ORIGINAL ARTICLE

Outcome of Using Hybrid Ilizarov External Fixator in The Treatment of Schatzker Type V and VI Tibial Plateau Fractures

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ABSTRACT

Aim: To determine the outcome of using hybrid Ilizarov external fixator in the treatment of Schatzker type V and VI Tibial plateau fractures
Study Design: Descriptive Case Series
Duration of Study: From: 19-10-2015 to 18-04-2016
Results: In our study, common age was calculated as 31.25±7.29 years, 63(70%) were male and 27(30%) were females, mean knee society score was calculated as 79.77±9.93, frequency of union was recorded in 84(93.33%), 18(20%) with excellent outcome, 49(54.44%) had good functional outcome and 23(25.56%) had fair functional outcome, 7(7.78%).
Conclusion: The outcome of using Hybrid ilizarov external fixator in the treatment of Schatzker type V and VI Tibial plateau fractures is good and encouraging for the management of this complex fracture.
Keywords: Tibial plateau fractures, treatment, hybrid Ilizarov external fixator, functional outcome

INTRODUCTION

Tibia, being a subcutaneous bone, is more exposed to fractures which are often complex.[1-3] Intra-articular fractures of the proximal end of the tibia i.e. 'plateau fractures', are serious and complex injuries and difficult to treat[2]. Tibial plateau fractures comprise a varied group of injuries to a major weight-bearing joints and are frequently associated with functional impairment. The most commonly used classification system for these fractures was proposed by Schatzker (S). High-energy Schatzker V and VI tibial plateau fractures are difficult to reduce, as they entail articular depression, condylar displacement, dissociation of comminuted metaphysis and closed degloving injuries[3] which may result in non-union. Tibial nonunion ranges from 2 to 10% of all tibia fractures[1].

The Ilizarov circular ring fixator, a "minimal invasive technique", an external fixator, in the management of S-V and S-VI fractures may provide results of fair reduction without endangering the soft-tissue elements. It can be an accepted option for high-energy fractures with gross intra-articular comminution.[4] In a case series, all 30 fractures united in an average time of 15 (range 9–20) weeks. All patients with open fractures (n=10) were operated immediately with Ilizarov frame fixation after irrigation of wounds, debridement, and administration of intravenous antibiotics. Twelve closed fractures were managed at first day of accident, while 8 were treated with an average of 5 days delay i.e., "3–9 days" to allow soft tissue edema to subside. Regarding the functional outcome using Knee Society Score, an excellent result was recorded in 16.7%, good in 60%, fair in 20%, and poor in 3.3%[3].

The purpose of the current study is to determine whether minimal intervention and hybrid external fixation using Ilizarov fixator can provide a fair outcome with fewer complications and to compare our results with previously reported data of types V and VI high energy tibial plateau fractures. A comparable results will encourage and worse results may lead to audit the current practices in our population as we have described above that union rate and pin tract infection varies from population to population.

METHODOLOGY

This study was conducted at Orthopaedic Unit I, Jinnah Hospital, Lahore during From: 19-10-2015 to 18-04-2016 and included 90 cases (both male & females), age > 18years and less than 50 years, both Schatzker V and VI tibial plateau fractures, both open (involving skin) and closed fractures, fully mobile patient were included while those having previous surgery or intervention for tibial fracture determined by history, Advanced osteoporosis as diagnosed by X ray Knee, bilateral tibial platue fractures and poly trauma cases, were excluded from the study. After approval from local ethical review board, an informed consent from the patients was obtained. Using consecutive non-probability sampling, a structured questionnaire containing background information i.e., age, sex, and address along with outcome variables (clinical and radiological union, functional outcome and pin tract infection) was used as research instrument. A uniform protocol of Hybrid external

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fixation was adopted. Anterior T frame, half-pin external fixator with percutaneous internal fixation for the management of the complex injuries. The proximal half-pin configuration consisting AP-directed Schanz pins into lateral and medial condylar fragments as well as an oblique pin was placed from anteroinferior to posterosuperior in the proximal tibial metaphysis, hence achieving a triangulation effect to stabilize the periarticular metaphyseal segment in three planes. The articular wires are placed percutaneosluly with minimal additional divitalization of the bone and its periosteal and osteal blood supply. A circular or hybrid fixator may span the fracture gap in cases of comminution or minimal bone loss, functioning much as does an internal neutralization plate. These patients were followed for 12 weeks for outcome.

RESULTS

Age distribution of the patients was done, it shows that 44(48.89%) were between 19-30 years of age while 46(51.11%) were between 31-50 years of age, mean±sd was calculated as 31.25±7.29 years. (Table 1) Patients were distributed according to gender, it shows that 63(70%) were male and 27(30%) were females (Table 2).

Table 1: Age distribution (n=90)

Age (in years)	n	%age
19-30	44	48.89
31-50	46	51.11
Total	90	100
Mean±SD	31.25+7.29	

Table 2: Gender distribution (n=90)

Gender	n	%age
Male	63	70
Female	27	30
Total	90	100

Table 3: Mean knee society score (n=90)

	Mean	SD
Knee society score	79.77	9.93

Table 4: Frequency of Union (n=90)

Union	n	%age
Yes	84	93.33
No	6	6.67
Total	90	100

Table 5: Frequency of functional outcome (n=90)

Functional outcome	n	%age
Excellent	18	20
Good	49	54.44
Fair	23	25.56
Total	90	100

Mean knee society score was calculated as 79.77±9.93 (Table 3). Frequency of union was recorded in 84(93.33%) while 6(6.67%) had no findings of union (Table 4). Frequency of functional outcome was recorded as 18(20%) with excellent outcome, 49(54.44%) had good functional outcome and 23(25.56%) had fair functional outcome (Table 5). Frequency of pin tract infection was recorded in 7(7.78%) while 83(92.22%) had no findings of the morbidity (Table 6).

Table 6: Frequency of pin tract infection (n=90)

Pin tract infection	n	%age
Yes	7	7.78
No	83	92.22
Total	90	100

DISCUSSION

In our study, common age was calculated as 31.25±7.29 years, 63(70%) were male and 27(30%) were females, mean knee society score was calculated as 79.77±9.93, frequency of union was recorded in 84(93.33%), 18(20%) with excellent outcome, 49(54.44%) had good functional outcome and 23(25.56%) had fair functional outcome, 7(7.78%).

The findings of our study are in agreement with a previous case series, where regarding the functional outcome using Knee Society Score, excellent result was in 16.7%, good in 60%, fair in 20%, and poor in 3.3%[3].

A Malaysian study of 31 patients, union was recorded within an average time of 14 weeks in all cases, and eight patients (24%) developed superficial pin track infection at the wires over the proximal ring[2]. In another study of Schatzker V and VI fractures, radiographic finding of union was observed at 3.4 months (range 3-7 months). One non-union (septic) was observed (3%), requiring revision surgery. Pin track infection was found in 3 patients (9.1%). Compared to previously reported series of conventional open reduction and internal fixation[5]. The above findings are showing agreement with our results.

The development of circular and hybrid frames, lateral compression and dynamization, the capability of axial, the development of olive wires offered new potentials to the external fixators for the treatment of complex fractures[6]. Mahadena and others, compared external to internal fixation and concluded that hybrid external fixation possesses theoretical advantages regarding protection of soft tissues; however the advantage over internal fixation is modest as far as accuracy of reduction is concerned[7]. Another study by Chin et al demonstrated 38.9% good/excellent, and 61.1% fair/poor results in his type V and VI

fracture series[8]. Catagni et al, in their series of high-energy Schatzker V & VI tibial plateau fractures treated with circular external fixator, recorded excellent and good results in 30(50.85%) and 27(45.76%) patients respectively[9] A similar study regarding type V and VI tibial plateau fractures, Katsenis and colleagues recorded excellent or good final clinical results in 36 patients (76%).

In summary, the finding of our study are in agreement with some of the above studies while some of the studies are showing difference with our findings, which needs to conduct some other studies to validate our results.

CONCLUSION

It is concluded that the outcome of using hybrid Ilizarov external fixator in the treatment of Schatzker type V and VI Tibial plateau fractures is good and encouraging for the management of this complex fracture.

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