



Functional Outcome In Neglected Ankle Fractures – Our Experience

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Abstract

Introduction

Surgical management with open reduction and internal fixation has been the treatment option for unstable displaced ankle fractures. Late presentation of these type of fracture is not so uncommon in our country. There are very few literatures published in this regard explaining the treatment and end result of neglected cases. Herein, we report our experience in treating such late presented neglected ankle fracture with some having the dislocation as well.

Material and Method

This is a prospective study conducted from August 2020 to January 2023. Total 10 patients with ankle fractures who were presented late and admitted in Sanjay Gandhi Institute of Trauma and Orthopaedics underwent fixation surgery. All surgeries done by same surgical team and patients were followed up with radiographs every 4weeks up to 6 months and then once in 3months.

Results

Out of the 10 patient's 8 were men with mean age 54.9yrs. All of them are presented late by more than 4weeks and one presented after 2yrs of injury. Fracture united by 12weeks in 9cases with mean AOFAS score of 83.7out of maximum 100 and excellent to good outcomes were seen in 8 cases.

Conclusion

Even with neglected ankle fractures functional outcomes following surgical treatment with internal fixation are mostly good to excellent and younger age patients have better outcomes and with good preoperative planning and meticulous soft tissue handing we can avoid the possible complications. Hence, surgery is a better option even in the treatment of late presented or neglected ankle fractures.

Keywords: Ankle, fractures, neglected, fixation, union

Introduction

Ankle fractures are one of the common lower limb fractures encountered which accounts for approximately 9% of all fractures worldwide.¹ The biomechanics of ankle and its fracture treatment still not understood completely in spite publications of numerous classifications and advancement in treatment. The aim in the management of ankle

fractures is to obtain an anatomical reduction of the ankle mortice and a stable, mobile and painless ankle joint.²

Surgical management with open reduction and internal fixation has been the treatment option for unstable displaced ankle fractures.^{3,4} However, recent

evidence has suggested that total contact casting may be considered as alternative for older patients if the reduction can be maintained.^{3,5}

To minimise the risk of development of degenerative arthritis, one should focus on accurate anatomical reduction which include restoration of fibula length and reduction and stabilisation of syndesmotic injuries while performing surgical fixation.^{6,7} Fixation of the posterior malleolus fragment with a postero-lateral approach is recognised as “an important step in restoring ankle congruity and in stabilising the syndesmosis”.⁸

In these ankle fractures, associated tibiotalar dislocations have been reported in 21% to 36% of cases. Those fracture-dislocation injuries will associate with higher rates of open injury, chronic pain, intra-articular loose bodies, posttraumatic osteoarthritis, and worse patient-reported outcomes when compared to isolated ankle fractures.⁹

Late presentation of these type of fracture is not so uncommon in our country where native bone setters still have license to do practice under the blanket of natural treatment. Covid-19 also contributed at large as we encountered more number of delayed presented fracture case in post covid period. Those patients who got ill-treated or neglected and presented late with chronic fracture-dislocations are difficult to treat and associated with increased risks of infection, amputation, and impaired functional outcomes.¹⁰⁻¹¹

There are very few literatures published in this regard explaining the treatment and end result of neglected cases and it demands good preoperative planning along with some expertise to handle the soft tissue contractures and malunited fractures.¹¹⁻¹⁴

Herein, we report our experience in treating such late presented neglected ankle fracture with some having the dislocation as well.

Aim and Objective

To determine the functional and radiological outcome of delayed fixation in neglected ankle fractures

Material and Method

This is a prospective study conducted from August 2020 to January 2023. Total 10 patients with ankle fractures who were presented late and admitted in Sanjay Gandhi Institute of Trauma and Orthopaedics,

Bangalore were included after getting written informed consent.

This study also documents the intra operative and post-operative complication.

Inclusion criteria

1. Patients above 18 years of age on either sex.
2. All ankle fractures who presented at least 4weeks late from the day of injury.

Exclusion criteria

1. Patients age below 18 years.
2. patients who underwent surgery for the same fracture.
3. Patients medically unfit for surgery.
4. Patients who do not given consent.

Preoperative protocol

After the admission of patient in the ward, thorough history and examination findings were noted along with the demographics and other injuries as well.

Radiographs along with Computed tomography if required were taken for the cases. All basic investigations required for surgery fitness are worked up and all cases were done by same surgical team under spinal anaesthesia.

Surgical technique

The position of the patient was supine with a pillow or sandbag under the buttocks. With all aseptic measures ankle fractures are opened with standard lateral incisions and medial incisions were made in those cases where medial malleolus also involved. Postero-lateral incision were used in case of associated posterior malleolus involvement.

The fracture reduced after clearing all the soft tissues between the fracture site and at most importance given to maintain the length of lateral malleolus. After

Initial fixation, ankle was assessed for syndesmotic injury with ‘Hook test’ and syndesmotic fixation has been done with either one or two screws.

In one case of unstable ankle subluxation, we used a steinmann pin from calcaneum through the talus to the tibia which kept for 4weeks post-surgery. If

necessary, below knee pop slab was applied to keep the joint in position for period of 3weeks.

Post operative protocol.

Day 0:

1. Post-operative antibiotics(intravenous), analgesics, iv fluids.
2. Limb elevation.
3. Monitoring for compartment syndrome
4. Vitals monitoring.
5. Post-operative radiography.

Day 1:

1. Continue antibiotics and analgesics.

2. Physiotherapy

Passive knee and ankle mobilization exercise started. (if slab not applied)

Day 2:

1. Wound dressing
2. Continue physiotherapy
3. Mobilisation started with walker support- non weight bearing.

Day 5:

1. Intravenous antibiotics was stopped and switch over to oral antibiotics and analgesics.
2. Patients were discharged and reviewed in OPD.

Figure 01. Clinical Photographs Pre-op



Figure 02. Radiographs of Case 01.

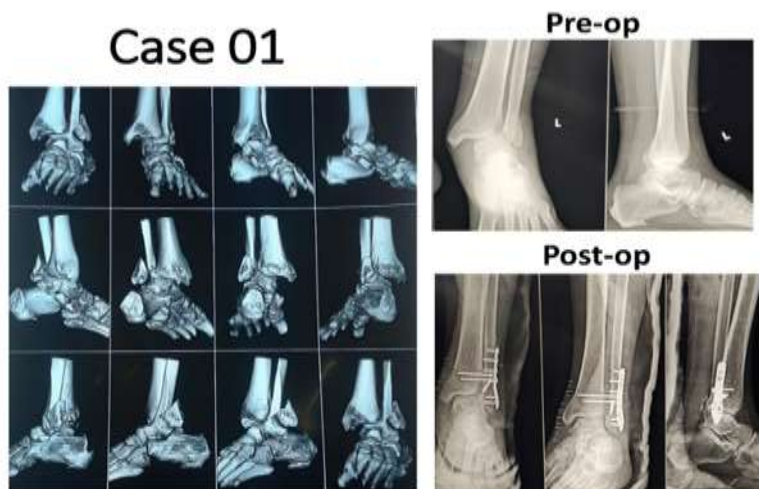


Figure 03. Radiographs of Case 02

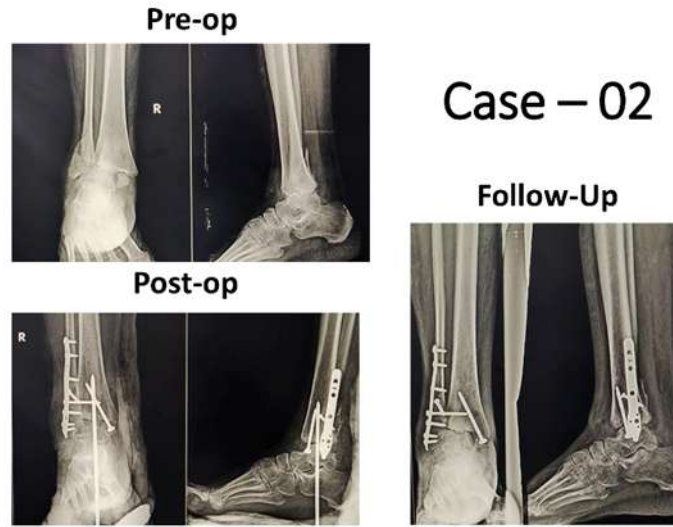
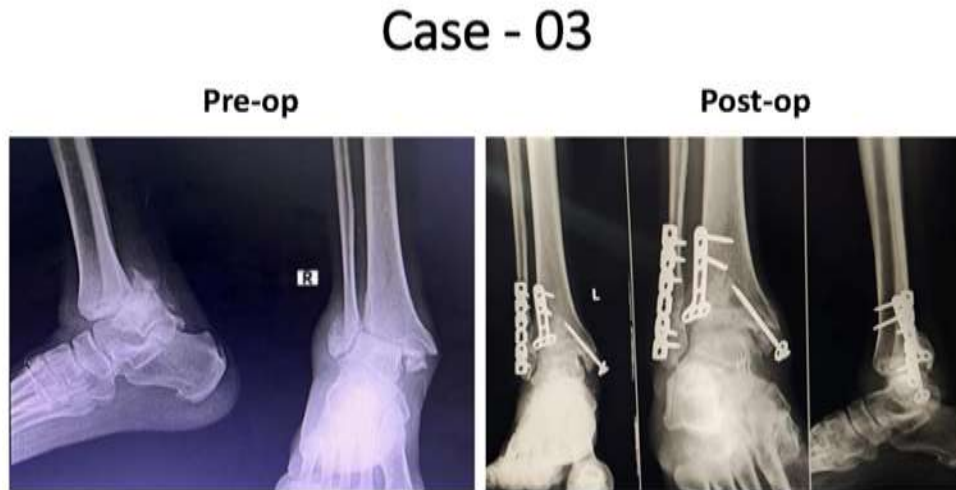


Figure 04. Radiographs of Case 03



Follow up

Patients were followed up with radiographs every 4weeks up to 6 months and then once in 3months. Syndesmotic screw removal was done at 12 weeks in all cases. Clinical and Radiological assessment were done to look for the fracture union. Functional outcomes were recorded with American Orthopedic Foot and Ankle Society (AOFAS) ankle-hindfoot scoring system.

After achieving callus formation around fracture site and no pain at the fracture site, full weight bearing was allowed.

Results

Out of the 10 patient’s majority were in the age group of 35-60 years (60%) and 8 out of 10 were men. The mean age in our study was 54.9yrs. Almost all of them are presented late by more than 4weeks and one presented after 2yrs of injury (Table 01).

Table 01. Case details with time since injury and AOFAS Score.

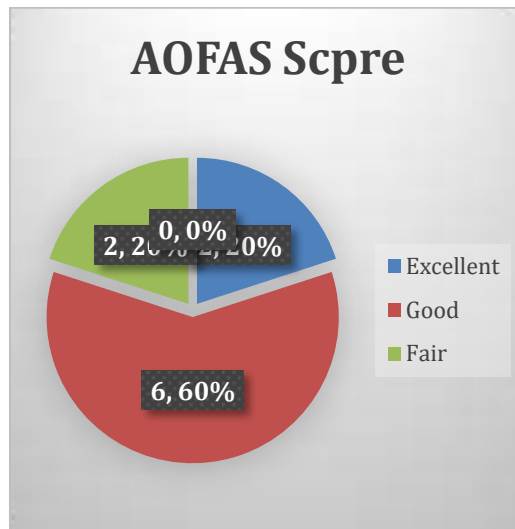
Case	Initial	Age	Gender	time after	AOFA
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No				injury	S score
1	G	80	M	4Weeks	73
2	M	60	F	2Years	70
3	P	68	M	4 Weeks	81
4	R	35	M	7 Weeks	96
5	T	42	M	6 Weeks	86
6	S	47	M	2Months	89
7	C	54	F	5 Weeks	82
8	A	37	M	4 Weeks	92
9	D	66	M	7 Weeks	82
10	H	60	M	8 Weeks	86

All the patients who came for follow up for minimum 6 months. Most of the Fracture united at the end of 12 weeks, 9 cases, one who had trimalleolar fracture with dislocation had delayed union of medial malleolus and one case which had presented 2 years after the injury showed ankle arthritic changes in subsequent follow ups. Surgical wound related complication was seen in only one (10%) case as superficial wound infection, which healed with antibiotics and wound care.

At the final functional evaluation done with mean AOFAS score and it was 83.7 out of maximum 100. Excellent to good outcomes were seen in 8 cases, fair results were seen in two cases and no case had a poor outcome.

Figure 05. AOFAS Score Results.



Discussion

The gold standard treatment for displaced ankle fracture is open anatomical reduction and rigid internal fixation.⁴ Surrounding soft tissue conditions usually a guide for the time of surgical intervention.

A cohort study by Naumann et al. reported the functional outcomes after 3-6 years who underwent open reduction and internal fixation and stated that, there is no clear association between the time of surgical intervention and postoperative complications. There may be a safe phase of surgical fixation up to six days from the onset of injury.¹⁵ In

ankle fractures, there is no agreed definition of delayed surgical fixation, and there is no prescribed time after which surgical intervention is associated with an adverse outcome.¹⁶

Fogel et al.¹² treated 26 ankle fractures with delayed surgical treatment and they stated 31 days from the time of injury is the upper limits for delayed open reduction and internal fixation. In another study Chiu et al.¹³ reported 13 cases of delayed surgical intervention for ankle fractures. The surgical intervention had better results whatever the time of surgical fixation.¹²⁻¹³

Management of ankle fracture which presented late is individualized according to the type of fracture, associated syndesmotic injury, talar injury, associated articular cartilage damage, ligaments injury, radiological signs of arthrosis, age at the time of presentation, sex, occupation, patient expectation, and lifestyle.¹⁶

In acute ankle fracture cases, the anatomical reduction is hold the key to successful fixation. In neglected cases of ankle fracture, it mainly depend on good quality reduction.¹² Poor outcomes are usually results of poor surgical techniques and bad quality reduction.¹²⁻¹³

With the involvement of articular surface, chances of osteoarthritic changes following surgical management of ankle fracture are still high.¹⁷ The main contributing factors that leads to development of arthritis include joint cartilage involvement, ankle instability, incongruent joint, and abnormal alignment.¹⁸ The aim of the surgical treatment to have a stable and congruent joint. Modification of contributing factors may delay the onset of arthritis for some extent and might have a window of a painless joint which is one of the goals of surgical fixation.¹⁶

In our present study, overall functional outcome as per the AOFAS ankle-hindfoot score was good and the mean AOFAS score was 83.7 out of maximum 100. Most of the patients experienced no pain or occasional pain. Most of the cases had excellent to good outcomes.

Previously, arthrodesis is the preferred choice in the neglected ankle fracture cases.^{10,16,19} But at the same time few of them advocated for fixation of the neglected fracture to restore the anatomy.^{11-14,16} There

were no similar study to compare our functional outcome, most of the reports are made on a case-by-case basis. Surprisingly, a study which recommended surgical fixation in case of bimalleolar fracture conducted by Dwivedi et al.²⁰ had the mean AOFAS score 89.86 (± 7.95) out of maximum 100 and excellent to good outcomes were reported in 25(86.20%) cases which is almost similar to our study.

Treating old, neglected ankle fractures with or without dislocation are surgically is a challenge to any surgeon, due to soft-tissue adhesion, disturbed anatomy, and deformed bones. To avoid the nonunion, preserving as much soft tissue attachments and periosteum is important to avoid the avascular necrosis of the fracture fragment and collapse of articular surface. There we expect Complications like delayed wound healing and joint stiffness are the major problems. However, we believe that anatomical reduction provides a better chance of decent long-term outcome even in ankle fractures which are presented late, as observed in our study.

The minimum follow-up period of six months and limited sample size as kind of presentation is not common are the few limitations of our study.

Conclusion

In ankle fractures, time of surgical fixation is very critical which contribute largely to postoperative outcomes and complications. Even with neglected ankle fractures functional outcomes following surgical treatment with internal fixation are mostly good to excellent and younger age patients have better outcomes and with good preoperative planning and meticulous soft tissue handling we can avoid the possible complications.

As stated by Alsherbeeney, M. A. et al.¹⁶ "If there is no significant joint arthritis, open anatomical reduction with rigid internal fixation is the gold standard treatment in malunited ankle fracture, whenever the time of presentation", surgery is a better option even in the treatment of late presented or neglected ankle fractures.

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