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THE TREATMENT OUTCOME OF ILIZAROV FIXATOR FOR THE HIGH ENERGY TIBIAL PLATEAU SCHATZKER TYPE V AND VI FRACTURES

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Abstract:

Objective: *To evaluate the Illizarov external fixation efficacy in Schatzker V and VI tibial plateau fractures due to high energy trauma.*

Study Design: *A descriptive case series.*

Place and Duration: *In the Orthopaedic department of Central Park Teaching Hospital from Dec 2017 to April 2019.*

Methods: *90 subjects with Schatzker V and VI tibial plateau fractures with high energy codylar fractures were managed by external fixator IIlizarov and surveyed for 12 weeks. Using the knee community score, the radiological association for pin tract infection and functional outcome was measured and rated as if 90/100 the score will be excellent, if 74 to 89 it will be good, 60 to 73 normal and if <60, it will poor.*

Results: *The pin tract infection developed in 8(8.9%) patients. The radiological union was achieved by Eighty-two (91.1%) patients. In 22 (24.4%) patients Functional results were excellent, 56 patients have good results (62.2%), moderate in 4 patients (4.4%), and poor in 8 patients (8.9%).*

Conclusion: *Radiological connection is excellent in 91.1% of Schatzker V and VI tibial plateau fractures V and VI patients treated with Ilizarov external fixing device and with better functional outcome and low pin tract infection rate.*

Key Words: *Tibial plateau fracture, Ilizarov external fixator, High energy Schatzker V and VI.*

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INTRODUCTION:

The tibia, subcutaneous bone is easily to more compound fractures. The intraarticular fracture of the tibia at its proximal end is a because of high-energy trauma, such as plateau fractures[1-3]. These complex - fractures treatment and severe damages is very challenging. Schatzker (S) suggested that this classification system should be widely used to manage these difficult fractures[4]. Treatment of condylar displacement, joint depression, closed degloving made plateau fractures (high energy tibial Schatzker V and VI fractures) and dissociation of comminuted metaphysis are difficult to treat[5-6]. But this can lead to non-union. The tibial nonunion range for all tibial fractures is 2 to 10%. In the S-V and S-VI treatment, an external fixator, the "minimally invasive technique" Ilizarov circular ring fixator, can give improved results for its approximation without sacrificing soft tissue rudiments[7]. It give better chance for high-energy fractures to deal with gross intra- articular comminution. In a series of 30 traumas, all fractures were treated[8]. To evaluate functional outcome; Knee community score was used. In 16.7% of cases the results were excellent with, in 60% good, in 20% normal and 3.3% have poor results[9]. In a 31 patients study from Malaysia, the mean duration of fracture union was 14 weeks; however, a superficial infection was observed in the nail region around the proximal ring in eight patients (24%). In alternative analysis of Schatzker fractures V and VI; at 3 months (3-7 months) radiographic evidence of the union was noted. With Ilizarov external fixator; one non-union was noted only after management[10]. The aim of this analysis was to evaluate the Ilizarov fused external fixation efficacy for V and VI tibial plateau fractures of Ilizarov Schatzker because of a high energy trauma, because it is a minimum intrusive method.

MATERIALS AND METHODS:

90 total patients were selected in this descriptive case series was performed at the Orthopaedic Department of Central Park Teaching Hospital Lahore from Dec 2017 to April 2019. Patients aged 18-50 years, high energy Schatzker V and VI tibial plateau fractures and open and closed fractures were included. Patients who had previously undergone surgery or intervention due to tibial fractures detected by a series of advanced and advanced osteoporosis X-rays were excluded. For these complex fractures treatment, indirect reduction has done by traction and clamps, in severly communated fractures widow formation and corticocalcelllous graft is used for the elevation. To hold the reduction tensioned olive wires were used in multiple planes form both medial and lateral condyle ; non-olive wires were used in the rest of segments; and a few cases had 5 mm Schanz screws applied to diaphyseal segments if needed. A. Three rings were used one at the articular level 14mm below articualr cartilage ,second just below the fracture site and third at the supromalleolar area. All the Cases having severe articular comminution or ligamentous instability accessed at operating table had their knees spanned with a single distal femoral ring for a period of 4–6 weeks.

post operatively below-knee constructs patinets were encouraged to mobilise their knees as much as the fixator would permit. All patients with spanning external fixators were made to full weight-bearing with crutches as per tolerated immediately after surgery and those with non-spanning fixators were made to partial weight-bearing and progress as tolerated.To know results; for 12 weeks these patients were followed up. In the SPSS version 17.0; collected data were analysed and entered.

RESULTS:

18-48 years was the age range of patients with 32.08 ± 7.144 mean age. The males were 61 (67.8%) and females29 (32.2%). 24 (26.7%) patients had Schatzker V fractures and Schatzker VI fractures were in 66 (73.3%) patients. The closed fractures were in 37 patients (41.1%) and open fractures in 53 (58.9%) patients. The pin tract infection was noted in 8 (8.9%) patients. The radiological union was achieved in 82 (91.1%) patients. Conferring to functional results, in 22 (24.4%) patients it was excellent, 56 (62.2%) patients have good results, 4 (4.4%) patients have fair results, 8 (8.9%) have poor results (Table 1).

Table 1: Demographic information of the patients

Variable	No.	%
Age (years)		
<30	30	33.3
≥30	60	66.7
Gender		
Male	61	67.8
Female	29	32.2
Fracture		
Schatzker V	24	26.7
Schatzker V	66	73.3
Type of Fracture		
Open	53	58.9
Close	37	41.1
Pin Tract Infection		
Yes	8	8.9
No	82	91.1
Radiological Union		
Yes	82	91.1
No	8	8.9
Functional Outcome		
Excellent	22	24.4
Good	56	62.2
Fair	4	4.4
Poor	8	8.9

The pin-tract infection was noted in 8 patients, in Schatzker V have 2 patients and in VI type 6 patients. The alteration was not statistically significant [p = 1.00] (Table 2).

Table 2: Comparison of pin tract infection with fracture

Pin Tract Infection	Fracture Class		Total
	Schatzker V	Schatzker VI	
Yes	2	6	8
No	22	60	82
Using Fisher's Exact Test = 1.000 (Non-significant)			

Pin tract infection noted according to fracture type and showed statistically insignificant results (p = 0.72). The pin tract infection was noted in 8 patients only, pin tract infection in open fractures were noted in 4 and in closed fractures was noted with 4 (Table 3).

Table 3: Comparison of pin tract infection with type of fracture

Pin Tract Infection	Type of Fracture		Total
	Open	Close	
Yes	4	4	8
No	49	33	82
Using Fisher's Exact Test = 0.71 (Non-significant)			

In terms of radiological union of total 82 patients, in Schatzker V, 24 achieved union and in class VI, 58 patients achieved union. The alteration was not statistically important [p = 0.103] (Table 4).

Table 4: Comparison of radiological union with fracture

Radiological Union	Fracture		Total
	Open	Close	
Yes	24	58	82
No	-	8	8
Using Fisher's Exact Test = 0.103 (Non-significant)			

The results were not significant when compared with the type of fracture of the radiological union [p = 0.712] (Table 5).

Table 5: Comparison of radiological union with type of fracture

Radiological Union	Type of Fracture		Total
	Open	Close	
Yes	49	33	82
No	4	4	8
Using Fisher's Exact Test = 0.712 (Non-significant)			

In comparison of fracture functional outcome, the results were significant statistically [p = 0.007] (Table 6).

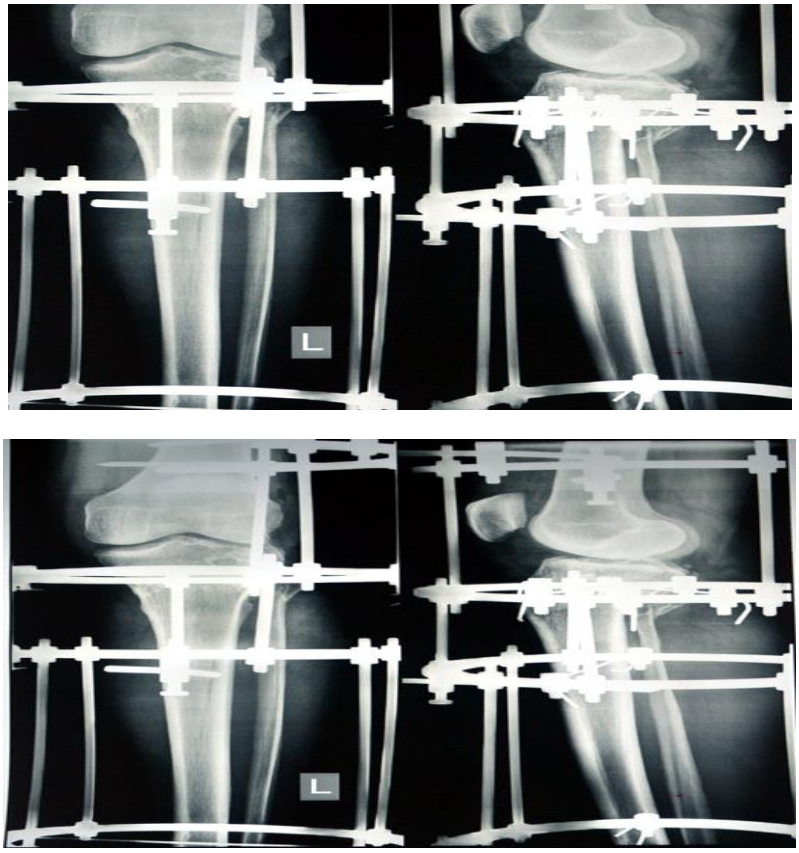
Table 6: Comparison of functional outcome and fracture

Functional outcome	Fracture		Total
	Schatzker V	Schatzker VI	
Excellent	2	20	22
Good	22	34	56
Fair	-	4	4
Poor	-	8	8
Using Fisher's Exact Test = 0.007 (Significant)			

The functional outcome did not show significant results with fracture type [p = 0.816] (Table 7).

Table 7: Comparison of functional outcome and type of fracture

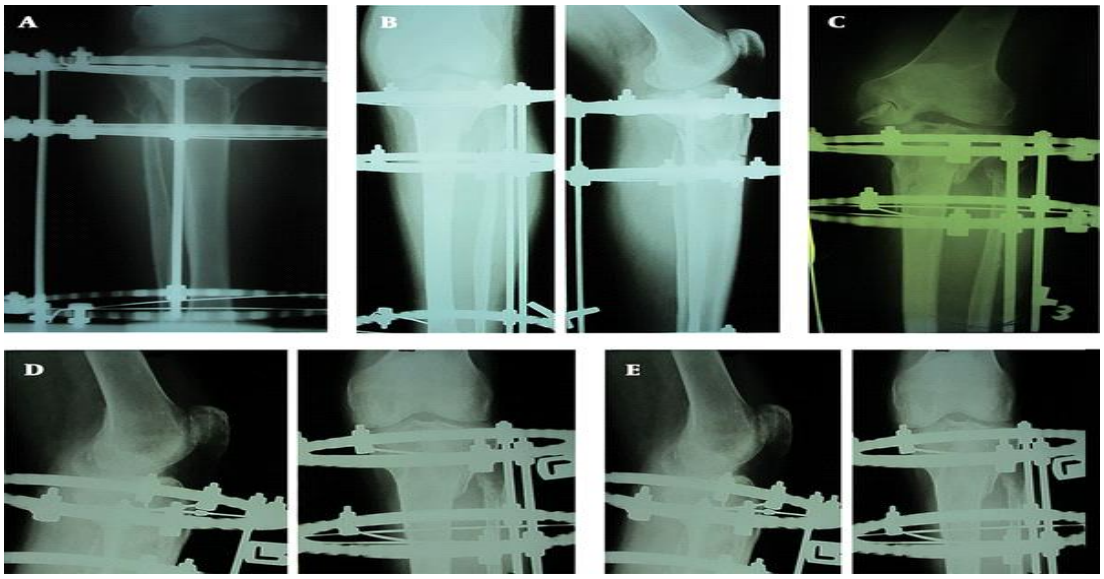
Functional outcome	Type of Fracture		Total
	Open	Close	
Excellent	12	10	22
Good	34	22	56
Fair	3	1	4
Poor	4	4	8
Using Fisher's Exact Test = 0.816 (Non-significant)			



The Preoperative and Postoperative results of the patients are shown in figure 1.

DISCUSSION:

The tibial plateau fractures of Schatzker V and VI type are managed with various methods, while the Ilizarov external fixator is minimum intrusive. The tibial nonunion range for all tibial fractures is 2 to 10%. In S-V and S-VI treatment, an external fixator, the "minimally invasive technique" Ilizarov circular ring fixator, can give good outcome for its reduction without sacrificing soft tissue rudiments[11]. It give better results for high-energy fractures to deal with gross intra- articular comminution. Ninety patients were included in this study.



The radiological union was achieved in 82 (91.1%) patients. These outcomes can be compared with earlier analysis. Surgery was accomplished instantaneously in all cases with open fracture (n = 10) after debridement, Ilizarov frame fixation was applied and then intravenous antibiotics and wound irrigation was done[12]. Total 12 closed fractures presented on the 1st day of accident and with an average 5 days delay 8 fractures admitted (3-9 days) to reduce soft tissue edema[13-14]. In a study of 31 patients from Malaysia, the mean duration of fracture attachment was 14 weeks; however, a superficial infection was observed in the nail region around the proximal ring in eight patients (24%). However, in another analysis of Schatzer's V and VI fractures, a radiographic test was observed for the union at 3.4 months (3 to 7 months) of the working period. One (septic) non-union (3.0%) need redo surgery was noted. In 8 (8.9%) patients; pin tract infection was noted. In the earlier analysis, in 3 (9.1%) cases; the pin tract infection was observed[15]. Conferring to functional results, in 22 (24.4%) patients it was excellent, 56 (62.2%) patients have good results, 4 (4.4%) patients have fair results, 8 (8.9%) have poor results. In a previous study, 16.7%, 60%, good, only 20%, and 3.3% of patients had excellent results compared to functional results using the knee community score. It shows that our outcomes are similar to earlier studies on this subject.

CONCLUSION:

Radiological connection is excellent in 91.1% of Schatzker V and VI tibial plateau fractures V and VI patients treated with Ilizarov external fixing device and with better functional outcome and low pin tract infection rate. The smaller sample size was the limitation of this study.

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