



MANAGEMENT OF DISTAL TIBIA FRACTURES WITH ANTEROLATERAL LOCKING PLATE

Dr Anil Gupta

Professor Orthopaedics, GMC, Jammu

Dr Gagandeep Singh*

Resident Orthopaedics, GMC, Jammu *Corresponding Author

ABSTRACT **INTRODUCTION:** There are many ways of managing distal tibia fractures and plating is one of them. Plating in distal tibia fracture is associated with high soft tissue complications. As adequate soft tissue cover is available over anterolateral aspect of tibia, anterolateral plating in distal tibia have increased. The purpose of our research is to evaluate the outcomes of anterolateral locking plate fixation in distal tibia fractures using ORIF.

MATERIAL AND METHOD: 50 patients with distal tibia fracture and underwent ORIF with anterolateral plating was selected for study. A retrospective analysis of these patients was done.

RESULTS: Full weight bearing was allowed at an average of 6 months (3-12 months). Superficial wound infection observed in 6 patients. Delayed union in 4 patients. Mean surgical incision was 8.5cm (5-12cm).

CONCLUSION: Anterolateral plating is reliable way of fixation if done with proper technique and under all aseptic precautions.

KEYWORDS : Tibia Fractures, Internal fixation, Anterolateral plating

INTRODUCTION

Many methods right from conservative to surgical management using techniques such as external fixators, intra medullary nailing and internal fixation have been used in the management of distal tibia fractures 1-6. There has been no agreement over the superiority of any one method over the other in this type of fractures as all the methods of surgical procedures have their own pros and cons. Soft tissue healing is one of the important aspect in these types of fractures for a favourable outcome. Open reduction and internal fixation (ORIF) using plate do cause soft tissue trauma but it also helps to achieve a good fracture reduction which eventually leads to proper healing of the fractures 12-13, provided an optimum soft tissue handling has been done. Many studies have shown reasonable results with minimally invasive osteosynthesis of distal tibia fractures using anterolateral tibia plating but has many complications such as non-union and malunion 14-18. There also have been certain studies that have shown poor results with ORIF with anterolateral plating 19-23. Many factors such as severity of injury, soft tissue trauma, surgical timing, surgical techniques and comorbid illnesses of the patient have effects on results 5, 6, 24. Patients with and without fibular fracture fixation along with distal tibia fractures were included in distal tibia fracture studies.

The purpose of our research is to evaluate the outcomes of anterolateral locking plate fixation in distal tibia fractures using ORIF.

MATERIALS AND METHODS

Fifty patients from 2017 to 2018 with distal tibia fracture were analysed, 30 patients male and 20 female with mean age of 45 years (25-75 years). Fractures were classified with AO classification. Open fractures were not included in study. Initial management consisted of below knee splint or slab with limb elevation. Once swelling subsided one stage procedure was done. Single incision of 8.5cms (5-12cm) was used. Different methods such as K wires for comminuted fractures, Lag screws, arthrotomy were used to achieve reduction and anterolateral plate was fixed.

Sutures were removed after 2 weeks. X rays were taken post op, 3 weeks, 6 weeks, 3, 6, 9, 12 months. Fracture healing was confirmed with callus formation. Weight bearing according to callus status on x rays. Full weight bearing was done on average 6 months.

Skin incisions, complications related to the soft tissue, wound breakdown and implant exposure were reviewed and recorded for the study. Complications were divided in to major and minor; major complications were those complications that resulted in to morbidities and required further interventions such as deep infections and failure of fixation 10. Events that did not require any further surgical interventions such as superficial skin infections were considered as minor complications.

RESULTS

Among fifty patients selected for study. 40 had high energy trauma, 10

fall from height. AO classification was used. Among them 30 had extra articular fracture, 15 partially articular fracture and 5 complete articular fracture. Average time between injury and surgery was 8 days (3-12 days). One stage procedure was done. Single incision of average 8.5 cm was used. Fibula was fixed first then distal tibia. Clinical and radiological healing occurred at 4 months in 35 patients, 6 months in 13 patients and 8 months in 2 patients. No patient was lost in follow up. Average time of full weight bearing was 6 months.

Six of our patients had superficial wound infection which was taken care by regular aseptic dressings and oral antibiotics. Wound healed in 3-4 weeks. Two diabetic patients needed wound debridement and re closure of wound. Wound healed in 4-5 weeks. Delayed union was observed in 4 patients. All were high energy trauma, 2 were diabetic and 2 were chronic smoker. 10 patient had mild ankle pain. Anatomical alignment was within the acceptable range of antero-posterior angulation <10 degrees and the anterolateral angulation of <5 degrees. No patient needed implant removal for infection. There was no limb length discrepancy in any of our patients. There was no articular depression in any of our patients.

DISCUSSION

Tibia is a subcutaneous bone with minimal soft tissue cover around it and minimal blood supply from surrounding soft tissue. There is high risk of compound fracture because of its subcutaneous nature. Historically distal tibia fracture were managed with antero medial approach but it had a major disadvantage of wound breakdown and implant exposure. Implant prominence was also present with this approach leading to implant removal as second surgery. Antero lateral area of distal tibia has shown better soft tissue coverage along with a better direct exposure to the anterolateral fragment. A separate incision for fibula fixation along with conventional distal tibia plating has shown problems with wound healing. Less damage to the periosteal blood supply has been shown in locking plate thus decreasing the incidence of any delayed union or non union or loss of any fixation. 48 out of 50 were united in 6 months in our study. Different studies have shown higher complication rate with tibia plating.

A study by McFerren *et al* showed the complication rate of 55% that comprise of wound breakdown, deep soft tissue infection, osteomyelitis and superficial wound infection 20. In order to prevent any soft tissue complication, earlier a 2 stage protocol was recommended that consisted of an initial use of external fixation with or without fibula fixation until the soft tissue envelope recovers sufficiently to allow the definitive fixation 26, 28, 30-33. In our study one stage procedure was done with mean time between injury and surgery 8 days.

In our study we did minimal soft tissue and periosteal damage. We used a single incision to fix both tibia and fibula, so we were not concerned about skin breach between two incision conventional approach. Fibula

dissection was limited to its anterior surface only. We did delay the surgery till the swelling subsided over the distal tibia. Average delayed time was six days in case of low energy trauma whereas in high energy trauma it was 8 days (range: 3-12days).

Zackry *et al* postulated that regardless whether the fracture exhibits a varus or valgus pattern, anterolateral plating has identical rigidity from a bio mechanical perspective when compared to medial plating in a varus fracture pattern³⁵. Thus, we can confirm that anterolateral plating is a more reliable fixation in a wide category of injuries.

CONCLUSION

Distal tibia fracture with or without fibula fracture can be successfully treated with anterolateral plating. It has an advantage of minimum soft tissue damage, single incision for both bones fixation. Moreover, implant removal surgery for implant prominence can be avoided with this approach.

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