

Fixation of pilon Fracture & Comminuted distal tibial fracture with Triangular External fixator

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Abstract

Back ground : patients with pilon fractures and distal comminuted fractures, These fractures give the surgeon a great challenge In methods of fixation starting from External fixator up to plating and Illizarov But our method of fixation which Is Triangular External fixator acheive a great success.

Introduction

Pilon fracture is a fracture of Tibial Plafond range from high to low energy Axial Injuries. Usually the cause of trauma Is falling from height. Pilon fractures have Two major ways for classification which are Ruedi Allgower classification & Ao/oTA Classification. Blood supply & Serve damage of Periosteal Blood Vessels has a very Important role In union delay. So External fixator doesn't lead to more periosteal Blood Vessels damage. So more good union results. Pilon is afrench word for pestle as away for severe that occur to the bone

Aim of Study :- To Assess the results of fixation of Pilon fracture and Distal comminuted Tibial fractures with Triangular External fixator. The specific questions to be answered were:

1. The mean period of healing of these fractures to be complete and duration

during which the patient can return to his normal activities

2. Is the triangular external fixator is a definitive method for fixation

patients & methods :

the study Included 20 patients addmitted to the orthopaedic and trauma unit in faculty of medicine sohag university . a written consents were taken from the patients and operated by external fixator as follow ;

1. the patient positioned in a supine position and spinal anaesthesia is given to the patient
2. after sterilisation of the limb , two schanzes applied to the tibia then one schanz centrally threaded to the calcaneous then connecting them by rods and reduction is made by traction like this picture



(Intraoperative picture)



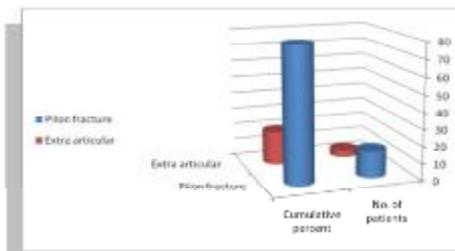
(Postoperative X. ray)

(Preoperative X-ray)

Results

The study was performed In Traumatology & orthopaedic department In Sohag university, faculty of medicine 20 patients have been operated with Triangular External Fixator.

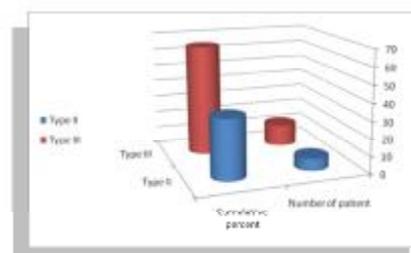
Fracture level	No. of patients	Cumulative percent
Pilon fracture	16	80
Extra articular distal tibialfr.	4	20
Total	20	100



(fracture level)

The patients were aging from 16 years old to 70 years old . 13 male patient & 7 female patient. 16 patients of them has pilon fractures & 4 of them has Extra. articular distal highly comminuted distal tibial fractures. 12 of them have a simple fractures & 8 have compound fractures I, II , 7 of the patients have Ruedi Allgower classification types II & III , 13 of them have Ruedi Allgower Type III.

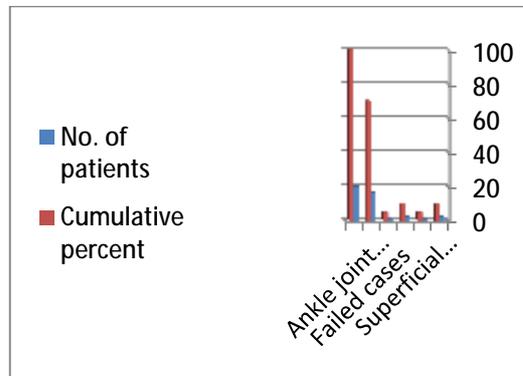
Type of fracture	Number of patient	Cumulative percent
Type II	7	35
Type III	13	65
Total	20	100



(Type of fractures according to Ruedi Allgower classification)

All patients give us a written consent for operation and a triangular External fixation
Is applied like the picture .

Complications



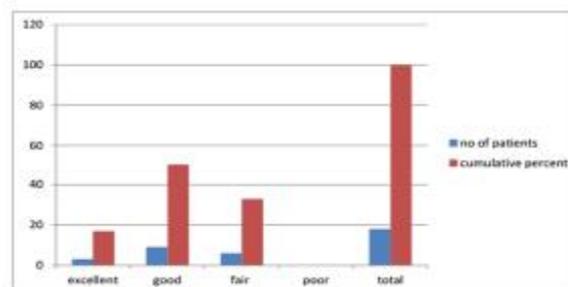
(Postoperative complication)

Superficial wounds infection in two cases managed by debridement and I,V antibiotics and there was five cases presented with pin tract infection that were recovered directly after schanz pin removal . two cases show delayed union where the fracture healing take about 9 months . one cases complicated with varus deformity . sixteen cases complaining from ankle joint arthritis . one case only had a deep infection
The patients followed up for 28 to 72 weeks, and the average time for healing was about 3 months .

The results according to Olerud and Molander score were

(Olerud and Molander score)

	Number of patients	Cumulative percent
Excellent	3	15%
Good	9	45%
Fair	6	30%
Poor	0	0%
Total	20	100%



(Olerud and Molander score)

Fixation of these fractures by triangular external fixator is the method of choice for most of surgeons

Discussion

In this study Twenty patients with Pilon fracture and distal comminuted Tibia fractures were operated with Triangular External Fixator, male patient more affected than female 2 : 1 External fixator Is the treatment choice for these fractures results of the present study appear to be more related to original Injury than timing of operation or type of definitive fixation, the

References:

1. Teeny S, Wiss DA. Open reduction and internal fixation of tibial plafond fractures. *ClinOrthop.* 1993;292:108-17.
2. Ovaida DN, Beals RK. Fractures of the tibial plafond. *J Bone Joint Surg.* 1986;68-A:453-551.
3. Bourne RB. Pilon fractures of the distal tibia. *ClinOrthop.* 1989;240:42-6.
4. Wyrsh B, McFerran M, McAndrew M. Operative treatment of fractures of the tibial plafond. A randomized prospective study. *J Bone Joint Surg.* 1996;78-A:1646-57.
5. Barbieri R, Schenk R, Koval K. Hybrid external fixation in the treatment of tibial plafond fractures. *ClinOrthop.* 1996;332:16-22.
6. Marsh JL, Bonar S, Nepola JV. Use of an articulated external fixator for fractures of the tibial plafond. *J Bone Joint Surg.* 1995;77-A:1498-509.
7. Bone L, Stegemann P, McNamara K. External fixation of severely comminuted and open tibialpilonfractures. *ClinOrthop.* 1993;292:101-7.
8. Marsh JL, Weigel DP, Dirschl DR. Tibial plafond fractures: how do these ankles function over time? *J Bone Joint Surg.* 2003;85-A:287-95.
9. Tornetta P, Weiner L, Bergman M. Pilon fractures: treatment with combined internal and external

patient with more severe fracture pattern and soft tissue Injury had the worst functional results.

Conclusion Triangular External Fixator Is the best choice for treatment of pilon fracture of comminuted distal tibial fractures due to least soft tissue dissection.

- fixation. *J Orthop Trauma.* 1993;7:489-96.
10. Haidukewych GJ. Temporary external fixation for the management of complex intra-and periarticular fractures of the lower extremity. *J Orthop Trauma.* 2002;11:678-85.
11. Patterson MJ, Cole DJ. Two-staged delayed open reduction and internal fixation of severe pilon fractures. *J Orthop Trauma.* 1999;2:85-91.
12. Sirkin M, Sanders R, DiPasquale T, Herscovici D. A staged protocol for soft tissue management in the treatment of complex pilon fractures. *J Orthop Trauma.* 1999;2:78-84.
13. Koval KJ, Clapper MF, Brumback RJ. Complications of reamed intramedullary nailing of the tibia. *J Orthop Trauma.* 1991;5:184-9.
14. Robinson CM, McLauchlan GJ, McLean IP, Court-Brown CM. Distal metaphyseal fractures of the tibia with minimal involvement of the ankle. Classification and treatment by locked intramedullary nailing. *J Bone Joint Surg Br.* 1995;77:781-7.
15. Mazur JM, Schwartz E, Sheldon RS. Ankle arthrodesis: Long-term follow-up with gait analysis. *J Bone Joint Surg.* 1979;61-A:964-75.
16. Ruedi TP, Allgower M. The operative treatment of intraarticular fractures of the lower end of the tibia. *ClinOrthop.* 1979;138:105-10.

17. Etter G, Ganz R. Long-term results of tibial plafond fractures treated with open reduction and internal fixation. *Arch Orthop Trauma Surg.* 1991;110:277-83.
18. McFerran M, Smith S, Boulas HJ. Complications encountered in the treatment of pilon fractures. *J Orthop Trauma.* 1992; 6:195-200.
19. Marsh JL, Mueling V, Dirschl DR, Hurwitz S, Brown TD, Nepola J. Tibial plafond fracture: Articulated external fixation with and without motion similar, *J Orthop Trauma.* 2006;20(8):536-41.
20. Okcu G, Aktuglu K. Intra-articular fractures of the tibial plafond a comparison of the results using articulated and ring external fixators. *J Bone Joint Surg.* 2004;86-B:868-75.
21. Kapukaya A, Subasi M, Arslan H. Management of comminuted closed tibial plafond fractures using circular external fixators. *ActaOrthop Belg.* 2005;71:582-9.
22. Antoci V, Voor MJ, Seligson D, Roberts CS. Biomechanics of external fixation of distal tibial extra-articular fractures: is spanning the ankle with a foot plate desirable? *J Orthop Trauma.* 2004;18(10):665-73.
23. Pugh KJ, Wolinsky PR, McAndrew PM, Johnson KD. Tibialpilon fractures: a comparison of treatment methods. *J Trauma.* 1999;47:937-42.
24. Leung KL, Kwok HY, Pun TS, Chow SP. Open reduction and Ilizarov external fixation in the treatment of distal tibial fractures *Injury.* 2004;35:278-83.
25. Varsalona R, Liu GT. Fibular fixation in distal tibial metaphyseal fractures. *Strat Traum Limb Recon.* 2006;1:42-50.