces in this area causes shear at the fracture site.[3,4] Biomechanical studies have shown that femoral cortex in the postero-medial subtrochanteric region is subjected to highest stresses in the body as a result of high compressive and tensile forces in the medial cortex distal and lateral to the lesser trochanter respectively, internal fixation is difficult and risks a high failure rate.[5] Considering the biomechanical forces which lead displacement, open reduction and internal fixation is necessary.[5]

Conservative treatment gives only satisfactory results in 56% of patients as compared to70-80% for operative methods.[6] During the past 30 years, there has been a near-complete elimination of nonoperative treatment in adults and a corresponding increase in the operative treatment of subtrochanteric fractures.[7,8]

There are two main types of devices to fix subtrochanteric fractures, inta-medullary devices and extra-medullary devices.[9] Intramedullary implants includes reconstruction nail, gamma nail, Russel taylor nails while extramedullary Implants commonly use includes A.O 95 angled condylar blade plate, A.O 95 degree dynamic condylar screws, Dynamic hip screws.[10,11] The A.O dynamic condylar screw provide strong fixation in the cancellous bone of the neck and head with considerable rotational stability. Intramedullary devices require less surgical exposure, enable early weight bearing, achieve better proximal fixation and exert less biomechanical stresses.[12]

DCS is considered a very good device for subtrochanteric fracture because it has many advantages like easy insertion, firm fixation, more strength, and resistant to stress failure with less operative time. But its union rate is not determined in our local population before my study. So a study is planned to find out the frequency of union after subtrochanteric fracture by using DCS

Material and methods:

This was a case series study and was conducted at Department of Orthopedic Surgery, D. G. Khan Teaching Hospital, DG Khan from June 2021 to December 2021. Total 90 patients with closed subtrochanteric fractures (within the 1 week of fracture), having age from 20-70 years either male or female were selected.

All cases with open fractures. (clinically), all cases with history of diabetes mellitus (On history), patients with previous surgery (On history), patients with osteoporosis (Assessed on x-ray) were excluded from the study.

Subtrochanteric fractures defined as fractures that occur in a zone extending from the lesser trochanter to 5cm distal to the lesser trochanter assessed on anteroposterior (AP) radiographic view of femoral shaft.

Types of Subtrochanteric femoral fractures:

Type A =At level of lesser trochanter **Type B** =<2.5cmbelow lesser trochanter Type C =2.5-5cm below lesser trochanter**.** Union is defined as the renewal of continuity in a broken bone and is determined radiologically by loss of gap between fracture fragments upto 8th week.

Data collection procedure:

An approval from hospital ethical committee was taken before commencing the study and written informed consent was taken from every patient. After admission, temporary skin traction was applied to relieve pain. To choose proper implant size and fracture geometry was assessed preoperative planning on X-rays and was operated on elective list. All the fractures were classified according to A.O classification. Union of fracture was assessed after 8 weeks and findings (in term of union/non-union) were recorded in pre-designed proforma along with demographic profile of the patients.

All the collected was analyzed by using SPSS version 20. Mean and SD was calculated for age and duration of fracture. Frequencies were calculated for union/non-union, gender and type of fracture. Chi-square test was used to detect the association. P. value ≤0.05 was considered as significance.

Results:

In present study, total 90 patients with subtrochanteric fracture were recruited and union rate was assessed. Mean age of the patients was 39.53 ± 15.08 years. Mean duration of fracture was 4.10 ± 1.99 days.

Out of 90 patients with subtrochanteric fracture, union was noted in 71 (79%) patients. (Fig. 1)

Selected were divided into 2 age groups which are age group 20-45 years and age group 46-70 years. Age group 20-45 years consisted on 62 (68.89%) patients and union of fracture was seen in 53 (85.48%) patients. Total 28 (31.11%) patients belonged to age group 46-70 years and union rate was 18 (64.29%). Statistically significant association of fracture union with age group was noted with p value 0.029. (Table 1)

Out of 37 (41.11%) male patients fracture union was noted in 29 (78.38%) patients. Out of 53 (58.89%) female patients, fracture union was noted in 42 (79.25%) patients. Insignificant (P = 1.00) association of gender with union was noted. (Table 2)

Patients were divided into two groups according to duration of fracture i.e. 1-3 days duration of fracture and 4-7 days duration of fracture. Total 35 (38.89%) patients belonged to 1-3 days duration group and union of fracture was noted in 32 (91.43%) patients. Out of 55 (61.11%) patients of 4-7 days duration of fracture group, union was noted in 39 (70.91%) patients. Statistically significant association of duration of fracture with union of fracture was noted with p value 0.032. (Table 3)

Total 17 (18.89%) patients found with type A fracture followed by 42 (46367%) with type B fracture and 31 (34.44%) patients with type C fracture. Union of fracture was seen in 5 (29.41%) patients, 39 (92.86%) patients and 27 (87.17%) patients respectively in Type A, B and C fractures. Union was strongly (P = 0.000) associated with type of fracture. Higher number of union was noted in type B fracture. (Table 4)

Fig. 1
Union rate

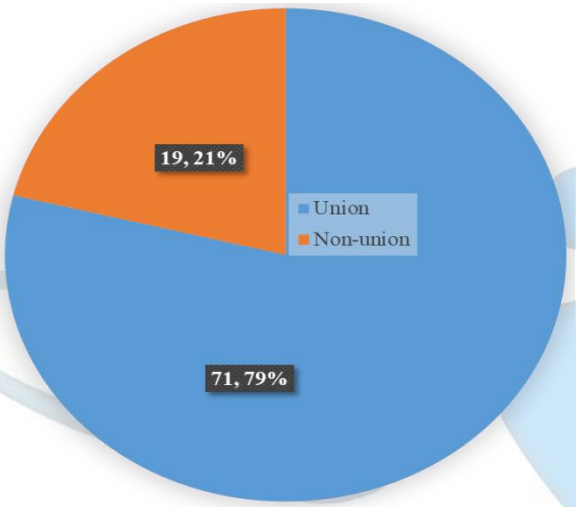

Table 1
Association of union the age group

Age Group	Union		Total (%)	P value
	Yes (%)	No (%)		
20-45	53 (85.48)	9 (14.52)	62 (68.89)	0.029
46-70	18 (64.29)	10 (35.71)	28 (31.11)	
Total	71 (79)	19 (21)	90	

Table 2
Stratification for gender

Gender	Union		Total (%)	P value
	Yes (%)	No (%)		
Male	29 (78.38)	8 (21.62)	37 (41.11)	1.00
Female	42 (79.25)	11 (20.75)	53 (58.89)	
Total	71 (79)	19 (21)	90	

Table 3
Stratification for duration of fracture

Duration of fracture	Union		Total (%)	P value
	Yes (%)	No (%)		

1-3	32 (91.43)	3 (8.57)	35 (38.89)	0.032
4-7	39 (70.91)	16 (20.09)	55 (61.11)	
Total	71 (79)	19 (21)	90	

Table 4
Stratification for type of fracture

Type of fracture	**Union**		**Total (%)**	**P value**
	Yes (%)	**No (%)**		
Type A	5 (29.41)	12 (70.59)	17 (18.89)	0.000
Type B	39 (92.86)	3 (7.14)	42 (46.67)	
Type C	27 (87.10)	4 (12.9)	31 (34.44)	
Total	71 (79)	19 (21)	90	

Discussion:

Subtrochanteric fractures of the femur demand a special consideration in orthopaedic traumatology, given the high rate of complications associated with their management biomechanically.[13] There is a high stress concentration in subtrochanteric region and high degree of comminution makes reduction and fixation of such fractures a difficulty, which in turn is responsible for high incidence of complications in treatment of these fractures.[14]

Present study was planned to asses fracture union in cases of subtrochanteric femoral fractures managed with dynamic condylar screw.

Out of 90 patients with subtrochanteric fracture, union was noted in 71 (79%) patients. In one study by Halwai et al[15], union of fracture in cases of subtrochanteric femoral fractures was reported as 77% which is similar with our study. Comparable (93.5%) union rate in cases of subtrochanteric femoral fractures treated by fixation with dynamic condylar screw system was aslo reported by Laghari et al.[1] Union of fracture was found in 100% cases of subtrochanteric femoral fractures managed by fixation with dynamic condylar screw system in study of Rohilla et al.[16] Kulkarni et al[17] found fracture union in 90% cases. In this study, subtrochanteric femoral fractures were reported in 40.43% male patients and 59.57% in female patients. Laghari et al,[1] reported that out of 48 cases with subtrochanteric femoral fractures, male cases were 60.42% and female cases were 39.58%. Findings of this study were with our study.

Total 17 (18.89%) patients found with type A fracture followed by 42 (46367%) with type B fracture and 31 (34.44%) patients with type C fracture. Union of fracture was seen in 5 (29.41%) patients, 39 (92.86%) patients and 27 (87.17%) patients respectively in Type A, B and C fractures. Union was strongly (P = 0.000) associated with type of fracture. Higher number of union was noted in type B fracture. Laghari et al,[1] reported type A fracture as 37.50%, type B fracture as 33.34% and type c fracture 29.16% which is comparable with findings of this study.

Conclusion:

A higher rate of fracture union was observed in cases of subtrochanteric femoral fractures treated by fixation with dynamic condylar screw system. Findings of present also revealed that fracture union is not associated with gender. But significant association of fracture union with age group, duration of disease and type of fracture.

REFERENCES:

Laghari MA, Makhdoom A, Pahore MK, Memon A, Memon FA. Subtrochanteric femoral fractures treated by fixation with dynamic condylar screw system. JLUMHS. 2011;10(3):134–7.

Patil SV, Rajale S. Subtrochantericfemoral fractures treated by fixation with dynamic condylar screw. Arch. Appl. Sci. Res.2014;6(3):94-101.

Barbosa de Toledo Lourenço PR, Pires RES. Subtrochanteric fractures of the femur: update. Rev Bras Ortop. 2016 Mar 21;51(3):246–53.

Vashisht D, Sreen S, Daroch MS, Alawadhi K. Dynamic condylar screws versus 95º angle blade plate fixation of subtrochantric fractures of femur. International Journal of Research in Medical Sciences. 2017 Apr 26;5(5):2040.

Vashisht D, Sreen S, Daroch MS, Alawadhi K. Dynamic condylar screws versus 95º angle blade plate fixation of subtrochantric fractures of femur. International Journal of Research in Medical Sciences. 2017 Apr 26;5(5):2040.

Craig NJA, Maffulli N. Subtrochanteric fractures: current management options. Disabil Rehabil. 2005 Oct 30;27(18-19):1181–90.

Salminen S. Femoral shaft fractures in adults: epidemiology, fracture patterns, nonunions and fatigue fractures ; a clinical study. [Helsinki]: [Sari Salminen]; 2005.

Umer M. Use of femoral nail with spiral blade in subtrochanteric fractures. ACTA ORTHOPAEDICA et TRAUMATOLOGICA TURCICA. 2014;48(1):32–6.

Abdulkareem IH. A review of tip apex distance in dynamic hip screw fixation of osteoporotic hip fractures. Niger Med J. 2012;53(4):184–91.

Subtrochanteric hip fractures treatment & management: surgical therapy, preoperative details, intraoperative details. 2015 Sep 17 [cited 2015 Nov 26]; Available from: http://emedicine.medscape.com/article/1247329-treatment.

R Rohilla RS. Mini-incision dynamic condylar screw fixation for comminuted subtrochanteric hip fractures. Journal of orthopaedic surgery (Hong Kong). 2008;16(2):150–5.

Vaidya SV, Dholakia DB, Chatterjee A. The use of a dynamic condylar screw and biological reduction techniques for subtrochanteric femur fracture. Injury. 2003 Feb;34(2):123–8.

Sn S, Pp M, Np M, Kc P, Pr G. Outcome evaluation of dynamic condylar screw fixation for subtrochanteric femur fracture. International Journal of Orthopaedics Sciences. 2017 Jan 1;3(1f):351–5.

Barbosa de Toledo Lourenço PR, Pires RES. Subtrochanteric fractures of the femur: update. Rev Bras Ortop. 2016 Mar 21;51(3):246–53.

Halwai MA, Dhar SA, Wani MI, Butt MF, Mir BA, Ali MF, et al. The dynamic condylar screw in the management of subtrochanteric fractures: does judicious use of biological fixation enhance overall results? Strategies Trauma Limb Reconstr. 2007 Dec;2(2):77–81.

Rohilla R, Singh R, Magu NK, Siwach RC, Sangwan SS. Mini-incision dynamic condylar screw fixation for comminuted subtrochanteric hip fractures. Journal of Orthopaedic Surgery [Internet]. 2008 [cited 2016 Dec 24];16(2). Available from: http://www.josonline.org/index.php/JOS/article/view/477.

Kulkarni SS, Moran CG. Results of dynamic condylar screw for subtrochanteric fractures. Injury. 2003 Feb;34(2):117–22