ISSN: 0975-3583,0976-2833 VOL13, ISSUE05, 2022

Original Research Article

CLINICAL RESULT OF MANAGEMENT OF FIXATION OF DISTAL TIBIA FRACTURE BY VARIOUS METHODS.

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Abstract:

Background & Method: The aim of this study is to study Clinical result of management of fixation of distal tibia fracture by various methods. The total number of patients in this study is 23 with their ages ranging from 21 – 70 years with an average of 46.91 years. 3 patients were lost to follow up. Hence, the total number of patients were 20. There were 17 males and 6 females.

Result: There were 10 open injuries, of which there were 6 – Grade1; 3 Grade 2 and 1-grade 3 open injuries. Those 5 patients who were not willing to undergo surgical procedures were treated conservatively by applying POP after 3 weeks of pin traction and check x-ray.

Conclusion: A short series of results of various modalities of management of distal tibial fractures were analyzed and the overall results including quality of reduction, functional recovery and the presence or absence of complications have led to us to individualize the option of treatment according to the status of the soft tissue, fracture location; fracture pattern and articular involvement. We are aware of the fact that the number of patients and duration of study may not give us the liberty to conclusively arrive at a protocol and might need a more elaborate study for standardization of the different methods available for the management of fractures of distal tibial.

Keywords: fixation, distal tibia & fracture.

Study Designed: Observational Study

1. INTRODUCTION

Distal tibial fractures remain a challenge to orthopedic surgeons. They usually occur as a result of high energy trauma in young patients, but in the elderly they can result from a simple fall. In the elderly, the problem is compounded by poor bone-stock, their limited ability to partially weight bear and co-morbid conditions. In non-fatal road traffic injuries, fractures are the commonest injuries. Bones of the lower extremity are commonly involved in road traffic accidents. Gravitational force and velocity of the vehicle at the time of trauma has

ISSN: 0975-3583,0976-2833 VOL13, ISSUE05, 2022

shown to play a major role in such types of injury. The commonest long bone fractured and most common open one is tibia. According to the location in the tibia bone; distal tibia has 2nd highest incidence of the fracture.[1]

Problems like mal-union, delayed union, non-union and wound dehiscence due to poor soft tissue coverage, reduced vascularity of distal tibia region and associated soft tissue injury. Anatomic reduction of the articular surface, restoration of fracture alignment, proper soft tissue handling and early ankle mobilization has shown effective results in managing distal tibial fractures. Ruedi and Allgower[2] presented their landmark paper in 1969, in which at 4 years follow up 74% patients had good functional outcome, revolutionized the treatment protocol of distal tibia fractures. Open reduction and internal fixation, joint spanning external fixator, hybrid external fixator, ilizarov fixator application, closed reduction and internal fixation with intra medullary nailing, biological minimally invasive plate osteosynthesis (MIPO) are the various modalities of treatment in these types of fractures. Method selected for stabilization should be sufficient enough to maintain the reduction. The best modality of method of management for distal tibial fracture is one that achieves a good reduction and stability and minimizes soft tissue compromise as well as devascularization of the bony fragments. Choosing a modality of treatment method for distal tibia fracture remains difficult and controversial because the final results depends upon multiple factors like the status of soft tissue,degree of comminution and involvement of articular surface.[2] In another analysis [3] by Ruedi and Allgower in which they showed good results at 9 years of follow up, but most of the patients they studied had low-energy injuries so standard protocol for these types of injuries could not set. In 1979 Ruedi and Allgower came up with another study in which patients had high energy injuries and came to the conclusion that the overall results were better in low energy injuries compared to high energy injuries.[4] Appropriate soft tissue management along with fixation of fracture gave better results.[5,6]

Ethics

Ethical committee approval was taken prior to the initiation study.

Study Design:

The present study deals with the analysis of outcome of various modalities of treatment of distal tibial fractures depending on the type of fracture, location of the fracture and the status of the soft tissue envelope. Patients admitted with distal tibial fractures with or without intra articular extension and those having closed or open injuries were considered for this study.

2. METHODOLOGY:

The total number of patients in this study is 23 with their ages ranging from 21 – 70 years with an average of 46.91 years. 3 patients were lost to follow up. Hence, the total number of patients were 20. There were 17 males and 6 females.

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Table No. 01: Age Group

Age Group	Male	Female
21 – 30	2	1
31 – 40	5	3
41 – 50	2	0
51 – 60	4	1
61 - 70	4	1

Graph No. 1: Gender Distribution

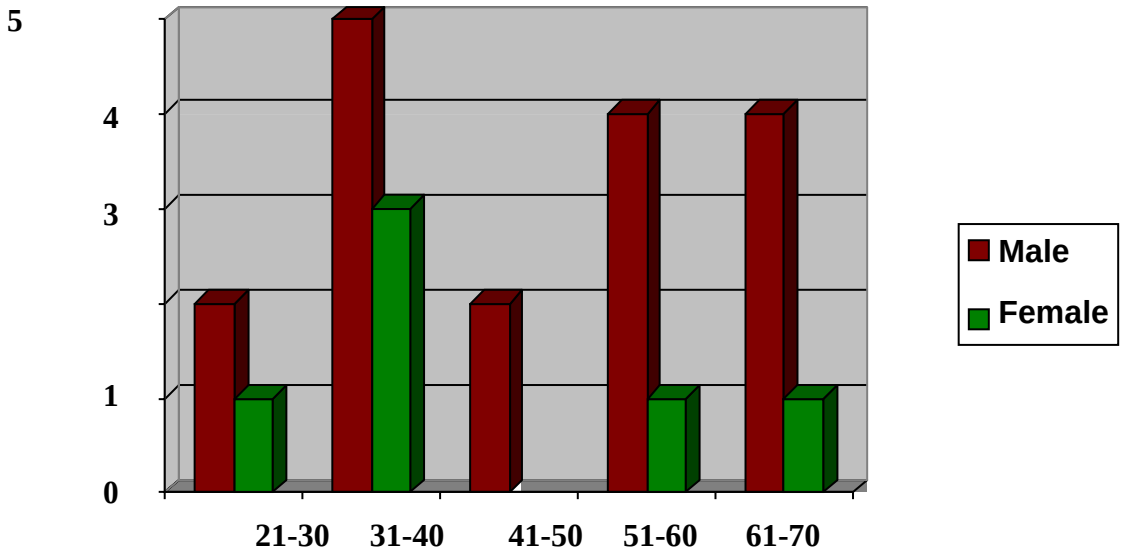
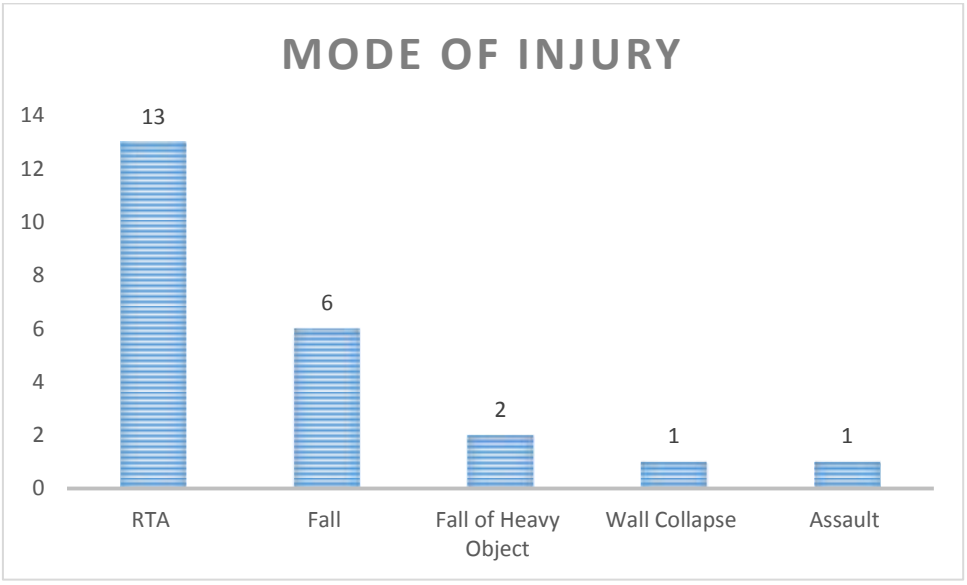


Table No. 2: Mode of Injury



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RTA	13	56.5%
Fall	6	26%
Fall of Heavy Object	2	8%
Wall Collapse	1	4.3%
Assault	1	4.3%

The patients with symptoms suggestive of distal third tibial fractures are examined both clinically and radiologically after initial resuscitation.

Antero – Posterior radiographs of the affected leg with knee and ankle joints taken. All fractures were classified according to AO system. Out of 23 there were totally 13 patients in type A, 3 patients in type B and 7 patients in type C.

The open fractures were classified according to GUSTILO – ANDERSON System.
Initially patients were immobilized in POP Splints. In open injuries, thorough wound wash and debridement was done and calcaneal pin traction was applied in few cases. Patients with open injuries, being received in the causalty was given intravenous antibiotics.
In five patients with open injuries and severe comminution, Hybrid external fixation was done;
whereas, in another five patients with closed, simple fractures interlocking nailing was done.
Patients with closed injuries with severe comminution away from the tibial plafond were treated with Bridge plating technique. Patients associated with medical diseases (not fit for anesthesia) and those not willing to undergo surgical procedures were treated conservatively either by POP immobilization or pin traction technique according to the soft tissue status of their lower legs. The range of follow up varies from 6 months to 16 months.
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3. RESULTS and OBSERVATION:

All patients having distal third tibial fractures were admitted and evaluated for co-morbid condition. Routine investigations are done for anesthetic fitness and also to ruleout systemic illness. Associated medical conditions were treated by corresponding specialists. The patients were maintained in POP and calcaneal pin traction inthe case of compound fractures. Patients with compound fractures were treated with broad spectrum antibiotics. The time of surgery varied from 5 days to 25 days.

There were 10 open injuries, of which there were 6 – Grade1; 3 Grade 2 and 1-grade 3 open injuries.

Those 5 patients who were not willing to undergo surgical procedures were treated conservatively by applying POP after 3 weeks of pin traction and check x-ray.

6 patients with comminution (OA type A3.1/A2.2) in their diaphyseo metaphyseal region were treated with Bridge plating after their swelling subsided and wound healed. The range of period for taking the patient for surgery was 5 to 10 days. This was effectively done by means of limb elevation, ice packing in the immediate period after injury, good wound management and immobilization. 1 patient who was treated with conventional plate osteosynthesis lost to follow up.

6 patients with fractures of OA type A1.1 / A2.1 were treated with interlocking nailing. The range of preoperative period was 5 to 10 days. 1patient not turned for follow up. 5 patients with OA type B.3.3 / C1.1 / C2.1 / C 3.2 were treated with Hybrid external fixation. No patient in our study had non-union or amputation. However two patients had osteitis and deep infection. In one patient infection settled after nail removal and antibiotics. Another patient is on treatment at present.

Deformity: 5 patients had varus / valgus deformity ranging $2^0 – 5^0$, 4 patients had varus / valgus deformity ranging $6^0 - 10^0$. No anteversion or recurvation deformity noted. Shortening measuring 0.5cm found in 3 patients and 1cm shortening was noted in two patients.

Mobility:

Knee: 13 patients had full range of movements,8 patients it was >80%,1 patient had $<75^0$ of knee mobility.

Ankle: 8 patients had >75% of normal movements, 3 patients had <50% of Ankle movement.

Subtalar Joint: All patients had regained almost normal range of subtalar movement except for 3 patients who had <50% of normal.

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Pain: Five patients with interlocking nailing had anterior knee pain,10 patients had occasional pain at the fracture site for 2 months, 4 patients had moderate amount of pain at the fracture site for 1month.3 patients had severe pain at the fracture site, which disturbedtheir sleep and activities of daily life for 15 days.

Gait: Gait was near normal in almost all patients except 3 patients who complained of significant Limp. 2 of them had been treated conservatively.

Strenuous Activities: 16 patients were able to do strenuous activity and it was severely limited in 4 patients. In comparing our results we have used general features like time to union and infection rate.

The incidence of deep infection rate in our study may be due to more numbers of open reduction performed and increased exposure of fracture site to the environment. The mean time of union in many literatures is around 5 months (2 – 8months) which is the same in our study. The variation in the results of functional out come in various modalities reflects the difficulties in distal third tibial fractures management. In our study we observed 69.55% (16) excellent or good results,17.39% (4) showed fair results and 13.04% (3) of poor results. The poor out comes were associated with either technical difficulties or the presence of other injuries (or) associated co-morbid conditions

4. CONCLUSION

A short series of results of various modalities of management of distal tibial fractures were analyzed and the overall results including quality of reduction, functional recovery and the presence or absence of complications have led to us to individualize the option of treatment according to the status of the soft tissue, fracture location; fracture pattern and articular involvement. We are aware of the fact that the number of patients and duration of study may not give us the liberty to conclusively arrive at a protocol and might need a more elaborate study for standardization of the different methods available for the management of fractures of distal tibial.

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ISSN: 0975-3583,0976-2833 VOL13, ISSUE05, 2022

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