

Comparative Analysis of Outcome of Nonoperative and Operative Methods of Treatment of Pilon Fractures: An Institutional Based Study

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Abstract

Background: Pilon fractures are traumatic injuries of the distal part of the tibia involving its articular surface at the ankle joint. The present study was conducted to compare the outcome of nonoperative and operative methods of treatment of pilon fractures. **Materials and Methods:** The present study was conducted to compare the outcome of nonoperative and operative methods of treatment of pilon fractures. The fractures were classified based on Ruedi-Allgower classification in adults. 30 patients were allocated operative treatment rest 30 patients treated conservatively. Assessment of outcome- 1.Functional outcome 2.Union 3.Complications in two groups. **Results:** Total 60 patients with pilon fracture were included in the study. 30 patients were allocated operative treatment rest 30 patients treated conservatively. The fractures were classified based on Ruedi-Allgower classification in adults.Type 2 fracture that were treated conservatively and operatively were maximum.In operative group mean is 18.2 wks and in nonoperative group it is 19.1wks. In conservative treatment maximum cases show poor outcomes (43.33%) and in operative treatment maximum cases show excellent results.Stiffness (26.66%), malunion (13.33%) was present in conservatively treated patients. Superficial Infection (10%), Deep Infection(3.33%), Osteomyelitis(3.33%) was present in operatively treated patients.Overall complications in conservatively treated patients were 40% whereas 16.66% in operatively treated patients. **Conclusion:**The present study concluded that in conservative treatment maximum cases show poor outcomes(43.33%) and in operative treatment maximum cases show excellent results(53.33%). Overall complications in conservatively treated patients were 40% whereas 16.66% in operatively treated patients.

Keywords:Conservative Treatment, Operative Treatment,Pilon Fractures.

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Introduction

“Pilon,” the French word for pestle, was first used by Etienne Destot in 1911 as an analogy for the mechanical function of the distal tibia on the talus [1]. Fractures of the distal tibial plafond are also termed pilon fractures to describe the high energy axial compression force of the tibia as it acts as a pestle, driving vertically into the talus [2-4]. It accounts for 7% to 10% of all tibial fractures [5]. Presently, nonoperative management using casts or pin traction is advocated by few orthopaedic surgeons and only for nondisplaced articular fractures or in patients who have surgical contraindications because of medical comorbidities, patients with low demand, and select inoperable cases[6,7]. The objective of operative treatment is to anatomically reduce the fracture fragments in order to restore the congruity of the joint surface and promote bony union and functional recovery with minimal disruption of soft tissues. To this end, several surgical techniques and staged procedure protocols have been proposed for treatment, including open reduction internal fixation (ORIF), minimally invasive plate osteosynthesis (MIPO), and external fixation (EF), often followed by internal syntheses[8,9]. The present study was conducted to compare the outcome of nonoperative and operative methods of treatment of pilon fractures.

Materials and methods

The present study was conducted to compare the outcome of nonoperative and operative methods of treatment of pilon fractures.Total 60 patients with pilon fracture were included in the study. Patients presented within 24 hrs with Closed fracture, Unilateral fracture were included in the study. Patients with Open fractures, associated spinal injuries(paraplegia and quadriplegia), Known case of bleeding disorders and sickle cell anaemia, Patient with vascular compromise, Associated fractures of other bones of the same limb, Patient presenting after 24 hrs were excluded from the study. The detailed history was taken. Patients general condition was assessed and then they were put through a thorough clinical examination. Then the patient’s radiograph’s were taken, both anteroposterior and lateral views of the ankle joints. The fractures were classified based on Ruedi-Allgower classification in adults. Routine investigations were done for all patients. 30 patients were allocated operative treatment rest 30 patients treated conservatively. The patients under operative treatment were operated with staged ORIF method i.e primary fibula fixation & ankle spanning external fixation,then after softtissue healing secondary definitive fixation with distal tibial plate by ORIF. Patients under conservative treatment were given calcaneal pin traction after reduction under fluoroscopy and after 3wks cast immobilizataion done. During follow up visit patient were assessed according to AOFAS guidelines. Follow up X-rays were taken to assess fracture union, the condition of implant (in operated cases), to look for ankle arthritis and any deformities.Assessment of outcome- 1.Functional outcome 2.Union 3. Complications.1. Functional outcome of two groups were assessed using AOFAS score. 2. Union of fracture was assessed by radiological and clinical method and compared with each other. Radiologically it is defined as union of at least one cortex in AP and lateral view of X ray 3. Complications of both groups were assessed clinically and radiologically. Final comparison between two groups

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were done by comparing the distribution of grades of functional outcome and complication in two groups.

Results

Total 60 patients with pilon fracture were included in the study. 30 patients were allocated operative treatment rest 30 patients treated conservatively. The fractures were classified based on Ruedi-Allgower classification in adults. Type2 fracture that were treated conservatively and operatively were maximum. In operative group

mean is 18.2 wks and in nonoperative group it is 19.1wks. In conservative treatment maximum cases show poor outcomes(43.33%) and in operative treatment maximum cases show excellent results(53.33%).Stiffness (26.66%), malunion (13.33%) was present in conservatively treated patients. Superficial Infection(10%), Deep Infection(3.33%), Osteomyelitis(3.33%) was present in operatively treated patients.Overall complications in conservatively treated patients were 40% whereas 16.66% in operatively treated patients.

Table 1: Fracture types in two group

Fracture types	Conservative treatment n(%)	Operative treatment n(%)
Type 1	7(23.33%)	6(20%)
Type 2	12(40%)	15(50%)
Type 3	11(36.66%)	9(30%)

Table 2: Comparison of mean time for radiological union

Mean time	Conservative treatment n(%)	Operative treatment n(%)
	19.1weeks	18.2weeks

Table 3: Final outcome in two groups

Outcome of different types of fractures	Conservative treatment(%)	Operative treatment (%)
Excellent	9(30%)	16(53.33%)
Good	5(16.66%)	6(20%)
Fair	3(10%)	5(16.66%)
Poor	13(43.33%)	3(10%)

Table4: Complications

Complications	Conservative treatment (%)	Operative treatment (%)
Superficial Infection	0(0%)	3(10%)
Deep Infection	0(0%)	1(3.33%)
Osteomyelitis	0(0%)	1(3.33%)
Stiffness	8(26.66%)	0(0%)
Malunion	4(13.33%)	0(0%)
Delayed/ Nonunion	0(0%)	0(0%)
Total	12(40%)	5(16.66%)

Discussion

The two most common classification systems used to describe pilon fractures are the Ruedi-Allgower classification and the AO/OTA classification. Type I Ruedi-Allgower fractures are defined as nondisplaced "cleavage fractures" of the tibial plafond [10]. Displacement is defined as greater than 2 mm of incongruity at the articular surface or mal-alignment greater than 10 degrees in any plane [11]. In Ruedi and Allgower's initial publication, type-I fractures were associated with the highest rate of satisfactory reduction using closed methods [8]. Type-II fractures are defined as simple displacement without comminution of the articular surface, while type-III fractures are defined by substantial articular comminution often associated with metaphyseal impaction. Type-III fractures are the most frequent presentation, comprising approximately 25% to 71% of all pilon fractures [8].

Total 60 patients with pilon fracture were included in the study. 30 patients were allocated operative treatment rest 30 patients treated conservatively. The fractures were classified based on Ruedi-Allgower classification in adults. Type2 fracture that were treated conservatively and operatively were maximum. In operative group mean is 18.2 wks and in nonoperative group it is 19.1wks. In conservative treatment maximum cases show poor outcomes(43.33%) and in operative treatment maximum cases show excellent results(53.33%).Stiffness (26.66%), malunion (13.33%) was present in conservatively treated patients. Superficial Infection(10%), Deep Infection(3.33%), Osteomyelitis(3.33%) was present in operatively treated patients.Overall complications in conservatively treated patients were 40% whereas 16.66% in operatively treated patients. Nonoperative treatment, however, often resulted in secondary joint displacement and poor outcomes[12].

Complications after surgical fixation include wound slough or dehiscence, infection, varus malunion, nonunion, joint stiffness, and post-traumatic arthritis[13].

In 1986 Dillin, reported infection rates as high as 55% and wound sloughing rates of 36% [14].

In 2012 Justin E. Richards, reported only 3.7 infection rate & 3.7% of nonunion rate with patients treated with ORIF in staged procedure compared to 11% infection and 22% nonunion in external fixation group. Also staged ORIF group has significantly higher Lowa ankle function score. They reported use of staged procedure & newer surgical techniques compared to old studies is key to successful result in ORIF group[15].

Conclusion

The present study concluded that In conservative treatment maximum cases show poor outcomes (43.33%) and in operative treatment maximum cases show excellent results(53.33%). Overall complications in conservatively treated patients were 40% whereas 16.66% in operatively treated patients.

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