ORIGINAL RESEARCH

Clinical and radiological outcome analysis of Schatzker type V and type VI tibial plateau fractures by MIPPO effectively on fracture table

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ABSTRACT

Background: Tibial Plateau fractures occur with a vulnerable 'soft tissue envelope', and usually more prone for infection, wound dehiscence, neurovascular injury and compartment syndrome, are more common after high-energy injuries. **Aim:** This study was conducted to observe the radiological and functional outcome of surgical management in closed Schatzker type V and VI tibial plateau fractures with lateral tibia locking compression plate by Minimally Invasive Percutaneous Plate Osteosynthesis (MIPPO) reduced by using traction table. **Materials and Methods:** Twenty-five cases of closed Schatzker type V and VI Tibial plateau fractures were taken up for this prospective study. All cases were operated on traction table using MIPPO technique and fixation done with Lateral tibia locking compression plate within 5 days of injury. Patients were followed upto minimum for two years. The anatomic and functional evaluation was done using the modified Rasmussen clinical and radiological criteria. **Results:** Out of 25 cases, 22 cases had signs of healing from 6 weeks onwards and radiological union at the end of 6 months. Two cases developed skin blisters due to elevated compartment pressure. One case was showing no radiological union at the end of 6 months. Two cases had superficial infections and required wound debridement out of which, in one case infection resolved and one case had soft tissue compromise required flap cover. **Conclusion:** MIPPO technique using traction table effectively favors alignment of fragments and restoring the articular congruity and minimizes soft tissue injury and in turn reducing post-operative complications, leading to better functional outcome in Schatzker type V and VI fractures.

Key words: MIPPO, Tibial plateau fracture, traction table

INTRODUCTION

Management of unstable [3] proximal tibia fractures has always been challenging [1]. Different kinds of surgical treatments such as ORIF with Lateral tibia locking Plate fixation [8, 9], Medial buttress locking plate [13], Hybrid external fixation [2], LISS [5, 6] systems, Dual plating [9, 12, 14, 15] are available. The technique of proximal tibia fractures fixation using MIPPO involves limited soft tissue handling and periosteal stripping; the fracture hematoma is also not disturbed resulting in faster healing and less complications. To evaluate the functional outcome of closed type V and type VI proximal tibia fractures treated by Minimally Invasive Percutaneous Plate Osteosynthesis effectively managed on fracture tibia.

AIM AND OBJECTIVE

To study the functional outcome of patients with type V [7, 8] and type VI proximal tibia fractures treated by MIPPO technique in fracture table.

To assess whether the patients treated by this modality achieved consistent union and when they returned to work.

To assess correlation between the clinical and radiological scores[10] of these patients. To document major complications[1] and minor complications[1] associated with this treatment modality.

INCLUSION CRITERIA

- Closed Schatzker type V and type VI fracture tibial plateau.
- Age-18-65 years.
- Both sexes.
- Timing of Presentation: Within 7 Days of Injury
- Closed Fractures.

EXCLUSION CRITERIA

- Pathological Fractures
- Unfit patients for surgery and patients with co morbidities
- Patients with neuro vascular injury
- Hohl and Moore fracture dislocations

MATERIALS AND METHODS

All 25 patients were primarily treated with lateral tibia locking plate using minimally invasive percutaneous plating Osteosynthesis. All cases were followed up every 4 weeks up to 3 months and then every two months upto 2 years.

STUDY DESIGN: Prospective Study.

STUDY CENTER: Department of Orthopaedics, Government Thoothukudi Medical College Hospital, Thoothukudi.

STUDY POPULATION: Twenty-five patients with closed type V and type VI tibial plateau fractures.

STUDY PERIOD: January 2019-December 2022.

SURGICAL TECHNIQUE

Under regional anaesthesia, patient positioned in fracture table, affected leg in traction (Fig 1). The plate is tunneled subcutaneously, but extraperiosteally, through a small skin incision (6 cm) and along the lateral of the tibia and then fixed with locking screws (Fig 2 and 3). The device allows the screws to lock to the plate, thus creating a stable fixed-angle device.

Fig 1: Positioning of the patient in fracture table

Fig 2: Surgical exposure by MIPPO

Fig 3: Plate slided through the incision

Fig 4: X-ray left knee AP/lat

Fig 5: CT pictures

Fig 6: CT pictures

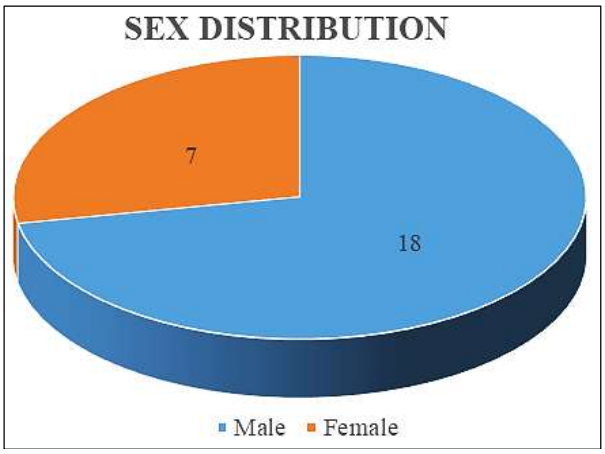
Fig 7: C-arm image with plate positioning after reduction in fracture table

POST-OPERATIVE PROTOCOL

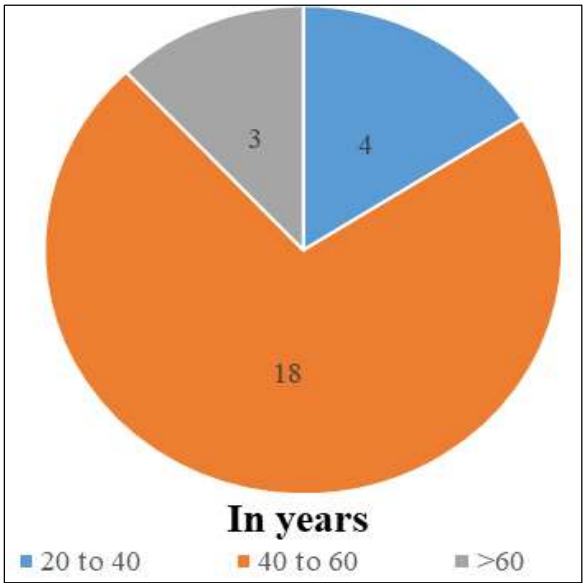
- Patients will be started on ankle mobilisation, knee mobilisation on the 2nd post op day, partial weight bearing at the end of 6 weeks and full weight bearing after 3 months.
- IV antibiotics for 5 days and discharge on 6th post op day[15].
- Suture removal on 12th POD.
- All cases were followed up every 4 weeks up to 3 months and then every two months upto 2 years.
- Functional and radiological outcome is measured using a Rasmussen knee score[15].

RESULTS

This study included 25 patients-18 males and 7 females (Graph 1 and 2). Complete Radiological union observed at 18-20 weeks in 60%, 20-24 weeks in 32%, and > 24 weeks in 8% of patients with mean of 22 weeks. According to Rasmussen knee score for functional outcome, excellent (66%), good (22%), fair (8%) Poor (4%) in proximal tibia Fractures. Complications such as skin irritation, superficial infection observed in 3(10%) of patients.



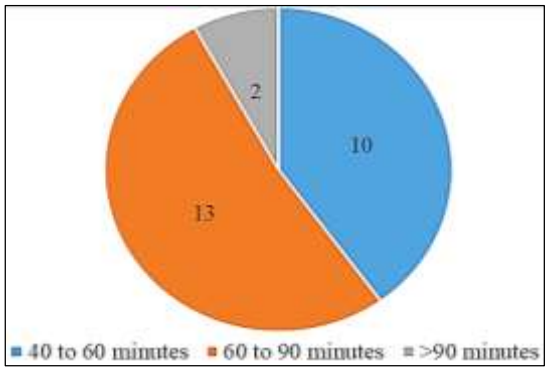
Graph 1: Sex Distribution



Graph 2: Age Distribution

Table 1: Duration of surgery

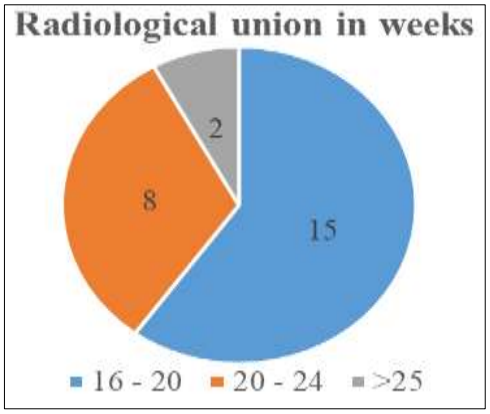
Duration of surgery	Number of patients
40 to 60 minutes	10
60 to 90 minutes	13
>90 minutes	2



Graph 3: Duration of surgery

Table 2: Duration of union in weeks

Duration of union in weeks	Number of cases (n=40)	Percent
16 - 20	15	60
20 - 24	8	32
>25	2	8



Graph 4: Radiological union in weeks

In our study, grading of our patient was done with Rasmussen Knee score and its functional outcome is depicted below:

Score	Nnumber of cases	Percentage
Excellent	16	66%
Good	6	22%
Fair	2	8%
Bad	1	4%

CASE 1

Preoperative X-Rays **CT Scan**

Immediate Post Op **6 Month Post Op**

Functional Outcome

CASE 2

Preoperative X-Rays **CT Scan**

Immediate Pre-Op **6 Months Post Op**

Functional Outcome

CASE 3

Preoperative X-Rays **Immediate Pre-Op**

Functional Outcome

THE DIFFICULTIES IN THE TREATMENT OF FRACTURES OF TIBIAL PLATEAU FRACTURES

High chances of re-displacement of fragments[4] when swelling subsides. Serious disability if there is a rotational or alignment mismatch because the knee and ankle joints normally move in the same physical axis. Obvious disfigurement of the leg will be evident if fragment opposition is not perfect since tibia lies subcutaneously. Increased chances of non-union if delayed union is not recognized.

LIMITATIONS

Fractures with extensive intraarticular communition there is difficulty in using MIPPO technique to restore articular congruity. Long plates are needed for type V and VI tibial plateau in which deep peroneal nerve and anterior tibial artery are at risk if stab incisions are used.

CONCLUSION

The main reduction method used in MIPPO is indirect reduction. Minimal soft tissue dissection results in low surgical trauma and thus preservation of the blood supply are one of the main advantages of MIPPO[11]. Positioning in fracture table helps in alignment of fragments with minimal handling of soft tissues. Biological fixation[16] is achieved with lesser evacuation of osteogenic fracture hematoma. Locking compression plates provide a stable construct. They function as an internal external fixator in a bridging fashion. Surgery with Minimally invasive approach helps to reduce the iatrogenic trauma to the fracture ends and fracture fragments. MIPPO[16] for meta-diaphyseal fractures may involve direct percutaneous or indirect closed reduction and soft-tissue windows away from the fracture site.

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