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Distal tibia fracture in 40 years old male patient - A case report and review

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Abstract

Distal tibia fractures are challenging injuries. These fractures constitute less than 7% of all the tibial fracture and less than 10% of all lower extremity fractures. We reported a case of distal tibia fracture in 40 years old male patient treated with MIPPO.

Keywords: Distal tibia, MIPPO, Fracture

Introduction

Distal tibia fractures are challenging injuries. They are primarily located within a square based on the width of the distal tibia without intra-articular extension. They are often caused by high energy axial compressive, direct bending or low energy rotation forces [1]. These fractures constitute less than 7% of all the tibial fracture and less than 10% of all lower extremity fractures. The aim of treating the fracture is to preserve normal mechanical axis, ensure joint stability and restore a near full range of motion. This is a difficult task to accomplish in each and every case as we face compromised soft tissue condition, variable bone quality and associated medical conditions [2].

The most complete classification of diaphyseal tibial fractures is the AO/OTA (Orthopedic Trauma Association) classification, which is based on standard radiographic projections and includes the fracture site as well as the degree and type of comminution. It distinguishes between simple fractures (A), compression fractures (B), and complex fractures (C) [3]. In current orthopedic practice, minimally invasive percutaneous plating osteosynthesis (MIPPO) and interlocking nailing are the preferred techniques for fractures of the distal third tibia. The intramedullary nail spares the extra osseous blood supply, allows load sharing, and avoids extensive soft tissue dissection. However, proximal and distal shaft fractures can be difficult to control with an intramedullary device, increasing the frequency of Malalignment [4]. Minimally invasive sub muscular and subcutaneous plate fixation (MIPPO) can address several of the issues associated with intramedullary nailing, while amalgamating all biological benefits of closed reduction and fixation. We reported a case of distal tibia fracture in 40 years old male patient treated with MIPPO.

Case report

A 40 years old male patient visited to our department with traumatized right lower limb. Patient met with accident since 4 days and got injury to lower limb. Informed consent from the patient was obtained. A thorough clinical examination was performed which showed generalized pain of the right leg as well as functional impotence, tibial fracture with medial exposure of degree IIIB of about 10 cm of extension at the level of the distal middle third of the right tibia. Anteroposterior and lateral radiographs were done which showed a complex multi-segmented displaced tibia fracture with an attached disrupted fracture of peroneal malleolus.

The patient was positioned supine on operation table, with a thigh tourniquet. Intravenous antibiotics were given, before inflating tourniquet. Before proceeding to percutaneous plating, the fibular fracture was fixed first. Following lateral malleolar fixation the integrity of syndesmosis was checked by pulling the distal fibula. After conventional plating of lateral malleolus, distal tibial LCP was tunneled sub-cutaneously, through limited skin incisions avoiding injury to the saphenous nerve and vein. Plate was temporarily fixed using K-wires through the especially designed holes on the distal and proximal ends of the plate. Preliminary reduction and position of plate was checked under image intensifier. Inter-fragmentary compression was accomplished in selected cases with cortical screws placed

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through the plate. Following inter fragmentary compression a mechanically stable construct was made by use of locking screws. All through the fixation care was taken to prevent posterior sagging of the tibia at the fracture site. Wound closure was done in layers without a suction drain. Following operation compression bandage was given, and limb was elevated. No splintage was used postoperatively. The patient was followed up for an average of 12 months.

Discussion

Distal tibial fractures often present a challenge to the orthopaedic surgeon. They usually occur in young and active patients and are often due to high-energy trauma like motor vehicle accidents, sports or falls from height. Direct trauma like road traffic accidents often cause concomitant severe soft tissue damage with a high incidence of open fractures. Distal tibia fractures are inherently difficult injuries of the lower extremity to treat owing to the complexity of the fracture along with the sparse soft tissue envelope. In conjunction with significant osseous injury, the surrounding soft tissue structures often become severely traumatized [5].

Distal tibia fractures with or without intra articular extension, are difficult fractures to manage. Distal tibia is circular in cross section and has a thin cortex while the diaphysis is triangular with thicker cortex. Since intramedullary nail is designed only for snug fit at the shaft, it cannot provide stability at the distal tibia. Complications of interlocking nailing in distal tibia fractures are malunion upto 29% - implant failure upto 39%. Since tibia is a subcutaneous bone 2/3rd of its blood supply comes from periosteum. ORIF strips off this vital layer and results in - Non union upto 35% - Infection upto 25%. External fixators are recommended only as a temporary method of stabilization in open fractures with severe soft tissue injury [6]. We reported a case of distal tibia fracture in 40 years old male patient treated with MIPPO.

Fan [7] in his study of MIPPO in treatment of tibial fracture, all the fractures united with a mean union time of 16.2 weeks ranging from 13 to 36 weeks. Clinical and radiological outcome according to the ASAMI scoring system in this study showed excellent results in 14 cases representing 87.5% of the studied group and good results in 2 cases representing 12.5% of the studied group. No neurovascular complications, no persistent limitation of the knee or ankle motions, no deep wound infection, no implant failure occurred in any case till the last follow-up and no cases required second major open intervention.

Ronga *et al.* [8] in their study fifty fractures of distal tibia without intra-articular extension were operated with locking compression plating with MIPPO technique. They were followed up at regular intervals. Functional and radiological results were evaluated at the end on one year. The fractures united in 48 (96%) patients with 2 (4%) cases of delayed union which took 30 weeks of time. Postoperatively, 2 patients developed superficial skin infection, 2 patients developed deep infection and 3 patients developed ankle stiffness due to loss of postoperative protocol and 4 patients had implant failure in form of screw breakage. Good amount of range of mobility of ankle joint was present in almost all patients.

Recently, minimally invasive percutaneous plate osteosynthesis (MIPPO), applied by indirect reduction has been a successful treatment method in cases of lower

extremity complex fracture. Minimally invasive percutaneous plate osteosynthesis is a surgical technique in which percutaneously inserted plate is fixed at a distance proximal and distal to the fracture site through minimal exposure and also blood supply to the fractured fragments is maximally preserved [9]. It aims at flexible elastic fixation to initiate spontaneous healing including induction of callus formation. Biological plate osteosynthesis is important in bone vascularisation, to improve consolidation, to decrease infection rate. MIPPO technique avoids direct exposure of the fracture site and transforms the implants in an internal extramedullary splint. Furthermore, MIPPO was successfully extended to complex tibial fractures, being actually indicated in all long bones complex fractures that are not suitable for intramedullary osteosynthesis [10].

Conclusion

Authors found that MIPPO technique using LCP is a safe, effective method to treat distal third tibia fractures with respect to time to union with few complications.

References

1. Collinge C, Kuper M, Larson K, Protzman R. Minimally Invasive Plating of HighEnergy Metaphyseal Distal Tibial Fractures. *J Orthop Trauma.* 2007; 21:355-61.
2. Gao H, Zhang CQ, Luo CF, Zhou ZB, Zeng BF. Fractures of the distal tibia treated with polyaxial locking plating. *Clin Orthop Relat Res.* 2009; 467(3):831-37.
3. Shrestha D, Acharya BM, Shrestha PM. Minimally invasive plate osteosynthesis with locking compression plate for distal diaphyseal tibia fracture. *Kathmandu Univ Med J.* 2011; 34(2)62-68.
4. Paluvadi SV, Lal H, Mittal D, Vidyarthi K. Management of fractures of the distal third tibia by minimally invasive plate osteosynthesis – A prospective series of 50 patients. *J Clin Orthop Trauma.* 2014; 5(3):129-36.
5. Guo JJ, Tang N, Yang HL, Tang TS. A prospective, randomized trial comparing closed intramedullary nailing with percutaneous plating in the treatment of distal metaphyseal fractures of the tibia. *J Bone Joint Surg Br.* 2010; 92(7):984-88.
6. Kitaoka HB, Alexander IJ, Adelaar RS, Nunley JA, Myerson MS, Sanders M. Clinical rating system for the ankle, hindfoot, midfoot, hallux and lesser toes. *Foot Ankle Int.* 1994; 15:349-53.
7. Fan CY, Chiang CC, Chuang TY, Chiu FY, Chen TH. Interlocking nails for displaced metaphyseal fractures of the distal tibia. *Injury.* 2005; 36:669-74.
8. Ronga M, Longo UG, Maffulli N. Minimally invasive locked plating of distal tibia fractures is safe and effective. *Clin Orthop Relat Res.* 2010; 468:975-82.
9. Lau TW, Leung F, Chan CF, Chow SP. Wound complication of minimally invasive plate osteosynthesis in distal tibia fractures. *Int Orthop.* 2008; 32(5):697-703.
10. Tull F, Borrelli J. Soft-tissue injury associated with closed fractures: evaluation and management. *J Am Acad Orthop Surg.* 2003; 11:431-38.