IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 11 Ser.5 (November. 2022), PP 18-21
www.iosrjournals.org

Complications Associated With Anterolateral Plating of Tibial Pilon Fractures

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Abstract
Introduction: Pilon fractures include a wide range of complexity. The timing and tyoe of definitive fixation is dictated by the soft tissue injury and energy imparted to the fracture. Variety of treatment methods have been suggested for these injuries, including conservative treatment, external fixation with or without internal fixation, intramedullary nailing, plate fixation (medial or anterolateral) and minimally invasive plate osteosynthesis (MIPO). But none of these techniques are without complications.
Aim and objective: Assessment of complications associated with anterolateral plating of tibialpilon fractures.
Materials and Methods: This study has been conducted at Postgraduate Department of Orthopaedics, Government hospital for Bone and Joint Surgery Barzulla, an associated hospital of GMC Srinagar. patients with tibialpilon fractures who underwent anterolateral plating were followed for a period of 2 years to look for any complications. A total of 100 patients were included in this study after fulfilling the inclusion criteria.
Results: In this study 28 patients developed different types of complications whereas the rest of 72 patients didn't develop any complication. Ankle stiffness was the most common complication which developed in eight patients. Superficial wound infection developed in six patients. Skin necrosis developed in six patients. Four patients suffered superficial peroneal nerve neuropraxia. Four patients had palpable implant postoperatively when the wound healed and two patients developed herniation of tibialis anterior tendon.
Conclusion:Plate fixation in distal tibia fractures has higher risks of problems associated with wound infection and wound healing, however anterolateral plating after proper surgical timing and technique minimize these risks.

Key-Words
Anterolateral plating, Distal tibia, Mippo

Date of Submission: 03-11-2022 Date of Acceptance: 16-11-2022

I. Introduction

Distal one-third tibial fractures with or without articular involvement can be difficult to manage [1,2]. Metaphyseal reduction and restoration of articular alignment without soft tissue complication is always challenging[3]. Variety of treatment methods have been suggested for these injuries, including conservative treatment, external fixation with or without internal fixation, intramedullary nailing, plate fixation (medial or anterolateral) and minimally invasive plate osteosynthesis (MIPO). But none of these techniques are without complications.

Conservative treatment may result in malunion if the fracture extends tothe articular surfaces. External fixation and intramedullary nailing have less soft tissue complications but have higher rates of malunion[4]. Intramedullary nailing has got limitations with far distal fractures and
with fractures extending to the joint line [5]. Plate osteosynthesis has local soft tissue complications including wound dehiscence and infection.

Fractures of distal tibia pose management challenges to anorthopaedic surgeon because of following reasons

1. Being subcutaneous incidence of open fractures is high [6].
2. Tendency to displacement after swelling subsides [7].
3. Precarious blood supply [8, 9, 10].
4. Presence of neighbouring hinge joints which allow for littlerotational malalignment.
5. Poor stabilization of distal fragment by conventional nails [6].
6. Increased incidence of post-operative infections due to limitedsoft tissue coverage8.

OPEN REDUCTION AND INTERNAL FIXATION USING PLATES

Good results of open reduction and fixation with plate and screws fixation of distal tibial fractures was reported by Ruedi and Allgower who even described the principles for the management of distal tibialfracture which were

(i) Reconstruction of the correct length of fibula,

(ii) Anatomical reconstruction of articular surface of tibia,

(iii) Autologous cancellous bone grafting for defects created bycomminution and impaction and stable internal fixation offragments by plate and screws placed on medial side of tibia [11].

However similar good results were not reported by other authors subsequently [12]. The main disadvantage reported with open reduction and plate fixation technique for tibia has been skin necrosis with resultant infection and delayed or non-union [13]. There is high incidence of swelling and blister formation in distal tibial fractures and skin conditions are not always good enough to permit open reduction and plate fixation [14, 15]. Operating through this poor soft tissue cover was cited as reason for high incidence of wound infection and delayed Healing [16-18].

However anterolateral approach avoids dissection over the tenuous soft tissue envelope of the distal tibia. This approach otherwise allows excellent access to the vast majority of the tibial plafond, particularly the lateral, posterior, and central aspects. The exposure exploits the fracture involving the anterolateral (Chaput) fragment, which, after the exposure is performed, is manipulated and typically externally rotated on the anterior tibiofibular ligament to allow access to the posterior and central aspects of the plafond. The anterolateral approach offers excellent visualization of the tibial articular surface as far as the medial malleolus, while avoiding dissection of the anteromedialtibial face. It is well suited for an accurate articularreduction, as well as submuscular and subcutaneous plate applications spanning metaphyseal comminution. However, access to the medial ankle joint is poor, and proximal extension is limited. Advantages also include good soft tissue cover, ability to get to both tibia and fibula and if there is an open wound on the medial side.

II. Materials And Methods

This study has been conducted at Postgraduate Department ofOrthopaedics, Government hospital for Bone and Joint Surgery Barzulla, an associated hospital of GMC Srinagar. patients with tibialpilon fractures who underwent anterolateral plating were followed for a period of 2 yearsto look for any complications.

A total of 100 patients were included in this study after fulfilling the inclusion criteria.

Inclusion criteria

1) Age > 18
2) Both Sexes.
3) Patients with closed intra articular fractures of distal third of tibia, where open reduction and internal fixation was done using anterolateral approach.

Exclusion criteria:

1. Age < 18
2. Open fractures
3. Fractures with impending or established compartment syndrome.
4. All fractures with neurovascular injury.
5. Pathological fractures.
6. Associated fractures of same limb
7. Medically unfit patients.

III. Results

Out of a total of 100 patients who were followed up, 28 patients developed different types of complications whereas the rest of 72 patients didn't develop any complication. Ankle stiffness was the most common complication which developed in eight patients. This complicationgradually improved with functional range of ankle movements achieved with the help of physiotherapy by 26-28 weeks.

Superficial wound infection developed in six patients. These patients were managed with alternate aseptic dressings and oral antibiotics. All of these patients recovered and no case of deep infection was reported.

Skin necrosis developed in six patients. 4 patients developedflap necrosis and two patients had marginal necrosis which healed with the help of antibiotics and regular dressing.

In our study, four patients suffered superficial peroneal nerve neuropraxia which improved within a period of four to eight weeks.

Four patients had palpable implant postoperatively when the wound healed and two patients developed herniation of tibialis anterior tendon.

A  B 

Flap necrosis Ankle stiffness

C  D 

Palpable implant Infection with marginal necro

IV. Discussion

Reference 78 High-energy injuries of distal tibia can cause serious damage to both soft tissues and bone in this area with an insufficient vascular structure. Failing to appreciate the soft tissue condition will invariably complicate the injury with infection, wound dehiscence or non-union. Minor complications in the soft tissues increase the rate of major complications therefore delicate handling of the soft tissues by using minimally invasive techniques has been advocated for this type of fracture [19, 20].

AIIMS- For quite some time, distal tibial fractures have been treated by open reduction and internal fixation with plates. The risk of disrupting blood supply is increased with the classic approach of open reduction and internal fixation in the metaphyseal region of the tibia [14].Open reduction with plates leads to devastating complications of infection and wound breakdown with implant exposure [15].

Historically, an anteromedial approach has been used for the management of tibialpilon fractures. One of the major disadvantages of this approach is the risk of wound breakdown with implant exposure. In addition, this approach limits visualization of the lateral Chaput fragment. Implant prominence in anteromedial plating has required implant removal as revision surgery in most of the cases. Anterolateral area of distal tibia has better soft tissue coverage and offers direct exposure to the anterolateral fragment.

Fibular fixation through separate incision along with conventionaldistal tibial plating is complicated by wound healing problems.But with precontoured locking plate for distal tibial fixation,fracture can be managed through smaller incisions via minimallyinvasive approach. Locking plates cause less damage to the periostealblood supply, which may decrease the incidence of delayedunion or nonunion and secondary loss of fixation [16].

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Suhail Shabnum Wani, et. al. "Complications Associated With Anterolateral Plating Of Tibial Pilon Fractures." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(11), 2022, pp. 18-21.