ORIGINAL RESEARCH PAPER

Orthopaedics

STUDY OF COMPLEX TIBIAL PLAFOND FRACTURES TREATED BY DELAYED SINGLE STAGE PROCEDURE - PROSPECTIVE STUDY

KEY WORDS: tibial pilon fractures, distal tibial fractures, ankle fractures, soft tissue management.

Dr. Mogileesh* 3RD Year Post Graduate M.S(ORTHO), Apollo Institute of Medical Sciences & Research, Chittoor, Andhra Pradesh. *Corresponding Author

Dr. Ashish Abdul Assistant Professor M.S (ORTHO), Apollo Institute of Medical Sciences & Research, Chittoor, Andhra Pradesh.

Dr. Chetan Senior Resident M.S (ORTHO), Apollo Institute of Medical Sciences & Research, Chittoor, Andhra Pradesh.

Dr. Chandra sekhar Babu 2nd Year Post Graduate M. S.(ORTHO), Apollo Institute of Medical Sciences & Research, Chittoor, Andhra Pradesh.

ABSTRACT

Background: Tibial Pilon fractures are the most severe ankle joint injuries. Pilon injuries are relatively rare and constitute only 5% to 10% of all tibial fractures. Most Pilon fractures are caused by high- energy trauma and are usually associated with articular communication and severe soft tissue injury, making management extremely difficult for foot and ankle surgeons. **Aims And Objectives:** Delayed single stage procedure and two stage open reduction and internal fixation are the two commonly used surgical methods in management of tibial Plafond fracture. Surgery by Delayed Single stage procedure shows better outcome compared to two stage Procedure. So we advice these modified surgical procedure suitable to our hospital scenario. **Methods-** Source for this study: It is a prospective study done during the period between May 2022 to August 2023 in department of orthopaedics at our teaching hospital . A total of 12 patients who underwent delayed single stage procedure followed for a period of 18 months. Among which 10 patients are men and two patients are women. Fractures with right leg in 8 people and left leg with 4 people .Mean age of patients was 20-65 yrs of age. Trauma energy was defined as high velocity injury. **Results:** Pilon fractures account for 1% of all fractures. There is debate in the literature about its treatment. In this study, we analysed important parameters in the surgical treatment of these fractures to study possible correlations among them and how they correlate to functional results, complications and sequelae. The quality of anatomic reduction is the most important parameter in the management of these fractures. Anatomical reduction of these fractures are associated with better outcome. **Conclusion:** Pilon fractures are usually because of high velocity trauma associated with soft tissue injury hence we advised treatment by delayed single stage procedure.Delayed single stage surgical procedure are convenient, acceptable to our low socio-economic patients, reduced hospital stay, avoid repeated admissions, decreased morbidity, lower risk of anaesthesia complications, post operative infections, less chances of non union and better bone healing for complex tibial Plafond Fractures. **Advice:** As soft tissue coverage is very minimal in ankle region there is increased incidence of wound dehiscence, infection, implant failure so we wait till appearance of wrinkle over wound site, soft tissue healing and plan for definite management.

INTRODUCTION

Tibial pilon fractures are rare, accounting for 3–10% of all tibial fractures and <1% of all fractures to the lower extremity (1–3). Males are affected more than females with mean age accounting at around 45 years (3, 4). 75–90% of cases are associated with farcture of fibula (5). Tibial pilon fractures with the fibula intact are more likely in AO Type B fractures than in Type C fractures. Furthermore, in recent studies it has been suggested that tibial pilon fractures are likely to be less comminuted and less severe when the fibula remains intact (6).pilon fractures usually result from high—energy trauma with heavy axial force, which basically causes the tibial plafond to burst over the talus (7). Sometimes low—energy rotational forces, can also lead to pilon fractures, but the comminution seen in these fractures is usually less severe (5). Most commonly the high–energy traumas are due to falls or jumps from great heights or motor vehicle accidents. The high energy trauma associated with severe damage to the surrounding soft tissue as well and 6% of all patients with tibial pilon fracturesassociated with multiple fractures. The position of the foot at the time of axial impact seems to be the decisive factor in terms of fracture pattern and amount of comminution (9, 10). Topliss et al. emphasize the importance of the position of the foot at the time of axial impact and therefore distinguish between fractures in the sagittal plane and those in the coronal plane.

Sagittal fractures are mostly seen in younger patients and high–energy trauma with the foot in varus angulation at the time of impact, while coronal fractures are rather seen in older patients, with low–energy trauma and the foot in valgus angulation (10). Furthermore, when the foot is in plantar flexion at the time of impact the force will likely cause a fracture of the posterior part, when the foot is in dorsiflexion an anterior fracture of the tibial pilon is the result. When the foot is in neutral position at the time of the impact, the talus will act as a pestle, which will result in destruction of the whole articular surface (8).

MATERIALS AND METHODS

Our study analysis include patients attended our out-patient orthopaedic department from may 2022 to august 2023. A Total of 12 patients presented to emergency department with distal pilon fracture among which 10 patients are male 2 Patients are females .Right leg is involved in 8 people and left leg involved in 4 people . Among 12 patients 2 patients treated by Ilizarov fixation ,6 Patients were treated by MIPPO technique ,4 people treated by open reduction and internal fixation .our idea is to give minimum duration to the patients to recover from the intial traumatic injury .during waiting period we attended open wounds and improved the general condition ,we found the changes of post op complications including infections are substantially reduced due to delayed surgical intervention.

Baseline Patient Characteristics For The Study Of PILON FRACTURES:

Sex	Women	Men
Age-years	20-30: 0%	20-30:10%
	30-50: 50%	30-50:40%

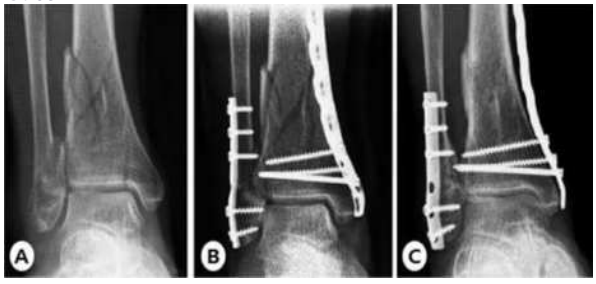
	50-65: 50%	50-65:50%
Co-morbidities	Diabetes:55% , Hypertension:44%	Diabetes:50% , hypertension:58%
Medications	Anti-Diabetic:48%	Anti-Diabetic:36%
Use	Anti-Hypertensive:35%	Anti-Hypertensive:40%
	NSAIDS:30%	NSAIDS:38%
	Anxiolytics:18%	Anxiolytics:5%
Personal habits	Tobacco chewing:4%	Alcohol:40%, smoking:30% tobacco chewing:28%

Socio-demographic Chart:

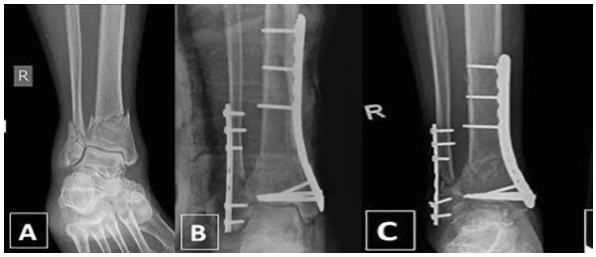
Post Op Management:

Static quadriceps exercises and active toe movements, began from the 3rd postoperative day. Intra-venous antibiotics are given for 7 days, followed by a course of oral antibiotics for 7 days. Analgesics are to be given as per need. Suture removal is done on the 12th post-op day. Ankle mobilisation started on the 10th postop day. Non-weight-bearing started with a walker after the 4th week. Partial protected weight bearing started as the first sign of callus seen in follow-up x-rays. Usually after 8 to 10 weeks. X-rays were taken at regular intervals and evaluated for fracture healing, alignment at the fracture site, and for any evidence of mal-alignment. Full weight bearing started as the union was achieved in 3 out of 4 cortexes, usually around 18 to 20 weeks. (Clinically, union is defined as a painless fracture site during full weight bearing. Radiographically, a fracture will be considered united if 3 of 4 cortices in 2 radiographic views are continuous. If fracture union was not achieved by the sixth month of surgery, the situation was classified as delayed union, and non-union by the ninth month.

Case 1



Case 2



Case 3

Followup:

patient are followed for a period of 18 months , regular intervals at 2 weeks ,4 weeks ,3 months,6 months,9 months,12 months ,18 months .And at final followup pateints are evaluated by using AFOAS SCORE e American Orthopaedic Foot and Ankle Society (AOFAS) score. The American Orthopaedic Foot and Ankle Society Score (AOFAS), introduced in 1994 byKitaoka, has nine questions related to three components: Pain (one question with 40 points), Function (7 questions with 50 points) and Alignment (one question with 10 points), making a total score of 100 points. The questions related to alignment and range of motion (measured by a goniometer) was done by the examiner based on radiographs and clinical assessment; the other questions were completed by the individual patients. The individual scores were then added to obtain an overall functional score, which was then expressed in the form of a percentage of the normal (100 points).

RESULTS AND DISCUSSION

The demographic features of the patients are tabulated below. There were 10 (83.3%) males and 2(26.7) females. The average age of the patients during the time of surgery was 43.7 (range of 20-65years).The fractures were at the right side in 8 (66.6%) and at left side in 4 (33.4%) patients. The mean followup after surgery was 3.6 months (range, 6 to 18 months) Fig 1. The mean operative time was 65 min (45-125 min). The mean time until surgery was 5 days (7- 14days).

Distribution of patients based on age, sex, fracture pattern, surgical procedure

Age		**43.7 (20-65)**	**percentage**
sex	male	10	83.3
	Female	2	26.7
side	right	8	66.6
	left	4	33.4
Fracture type	A1	1	8.3
	A2	2	16.6
	A3	2	16.6
	B1	1	8.3
	B2	1	8.3
	B3	2	16.6
	C1	2	16.6
	C2	1	8.3
procedure	Ilizarov fixation	2	16
	MIPPO	6	50
	Open reduction and internal	4	34

	fixation
AOFAS score	
Excellent	>85%
Good	70-80%
Fair	50-65%
poor	<50%

The mean AOFAS ankle hind food was 86.6 and according to the AOFAS score, >85% had an excellent score, 70-80% had a good result, 55-65% had a fair result and <50% poor results. The quality of anatomic reduction is the most important parameter in management of these fractures anatomical reduction of tibial articular surface is associated with better outcome.

Patient treated with open reduction and internal fixation showed better anatomical reduction and functional outcome but among four patients treated 2 developed superficial infection which later subsided with appropriate antibiotic therapy .patients treated with ilizarov fixator developed pintract site infection which later subsided and post op mobilisation in this patients and among six patients treated with MIPPO technique no complications are seen .

CONCLUSION

Delayed single stage surgical procedure are convenient, acceptable to our low socio economic patients, reduced hospital stay ,avoid repeated admission ,decreased morbidity, lower the risk of aneasthesia compliactions, post operative infections, less chance of non union and better bone healing for complex tibial plafond fractures.

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