

ORIGINAL ARTICLE

Outcomes of Dynamic Condylar Screw Fixation in Subtrochanteric Femoral Fractures

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ABSTRACT

Aim: To determine the union rate in subtrochanteric femoral fractures fixed with dynamic condylar screw system.

Study Design: Descriptive study

Place and duration of study: This study was conducted in the Department of Orthopaedic Surgery, Shaikh Zayed Hospital, Lahore from June 2019 to December 2021.

Methodology: This study included 100 patients with subtrochanteric femoral fractures. Sampling was done with the consecutive sampling technique. Male and female patients were included in this study. The A.O classification was used to classify all the fractures. After 8 weeks, the fracture union was evaluated, and the results (in terms of yes/no) were documented on a pre-designed proforma.

Results: This study included 100 patients with subtrochanteric femoral fractures. The patients' average age was 39.56 ± 15.125 years, and the average duration of fracture was 4.10 ± 1.973 days. There were fifty nine female patients (59%), and forty one male patients (41%). Type A fractures were reported in 19(19%) patients, type B in 48 (48%) patients, and type C in 33 (33%). Fracture union was reported in 79 (79%) of the 100 cases. Dynamic condylar screw is regarded as a very good implant for subtrochanteric fractures due to numerous advantages such as ease of availability, stable fixation, increased strength, resistance to stress failure and reduced surgical time. However, the union rate in our local population was not known prior to our research. Therefore, the purpose of this study is to find the union rates in subtrochanteric femoral fractures fixed with dynamic condylar screw.

Conclusion: The results of this study revealed an increased union rate in patients with subtrochanteric femoral fractures fixed with DCS (dynamic condylar screw system). There was a significant relationship between patient age, fracture duration, and fracture type.

Keywords: Subtrochanteric Femoral Fractures, Internal Fixation, Dynamic Condylar Screw.

INTRODUCTION

Ten to 34% of all hip fractures are subtrochanteric fractures¹⁻². Orthopedic surgeons continue to have a significant difficulty managing sub-trochanteric femoral fractures due to biomechanical and anatomical factors³⁻⁵. According to the literature, conservative treatment of these fractures yields positive outcomes in just 26% of cases, compared to surgical management which achieves satisfied results in 80% of patients⁶. In the past thirty years, non-invasive management of these fractures in adults have been replaced mainly with surgical treatment^{7,8}.

Subtrochanteric fractures are managed using intramedullary (proximal femoral nail, gamma nail, Russell Taylor nails) and extramedullary implants(AO 95 degree dynamic condylar screw, Proximal femoral plate, AO 95 angled condylar blade plate)⁹⁻¹¹. AO dynamic condylar screw (DCS) offers substantial rotational stability and stable fixation in the cancellous bone of the head and neck of femur. Intramedullary implants allow for early weight bearing, provides better proximal fixation, lessen biomechanical stresses and need less surgical exposure and periosteal stripping.¹²Proximal femoral nail and dynamic condylar screw are two of the best fixation devices for treating subtrochanteric fractures in adults¹³.

Dynamic condylar screw is regarded as a very good implant for subtrochanteric fractures due to numerous advantages such as ease of availability, stable fixation, increased strength, resistance to stress failure and reduced surgical time. However, the union rate in our local population was not known prior to our research.

Therefore, the purpose of this study is to find the union rates in subtrochanteric femoral fractures fixed with dynamic condylar screw.

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MATERIALS AND METHODS

After obtaining approval from the hospital's ethical committee and taking written informed consent from each patient, a total of 100 cases of subtrochanteric femoral fractures were selected. Skin traction was applied temporarily to relieve pain after admitting the patient in the orthopedic ward. The fracture geometry was evaluated in order to select the appropriate implant size. Patient was operated on the elective list after preoperative workup and X-ray planning. The A.O classification system was used to classify all of the fractures. After 8 weeks, the fracture union was evaluated clinically and on serial radiographs, and the results (in terms of yes/no) were documented on a pre-designed questionnaire. The data was analyzed with SPSS version 17. The quantitative variables of the research, namely age and fracture duration, were stated as mean standard deviation. For qualitative variables, gender, frequency of fracture union, and fracture type (according to AO classification) were expressed as frequencies and percentages. Age, gender, fracture type, and fracture duration were all stratified. The Chi-square test was used after stratification. A P value of ≤ 0.05 was considered significant.

Inclusion Criteria

- Any patient who has a closed subtrochanteric fracture presented within the 7 days of fracture
- Age range: 20 to 70 years old
- Either male or female

Exclusion Criteria

- Patients with open fractures assessed clinically
- Patients with previous surgery of hip
- Patients with pathological fracture assessed clinically and on radiographs.

- Patients with history of infected hip (septic arthritis or osteomyelitis)

RESULTS

This study included 100 individuals with subtrochanteric femoral fractures. The patients' average age was 39.6±15.12 years, and the average fracture duration was 4.10±1.97 days. There were 59 female patients (59%), and 41 male patients (41%) out of 100 patients (Figure 1). Type A fractures were reported in 19(19%) of the patients, type B fractures in 48(48%) of the patients, and type C fractures in 33(33%) of the patients (Figure 2). Fracture union was observed in 79(79%) of the 100 cases. Patients were separated into two age groups: those aged 20-45 and those aged 46-70. A total of 68 (68%) patients were between the ages of 46 and 70, with 32 (32%) being between the ages of 20 and 45. Clinical and radiological union of fracture was observed in 58 (85.29%) patients and 21 (65.62%) patients respectively. It was observed that there was a statistically significant (p = 0.02) correlation between age groups and fracture union. Fracture union was observed in 32(78.04%) of the 41(41%) male patients and 47(79.66%) of the 59 (59.0%) female patients. A non-significant (p = 1.00) relationship between gender and union was reported. The shortest fracture duration was one day, and the longest fracture duration was seven days. Patients were separated into two groups based on the duration of their fracture, 1 to 3 days and 4 to 7 days. There were 40 (40%) individuals in the 1 to 3 days duration of fracture group, and 36(90%) patients had complete union. A total of 60(60%) individuals had a fracture that lasted 4 to 7 days, and union was observed in 43(71.66%) patients. There was a significant (p=0.01) correlation between union and fracture duration. Type A fractures were found in 19(19%) of the patients, followed by Type B fractures in 48(48%) and Type C fractures in 33(33%). Fracture union was observed in 16 patients (84.21%), 41 patients (85.42%) and 22 patients (66.67%) respectively. There was a significant (p = 0.00) correlation between fracture type and union.

Fig.1: Gender distribution of patients

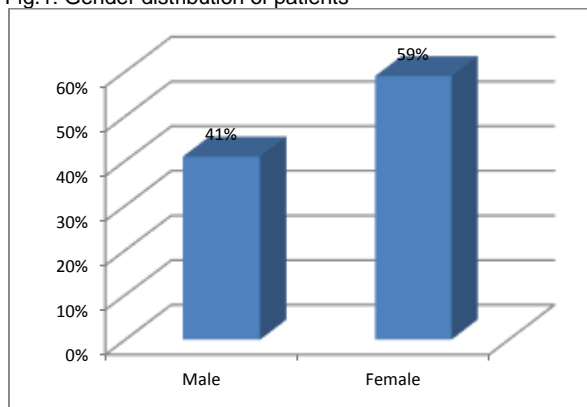


Fig. 2: Type of fracture

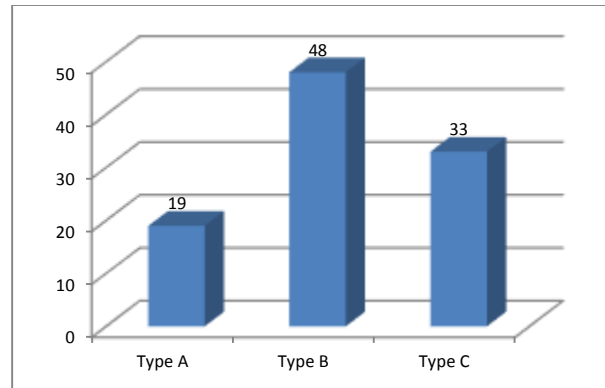


Table 1: Age-based stratification

Age Group	Fracture union		Total	P value
	Yes	No		
20-45	58(85.29%)	10(14.7%)	68(68%)	0.02
46-70	21(65.62%)	11(34.37%)	32(32%)	
Total	79(79%)	21(21%)	100(100%)	

Table 2: Gender-based stratification

Gender	Fracture union		Total	P value
	Yes	No		
Male	32(78.04%)	9(21.95%)	41(41%)	1.00
Female	47(79.66%)	12(20.33%)	59(59%)	
Total	79(79%)	21(21%)	100(100%)	

Table 3: Stratification based on fracture duration

Fracture Duration	Fracture union		Total	P value
	Yes	No		
1-3	36(90%)	4(10%)	40(40%)	0.01
4-7	43(71.66%)	17(28.33%)	60(60%)	
Total	79(79%)	21(21%)	100(100%)	

Table 4: Stratification based on fracture type

Fracture Type	Fracture union		Total	P value
	Yes	No		
Type A	16(84.21%)	3(15.78%)	19(19%)	0.000
Type B	41(85.41%)	7(14.58%)	48(48%)	
Type C	22(66.67%)	11(33.33%)	33(33%)	
Total	79(79%)	21(21%)	100(100%)	

DISCUSSION

The basic goal of subtrochanteric fracture management is to obtain satisfactory union and stable fixation with good functional results. The treatment of these fractures is currently being debated. Femoral reconstruction nails with interlocking options, or proximal femoral nails or 95-degree angled plates can effectively stabilize these fractures. Precise reduction and careful surgical technique with little soft tissue dissection and minimal periosteal stripping can give favorable outcomes. Because of the increased stress in this specific region of the proximal femur, the complication rate for unstable fractures treated with proximal femoral nails or dynamic condylar screws is considerable. For subtrochanteric fracture fixation, we opt for the dynamic condylar screw because it is frequently employed in our setting and easily available¹.

The patients' average age was 39.5±15.12 years, and the average fracture duration was 4.10±1.97days. In the current study, 79% of the 100 patients had complete fracture union. According to one research by Laghari et al., the union rate for subtrochanteric femoral fractures fixed with DCS was 93.5%. The results of this study are equivalent to those of ours. In another study by Rohilla et al¹⁴, the union rate for subtrochanteric femoral fractures fixed with aDCS (dynamic condylar screw) was 100%. Fracture union rate was reported to be 77% by Halwai et al¹⁵. In their research work on patients with subtrochanteric femoral fractures fixed with DCS (Dynamic condylar screw), Kulkarni et al¹⁶ reported a 90% fracture union rate.

In the current study, 41% of the participants were male and 59% were female. Out of 48 patients with subtrochanteric femoral fractures, Laghari et al study¹ found that 60.42% of the patients were men and 39.58% were women, which is contrast to our study.

In the current investigation, type A fractures were found in 19(19%) of the patients, type B in 48(48%), and type C in 33(33%). Laghari et al stated 37.50% type A fracture, 33.34% type B fracture, and 29.16% type C fracture, which is similar with the findings of this study.

CONCLUSION

The results of this study revealed an increased union rate in patients with subtrochanteric femoral fractures fixed with DCS(dynamic condylar screw system). There was a significant relationship between patient age, fracture duration, and fracture type.

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