Original Article
Orthopaedics

EVALUATION OF PROXIMAL TIBIAL FRACTURES TREATED WITH LOCKING PLATE-A STUDY OF 25 CASES

Rajan Sharma[1], Simranjit Singh[2], Ritika Sharma[3]

[1] - Associate Professor, Dept. of Orthopaedics, Sri Guru Ram Das University of health sciences Vallah Amritsar
[2] - Senior Resident, Dept. of Orthopaedics, Government Medical College, Amritsar
[3] - Senior Resident, Anatomy Dept. Government medical College Amritsar

Corresponding Author
Dr. Simratjit Singh
184, Medical Enclave Circular Road,
Amritsar, Punjab 143001

Article submitted on: 12 February 2019
Article Accepted on: 26 February 2019

Abstract

A proper function of the knee is important in walking, running and in most activities. The knee joint is a complex joint and is commonly injured now a days because of increased road traffic accidents and sports related injuries. Tibial plateau fractures makes 1% of all fractures and 8% of all fractures in elderly. 25 patients of proximal tibia fractures treated with locking plate were included in the study and results were assessed according to Rasmussen's criteria. According to radiological criteria, excellent and good results were obtained in 84% patients at 6 months post surgery, whereas rest of the patients (16%) had fair to poor outcome. We conclude from our study that open reduction and internal fixation of proximal tibia fractures with locking plate provides an excellent treatment modality for these complicated fractures

Keywords: *Proximal tibia fractures, locking plate.*

Introduction

Injuries around the knee must be given utmost importance as fractures of the proximal tibia can cause disruption of normal kinematics of the knee joint. A proper function of the knee is important in walking, running and in most activities. The knee joint is a complex joint and is commonly injured now a days because of increased road traffic accidents and sports related injuries. Being a superficial joint, it is prone to external injury in the form of ligamentous injury and fractures of tibial plateau. Proximal tibia fractures include articular depression, condylar displacement, metaphyseal fracture extension. Tibial plateau fractures makes 1% of all fractures and 8% of all fractures in elderly[1].

Latest implants and techniques have provided better options for the treatment of tibial plateau fractures. In young patients, the fragments of the fracture tend to be larger and in the wedges due to the shear forces involved. On the other hand in elderly pure depression type fractures are most common, caused usually by low energy trauma.[2] Proximal tibia fractures are usually associated with soft tissue complications so it is prudent for the soft tissues around the knee and proximal tibia to be in healthy condition before contemplating internal fixation.

Aims And Objectives

Aim of this study was to evaluate the outcomes of patients suffering from proximal tibial fractures managed by open reduction and internal fixation using locking proximal tibial plate .

Materials And Methods

From January 2016 to June 2017, patients with proximal tibia fractures presented at our tertiary care hospital treated with locking precontoured plate for proximal tibia were included in the study. Patients were followed up for minimum 1 year. Those patients with extensive soft tissue damage, recent active infection in the same limb or fracture with extensive comminution were excluded from the study. Patients with pathological fractures and associated comorbid medical conditions were also excluded from the study. Fractures were classified according to AO Classification and Schatzker classification systems. Anteroposterior and lateral radiographs of the thigh and leg including the knee joint were taken to determine the fracture pattern. The patients were stabilized and local soft tissue condition was assessed pre-operatively and the surgery was deferred till the wrinkle sign appeared. Anterolateral approach was used, reduction of joint components was done and fractures provisionally stabilised with k-wires, the depressed fragments were elevated and fixation was done with locking proximal tibial plate. Bone grafting was done wherever required. Post operatively, limb elevation was done and quadriceps exercises and ankle mobilization were started within 24 hours of surgery. Knee bending and toe touch walking with a walker was commenced on second or third postoperative day if the fixation allowed otherwise the patient was kept non weight bearing ambulation and a posterior splint. Intravenous antibiotics were continued for five days in closed injuries followed by oral antibiotics till suture removal after two weeks. In open fractures, intravenous antibiotics were continued till the wound condition necessitated the same.

Criteria

In cases of tibial plateau fractures, we compared our results into four groups i.e. excellent, good, fair and poor according to the modified Rasmussen's criteria as follows.[16]

Modified Rasmussen's criteria for clinical assessment	
Pain	**Points**
None	6
Occasional	5
Stabbing pain in certain positions	3
Constant pain after activity	1
Significant rest pain	-3
Walking Capacity	
Normal walking capacity for age	6
Walking outdoors(> 1 hour)	5
Walking outdoors(15 min – 1 hour)	3
Walking outdoors(<15 min)	1
Walking indoors onlyWheelchair/ bedridden	0 -3
Knee Extension:	
Normal	4
Lack of extension (<10°)	2
Lack of extension(>10°)	0
Lack of extension(>20°)	-2
Total Range Of Motion	
Full	6
At least 120°	5
At least 90°	3
At least 60°	1
<60°	-3
Stability	
Normal stability in extension and 20° flexion	6
Abnormal stability in 20° flexion	4
Instability in extension (<10°)	2
Instability in extension (>10°)	0
Power In Quadriceps	
Grade 5	2
Grade 3-4	1
Grade <3	-2

Maximum Score	30
Excellent	28-30
Good	24-27
Fair	20-23
Poor	<20

Modified Rasmussen's criteria for radiological assessment	
Articular Depression	**Points**
None	3
<5 mm	2
6-10 mm	1
>10 mm	0
Condylar Widening	
None	3
<5 mm	2
6-10 mm	1
>10 mm	0
Varus/Valgus Anulation	
None	3
<10°	2
10-20°	1
>20°	0
Osteoarthritis	
None/no progress	1
Progression by 1 grade	0
Progression by >1 grade	-1
Maximum Score	10
Excellent	9-10
Good	7-8
Fair	5-6
Poor	<5

Observations

Table 1
Showing Age Distribution

Age (in years)	Number of cases	Percentage
1-10	-	0
11-20	-	0
21-30	5	20
31-40	9	36
41-50	7	28
51-60	4	16
Total	25	100

Table 2
Showing Side Of The Limb Involved

Side	Number of cases	Percentage
Left	11	44
Right	14	56
Total	25	100

Table 3
Showing Mode Of Injury

Mode of injury	Number of cases	Percentage
Road traffic accidents	22	88
Fall from height	03	12
Total	25	100

Table 4
Showing Associated Pre-Operative Complications

Associated complications	Number of cases	%
None	19	76
Neurological	01	04
Compartment syndrome	00	00
Skin (blister formation)	05	20
Vascular	00	00
Total	25	100

Table 5
Final Radiological Assessment At The End Of 6 Months

Results	Number of cases	Percentage
Excellent	11	44
Good	10	40
Fair	03	12
Poor	01	04

Fig 1.Preoperative and postoperative X rays showing fracture proximal tibia fixed with locking proximal tibial plate

Fig. 2

Discussion

Proximal tibial fractures remain a challenge to the orthopaedic surgeon. Achieving good reduction and stable fixation sparing knee joint is a challenging task in external fixation.[3] The use of open reduction and internal fixation for treatment of these fractures has thus been increased .The major aims of treatment of tibial plateau fractures are to reduce the articular surfaces, achieve stable fixation and early motion, and to manage all soft tissue lesions.[4] Therefore, successful results depend on the quality of reduction, ligament stability, preservation of soft tissue envelope, with good evaluation of the articular surface, and minimal dissection.[5] Minimal articular cartilage incongruity is well tolerated in the knee joint, possibly due to the presence of menisci.[6] In our study, males were affected more than females probably due to more outdoor activities and increased number of vehicles driven by males. In our study, road side accidents was the major cause of these fractures (88%), whereas fall from height accounted for 12% of the cases. According to radiological criteria, excellent and good results were obtained in 84% patients at 6 months post surgery, whereas rest of the patients (16%) had fair to poor outcome. In this study, 1 patient had common peroneal nerve neuropraxia which recovered within 6 weeks postoperatively. 20% patients

had blister formation at the time of presentation to the hospital in which surgery was delayed for 7-10 days. In this study,time taken for radiological union was about 10-20 weeks.

Conclusion

We conclude from our study that open reduction and internal fixation of proximal tibia fractures with locking plate provides an excellent treatment modality for these complicated fractures provided proper care is taken of the skin condition prior to surgery. This treatment modality provides excellent range of motion of the knee with no residual instability.

Reference

1. Jacofsky DJ, Haidukerwych GJ. Insall & Scott Surgery of the knee. Philadelphia: Churchill Livingstone; Tibia plateau fractures. In: Scott WN; 2006; pp.1133–46.
2. Watson JT, Schatzker J. Tibial plateau fractures. In: Browner BD, Jupiter JB, Levine AM, Trafton PG, editors. Skeletal trauma. Basic science, management, and reconstruction. Saunders; Philadelphia: 2003. pp. 2074–130.
3. Mallik AR, Covall DJ, Whitelaw GP. Internal versus external fixation of bicondylar tibial plateau fractures. Orthopaedic Review. 1992;21(12):1433-6.
4. Tscherne H, Lobenhoffer P. Tibial Plateau Fractures: Management and Expected Results. Clinical Orthopaedics and Related Research. 1993;292:87-100.
5. Chan YS, Chiu CH, Lo YP, Chen AC, Hsu KY, Wang CJ, et al. Arthroscopy-assisted surgery for tibial plateau fractures: 2-to 10-year follow-up results. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2008;24(7):760-8.
6. Buckwalter JA, Brown TD. Joint injury, repair, and remodeling: roles in post-traumatic osteoarthritis. Clinical Orthopaedics and Related Research. 2004;423:7-16.