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Research Article

**A STUDY TO EVALUATE UNION RATE IN
SUBTROCHANTERIC FEMORAL FRACTURES THAT WERE
TREATED BY DCS FIXATION****¹Dr Sumiya bhatti, ²Dr Marrium Anwer, ³Dr Roshan Abdul Latif**^{1,2,3}Hamdard College of Medicine and Dentistry, Lahore.**Abstract:**

Objective: *Aspire of our study is to appraise union rate in management of subtrochanteric femoral fractures that were dealt by dynamic condylar screw (DCS) fixation.*

Venue and Duration of Study: *Study was performed in Orthopedic Department, Services Hospital, Lahore and completed in the period of 8 months from April, 2018 to November, 2018.*

Method and Material: *Study was cross sectional in nature and comprised on 111 cases presented with closed subtrochanteric femoral fractures including 70men and 41 women patients with age of 21 to 80 years (Mean 41.92 year). The fracture union rate was evaluated on 8th week. Analysis of data was made by using the SPSS-18. Dynamic condylar screw fixation was done after when the patients experienced traction table reduction.*

Results: *After assessing the union rate on the 8th week, among from the 111 studied cases, union was recorded in 91(81.98%) cases and non-union was noted in 20(18.02%) cases. With respect to the types of fractures, the union was found in 6 (5.41%) patients, 53 (47.75%) patients and 32(28.83%) patients respectively in type-A, type-B and type-C fracture.*

Conclusion: *The outcomes of our study to evaluate the union rate after dynamic condylar screw DCS fixation for the cases of subtrochanteric femoral fracture showed that DCS fixation was an excellent method with remarkable union rate. Majority of the patients were belonging to the type-B fracture. For good fracture healing and functional outcome, men were more important than women. Especially the patients of younger age had the high union rate of fracture.*

Key words: *Dynamic condylar screw, Subtrochanteric femoral fracture, Union rate.*

Corresponding author:**Dr. Sumiya bhatti,**

Hamdard College of Medicine and Dentistry, Lahore.

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INTRODUCTION:

Subtrochanteric femoral fractures occupied weight of 10–34% among overall weight of all hip fractures [1, 2, and 3]. Fractures of such type are always a great challenging consideration to manage the fracture with accomplishment [4]. Proximal femur consists of neck, head and trochanters with the adjacent region [5]. Subtrochanteric femoral fracture is a breakage b/w the lesser trochanter and the area roughly 5 centimeters below the lesser trochanter in femur's shaft [6]. Such fractures usually happened in the younger age and elder age group. In former group the fractures resulted by the high energy trauma, while in later group fractures resulted by fall and in later case the mostly fractures are osteoporotic. And in later group as the age increased, there is remarkable increase in the cases of fractures in the region of periprosthetic fractures (PF) and pathologic fractures [7, 8].

By the perspective of biomechanical studies, femoral cortex in the postero-medial subtrochanteric area is location of high value stressed region and due to this high compressive force focused the medial cortices and posteromedial cortices while high tensile forces focused lateral cortex. High tensile forces and high compressive forces detached the segments and create the complication in the fracture stability. So why in this case the internal fixation is hard to deal and contain risk of high rate of failure. By keeping this perspective in mind, it is indispensable to manage these cases by open reduction and internal fixation [9, 10, and 11].

The results of the operative treatment are noticeably different from the conventional treatment with reasonable outcomes of 70% to 80% in contrast with the conventional which has only 56% healing [12]. In last three decades, there was almost abolition of conventional management methods of subtrochanteric fractures for the cases of adults while on the other hand there was a large increase of operative treatment in the cases of subtrochanteric fractures [13].

For the operative treatment's methods of subtrochanteric fractures, primarily there are two categories of fixation methods; the intramedullar method and extramedullar method. Intramedullar fixation method comprises the devices such as gamma nail, reconstruction nail, Russel Taylor nails whereas extramedullar fixation method comprises the devices like dynamic hip screws DHS, A.O 95 angled condylar blade plate, A.O 95-degree dynamic condylar screws DCS [14]. The Intramedullary devices have the qualities; i.e. it involves small surgical incisions, make possible early weight

bearing, get enhanced proximal fixation and apply a smaller amount of biomechanical stresses. On the other hand, there are some complications when these devices are used for subtrochanteric fractures with intertrochanteric extension. In this situation, these devices are not appropriate and face the technical complications in the 63% of all cases. For the cancellous bone of the head and neck, A.O dynamic condylar screw DCS gives the powerful fixation having significant rotational stability. Dynamic hip screws DHS and dynamic condylar screws DCS are the preeminent devices among the all devices which were used ever in the treatment of subtrochanteric fracture management [15, 16].

As compared to the Dynamic hip screws DHS, dynamic condylar screws DCS is considered the best device in the management of subtrochanteric fracture. DCS has the more beneficial results which are solid fixation, painless implant, supplementary strength, and defiant to stress failure having small operative time. This study is planned and designed to compute union rate of fractures by evaluating the outcomes of dynamic condylar screw (DCS) fixation in the cases of subtrochanteric femoral fractures.

METHOD AND MATERIAL:

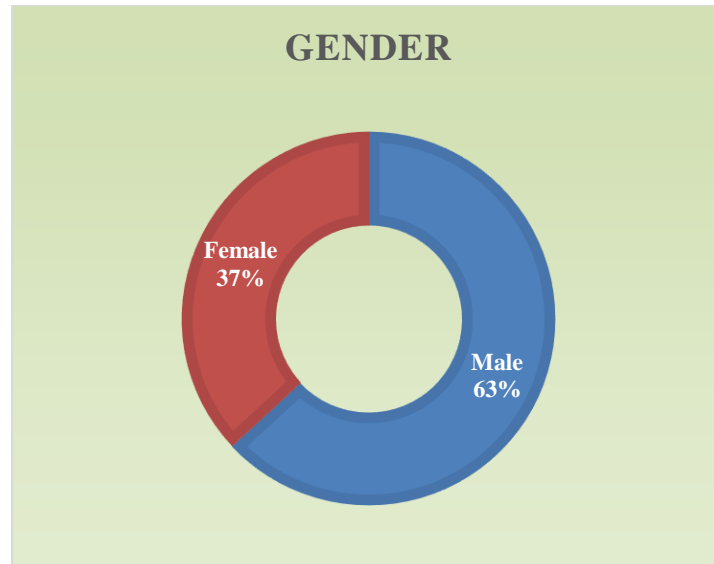
This study was performed in Orthopedic Department Services Hospital, Lahore and completed in the period of 8 months from April, 2018 to November, 2018. Accomplishment of the subject study was done by endorsement of ethical committee of the hospital and getting the sanction certificate from the patients. Study was cross sectional in nature and comprised on 111 cases presented with closed subtrochanteric femoral fractures including 70 men and 41 women patients with age of 21 to 80 years (Mean 41.92 year). The fracture union rate was evaluated on 8th week and all data of every individual was congregated on the purposed forms. Analysis of data was made by using the SPSS-18. Dynamic condylar screw fixation was done after the patients experienced traction table reduction. Exclusion was made as per these cases; open fracture cases, osteoporosis patients, patients having diabetes mellitus history and patients having previously surgical record. We determined numerical data and categorical data by using mean and standard deviation and rate of recurrence respectively. The fractures were categorized as per A.O classification i.e. type-A = at level of lesser trochanter, type-B = <2.5 cm below lesser trochanter and type-C = 2.5-5cm below lesser trochanter.

RESULTS:

Our study was comprised on 111 cases presented with closed subtrochanteric femoral fractures

including 70men and 41women. Age limits of the patients were; younger age limit was 21 years and the elder age limit was 80 years. Mean age and SD of these patients was 41.92 years \pm 14.99% years. The fracture union rate was evaluated on 8th week. Analysis of data was made by using the SPSS version 18. Dynamic condylar screw fixation was done after when the patients experienced traction table reduction.

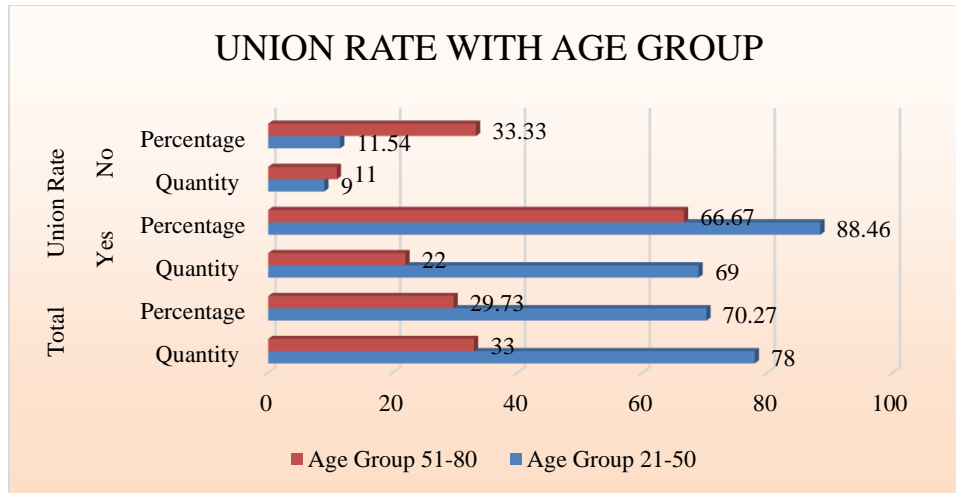
We assessed the union rate from five different perspectives. First of all, as union or nonunion, then by age, gender wise, duration of fracture before reporting and lastly by the categories of fracture. After assessing the union rate on the 8th week, among from the 111 studied cases, union was recorded in 91(81.98%) cases and non-union was noted in 20(18.02%) cases ref. Fig-1.



The two age groups were prepared, group one from 21 to 50 years and third one from 51 to 80 years having the class interval size of 30. Group-1 was consisted of 78 patients and group-2 of 33 patients with percentages 64.86% and 35.14% respectively. Among from 91 reported cases with union rate the

group was distribution as recorded union of rate of age group-1 was 88.46% (69 patients) and 66.67% (22 patients) of group-2. Considerable difference was found in the union rates of both groups having a p-value of 0.0119 as shown in the table-1.

Variables		Age Group		P-value
		21-50	51-80	
Total	Quantity	78	33	0.0119
	Percentage	70.27%	29.73%	
Union Rate	Yes	Quantity	69	
		Percentage	88.46%	
	No	Quantity	09	
		Percentage	11.54%	

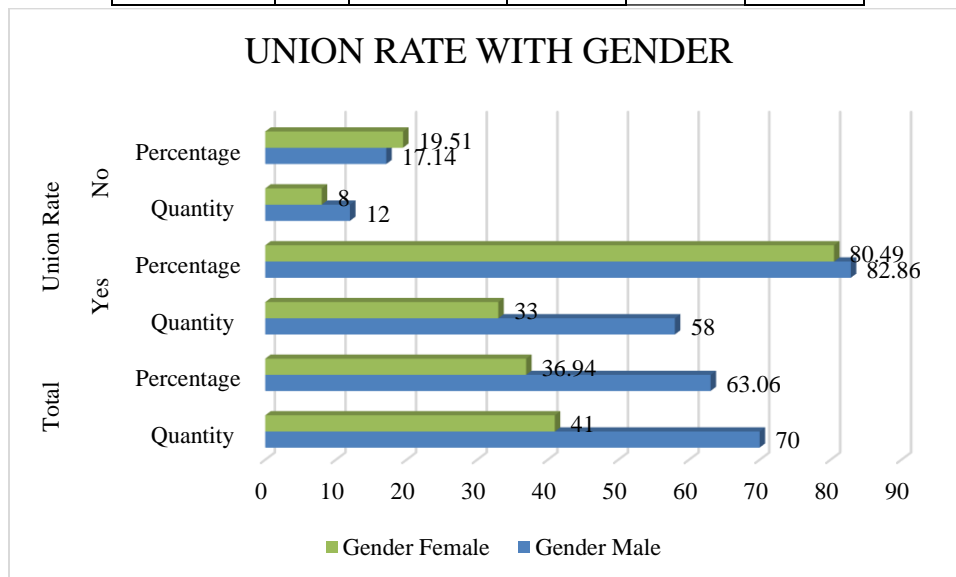


On the other side when we considered union rate in gender perspective then out of 70 men the union rate was 82.86% (58 patients) and out of 41 women the union rate was 80.49% (33 patients). In the

perspective the union rate was insignificant association due to the gender with p-value of 1.021 as shown in table-2.

Table No 02: Association of union rate with gender

Variables		Gender		P-value
		Male	Female	
Total	Quantity	70	41	1.021
	Percentage	63.06%	36.94%	
Union Rate	Yes	Quantity	58	
		Percentage	82.86%	
	No	Quantity	12	
		Percentage	17.14%	

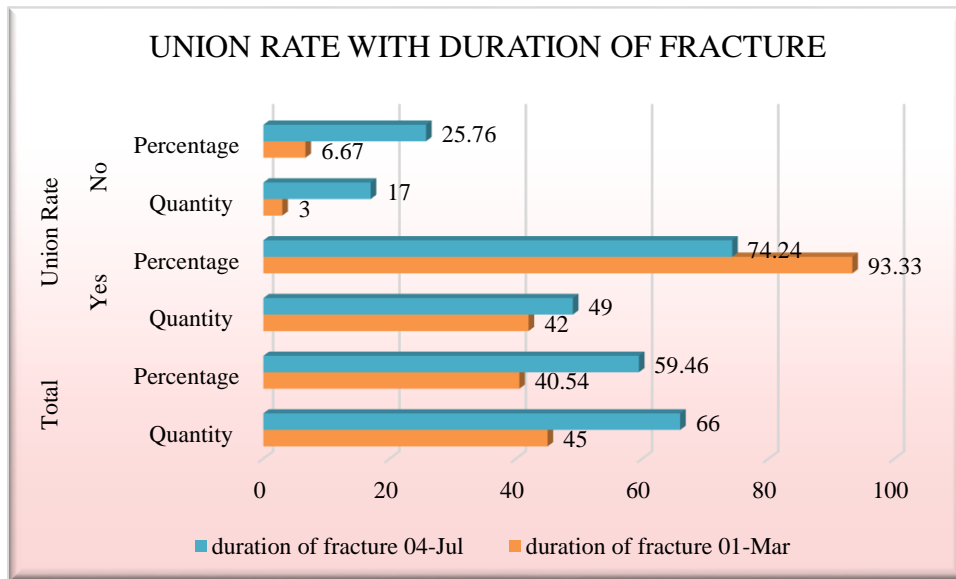


Fourthly, according to the duration of fracture before reporting, here again made the two groups: first was of 1 to 3 days and second group was from 4 to 7 days. First group comprised on 45 patients having 40.54 percentage and second group was on 66 patients having 59.46 percentage of total. First group

had union rate of 93.33% (42 patients) and second group had 74.24% (49 patients). In this perspective the union rate was significant association with respect to duration with p-value of 0.0119 as shown in table-3.

Table No 03: Association of union rate with duration of fracture

Variables		duration of fracture		P-value
		1-3	4-7	
Total	Quantity	45	66	0.0119
	Percentage	40.54%	59.46%	
Union Rate	Yes	Quantity	42	
		Percentage	93.33%	
	No	Quantity	03	
		Percentage	06.67%	

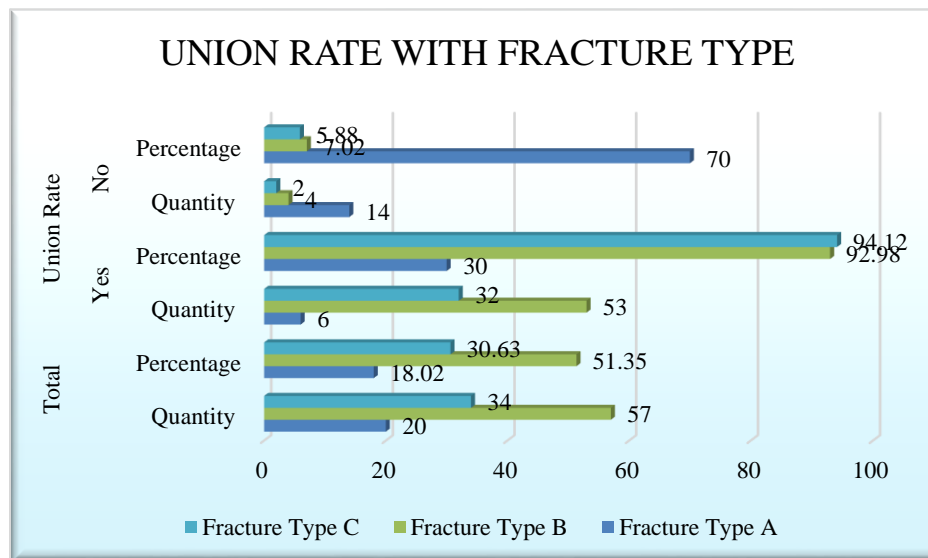


With respect to the types of fractures, the union was found in 6 (30.0%) patients, 53 (92.98%) patients and 32(94.12%) patients respectively in type-A, type-B

and type-C fracture. In this perspective the union rate was significant association with respect to type of fracture with p-value of 0.000 as shown in table-4.

Table No 04: Association of union rate with type of fracture

Variables		Type of Fracture			P-value
		Type A	Type B	Type C	
Total	Quantity	20	57	34	0.000
	Percentage	18.02%	51.35%	30.63	
Union Rate	Yes	Quantity	06	53	
		Percentage	30.00%	92.98%	
	No	Quantity	14	04	
		Percentage	70.00%	07.02%	



DISCUSSION:

The basic objective of subtrochanteric femoral fracture management is to attain the firm fixation and the satisfactory union rate. But the typical structure, biomechanical trauma and highly compressive and tensile forces creating stress on the subtrochanteric area creates the complications for the management of such fractures. The comminuted fracture trauma with high energy is normally sustained in younger patients while the comminuted fracture trauma with low energy is normally sustained in elder age patients [17]. Now a day, concept is developed that all subtrochanteric fractures should be managed with internally fixation methods to minimize the mortality rate and morbidity rate by ambulating the patients with early ambulation. Due to the highly occurrences of complications in cases and bone comminution, the surgeons obliged to propose a new concept of choice of the appropriate devices in the management of such fractures [18]. In these days the universal fixation methods for the management of subtrochanteric femoral fracture includes sliding nail-plate devices, intramedullary devices and blade-plate devices [19]. Here we will mention the results of some studies that were in the favor of our results of this subject study. First of all, we indicate the study of Laghari et al; outcomes of this selected study are in favor of our subject study. He took the 48 patients of the subtrochanteric femoral fracture for his study. The management of all the cases was done with dynamic condylar screw (DCS). Grafting of autogenous bone was made in seven cases. Union rate was observed in the patients those were acquiring the parentage of 93.51% and the nonunion rate was observed in percentage that yields 6.26%. Development of varus

deformity and infected occurrences was found in 3 and 2 patients and acquiring the 6.254% and 4.67% respectively [20]. In the series by Rohilla et al; we got results nearly similar to our study i.e. after subtrochanteric femoral fractures cases were managed with dynamic condylar screw system the union rate was observed yielding the 100% [21]. Almost same results also were found in the studies of Halwai et al and Kulkarni et al; fracture union rate of the subtrochanteric femoral fractures managed with DCS was yielding the nearly 77% and 90% patients respectively [22, 23]. When we compared the results of our study with another study of Mahmud et al, we found the nearly accordance with the results of the two. His study was comprised on the 94 patients of subtrochanteric femoral fractures dealt by DCS fixation. Patients mean age and SD was 39.6±15.13. Men patients were 38 and women were 56. In this study the categorical fracture data was type-A fracture was in 18.085% patients, type-B was in 48.936% and type-C fracture was in 32.978% patients. Union rate was found in 75 patients and nonunion in 19 patients who yielded the 79.787% and 20.323% percentage from the total [24]. In another comparison of our study and Khallaf et al, we compared the results of our study with this study, we found the almost accordance with the results of the two. His study was comprised on the 46 patients of subtrochanteric femoral fractures dealt by DCS fixation with a mean duration of four months. Patients mean age and SD was 36±12.19. Men patients were 37 and women were 11. For good fracture healing and functional outcome, men were more important than women. Younger age patients were 38 and elder age patients were eight. Union rate

was found in 44 patients and nonunion in 2 patients who yielded the 95.65% and 4.35% percentage from the total. In this scene, union rate was gender wise insignificant having p-value of 1.0000 [25].

And in last comparison of our study with Kumar Mishra et al, type of fracture wise results of fracture union rate was significant having a p-value 0.000. This study was comprised on the 100 patients of subtrochanteric femoral fractures dealt by DCS fixation. Patients mean age and SD was 41.63±15.12. Men patients were 60 and women were 40. In this study the categorical fracture data was type-A fracture was in 17.72% patients, type-B was in 52.41% and type-C fracture was in 29.87% patients. Union rate was found in 83 patients and nonunion in 17 patients who yielded the 83.00% and 17.00% percentage from the total [26].

CONCLUSION:

The outcomes of our study to evaluate the union rate after dynamic condylar screw DCS fixation for the cases of subtrochanteric femoral fracture showed that DCS fixation was an excellent method with remarkable union rate. Majority of the patients were belonging to the type-B fracture. For good fracture healing and functional outcome, men were more important than women. Especially the patients of younger age had the high union rate of fracture.

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