Functional Outcome of the Proximal Tibial Fractures Using Ilizarov External Fixator

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ABSTRACT

Objective: The objective of our study was to assess the functional results of Ilizarov fixator for treating proximal tibial fractures.

Methods: The design of our study was descriptive and we conducted this study in the department of Orthopedics Surgery Unit-I, PGMI/ AMC, Lahore General Hospital, Lahore from 14-5-2018 to 14-11-2018. In this study, 75 patients fulfilling inclusion criteria were selected. After informed consent demographic information like name, age, gender and address of each patient was noted. The surgery is performed under C-arm fluoroscopy. All the patients were followed clinically for 24 weeks. In each visit pain was assessed with Visual Analogue Sacale (VAS) and range of knee motion measured with a goniometer.

Results: A total of 75 patients with mean age 39.25±10.84 years were included in our study. Majority (81.3%,n=61) were males. Mean value of body mass index was 25.04±4.04. Majority(40%,n=30) of the cases belonged to Schatzker type III. Mild pain according to VAS was noted in the 43(57/3%). Knee range of motion was 106±6.82 degree post operatively.

Conclusion: The Ilizarov external fixator is an excellent method of treating Proximal tibial fractures. It results in good knee range of motion post operatively and with low pain.

Keywords: Ilizarov fixator, ORIF, Schatzker classification, Tibial plateau fracture.

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INTRODUCTION

Proximal tibial fractures are caused by axial compression alongwith some varus or valgus push and accounts for about 1% of all the fractures.[1] The most commonly used Schatzker classification divides these fractures into six types out of which type V and type VI are the most sever types.[2] These fractures are difficult to manage on one hand and are also associated with high incidence of complications like neurovascular compromise, loss of reduction, articular incongruity, soft tissue compromise and infection.[3,4]

The primary objective of proximal tibial treatment is to attain absolute and stable articular congruity allowing early knee mobilization with full respect to soft tissue envelop.[5,6] Therefore most of these fractures are treated operatively while non operative treatment is reserved for selective cases.[7] Various treatment options to treat these fractures include percutaneous screw fixation, open screw fixation or fixation using buttress plates, angle-stable locking plating and ring fixators.[8]

Although the gold standard to treat these fractures is open reduction and rigid fixation to ensure accurate stable reduction and early mobility, stripping of soft tissues and chances of infection are a major concern.[9] Literature reported excellent and good outcome results in terms of pain and early mobility when these fractures are treated with Ilizarov fixator.[10,11]

The objective of our study was to assess the functional results and pain assessment after Ilizarov fixator for treatment of proximal tibial fractures. There is no comprehensive study available that has been conducted on this topic particularly covering these two important parameters in the patients presenting with tibial fracture.

METHODS

This Descriptive study was conducted in the Department of Orthopedics Surgery Unit-I, PGMI/

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AMC, Lahore General Hospital, Lahore from 14-5-2018 to 14-11-2018. A total of 75 cases were included using 5% level of significance, d=0.04 with an expected mean knee range of motion as 109±8.35degree. Non-probability consecutive sampling technique was used.

All patients with either gender and age from 25 to 70 years with closed or open plateau fractures of Schatzker type I-VI assessed on anteroposterior and lateral digital radiographs (CT scan if needed) and displaced more than 5 mm were included in our study. Fracture of proximal tibia associated with ipsilateral distal femoral fractures, patients with co morbidities i.e. Diabetes Mellitus (BSG>200) ,hypertension (blood pressure >140mmHg),uremia and pathological fractures were not included in our study.

Prior permission from Ethical Committee of the hospital was taken and well informed written consent was taken from all the participants. The operation was performed on traction table.Tourniquet was not used. Prophylatic antibiotics(Inj Cefuroxime 1.5gm) was given to each and every patient. The Ilizarov frame was applied only in tibia without involving femur.Usually four rings connected to rods were applied according to the fracture geometry. Supervised physiotherapy was started on first post op day focusing on knee and ankle range of motion

All the patients were followed clinically fortnightly for initial 2 months and then monthly for 2 years. Outcome was recorded in terms of knee range of motion with goniometer and Pain assessed with VAS at each visit and at final follow up visit.All the data was statistically analyzed with SPSS version 20.Frequency and percentages of important variables were calculated. Data was represented in tables where necessary.

RESULTS

Our patients had a mean age of 39.25±10.84 years. Majority(81.3%,n=61) were males while females were 14(18.7%). Mean value of body mass index was 25.04±4.04. Majority(40%,n=30) of the cases were Schatzker Type III while other types are shown in table I.Road traffic accidents were responsible for fractures in 36(48%) patients followed by fall in 25(33.3%) and gunshot in 14(18.6%) patients. Majority(68%,n=51) of the fractures were closed while Gustilo Anderson Type IIIA in 14(18.6%),Type I in 6(8%) and Type II in 4(5.3%) patients.

Table I: Distribution of fractures according to Schatzker classification

Schatzker Type	Frequency	Percent
I	4	5.3
II	18	24.0
III	30	40.0
IV	13	17.3
V	9	12.0
VI	1	1.3
Total	75	100.0

Mild pain was reported by 43(57.3%) patients as assessed through VAS while other grades are shown in table II. Mean post operative knee range of motion was 106±6.82.

All the fractures ultimately united. No major complications like stiff knee, wire loosening, wire breakage and loss of fracture reduction was documented in our study.

Table II: Table II: Post operative Pain grades of our patients.

Pain (VAS Score)	Frequency	Percent
Mild	43	57.3
Moderate	20	26.7
Severe	12	16.0
Total	75	100.0

DISCUSSION

Post operative early range of knee motion is essential to prevent arthritis. [12,13] Traditionally ORIF with plating was the first choice to treat these fractures.[14] However, this technique is associated with soft tissue complications.Therefore, complication rate of this procedure is high.[15,16] Jiang[17] in his study reported 4.7% infection with two plates and 7.3% infection rate with Less Iinvasive Stabilization System (LISS).

In order to avoid soft tissue complications liner or monolateral external fixators have been used to treat these fractures but due to loss of fracture reduction they were not favoured.[18]

On the other hand, Ring fixators, like the Ilizarov system, provide excellent fracture reduction and stability to proximal tibial fractures.[19] Watson reported that four Ilizarov wires and lag screws are more stable than dual plates and early knee mobility is permitted without much pain or complications.[20]

Literature reports minimal complications with ring fixator than with dual plating. Kataria[21] treated 38

patients with ring fixator and no non union or septic arthritis was noted. Ali[19] treated 20 patients with hybrid external fixator and union was achieved in all cases and no septic arthritis or osteomyelitis was documented. Studies by Dendrinos[22] and Chin[23] showed excellent knee range of motion without any major complication.

In our study we could not evaluate the range of motion of individual fracture types. We, therefore recommend further studies.

CONCLUSION

The Ilizarov external fixator is an excellent method of treating Proximal tibial fractures. It results in good knee range of motion post operatively and with low pain.It has no major complications and the fixator is of great value in treating proximal tibial fractures with soft tissues compromise.

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Authorship and contribution Declaration

Usman Nazir Gill, Conception and design of the study,
acquisition of data, interpreted the data, Final approval of the version for publication
Muhammad Ali Raza, Drafted the manuscript,
Revised the manuscript critically for important intellectual content