ORIGINAL RESEARCH PAPER

Orthopedics

CALCANEUM FRACTURES: OVERALL OPERATIVE OUTCOMES.

KEY WORDS:

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ABSTRACT

objective: calcaneum fracture are most common fractures among tarsal bone fracture. We try to study overall operative outcome of calcaneum fracture.

Material and method: In this study we include 25 male patients with age range of 20 years to 65 years, having intraarticular calcaneum fracture treated surgically and they are followed for minimum one year postoperatively. we use two type of fixation method one is percutaneous screw fixation and other is anatomical plate fixation. We observed that Eleven (44%) patients having fixation with platting, thirteen (52%) patients with percutaneous screw and one (4%) patients having bilateral intra-articular calcaneus fracture with right sided percutaneous screw fixation and left sided plate fixation.

Results: Outcomes measured with AOFAS Score and we found Excellent results in 13(52%)patients, Good in 10 (40%) patients, Fair in 2 (8%) patients with none having poor outcomes. We found 94% excellent to good functional outcome in our operated patients.

Conclusion: Operative outcomes of intra-articular calcaneus fracture with all modalities of fixation shows better results.

INTRODUCTION:

Calcaneal fractures comprise 2% of all fractures and about ¾th of all calcaneal fractures are intra articular. They are the most common fractures among the tarsal bone fractures. Calcaneus fractures occur due to high-energy traumas such as falls from height and traffic accidents[1,2,3].

In present scenario, some authors believe surgical methods (open reduction and internal fixation, or percutaneous screw fixation) gives best results, others consider a conservative treatment method[4,5,6,7,8].

The conservative treatment of intra articular fracture often leads to increase in morbidity due to incongruence of articular surface, widening of heel, talar dorsiflexion, loss of talocalcaneal lever arm and peroneal tendon impingement[9].

In this study, we present the overall operative outcome of calcaneum fractures fixed either closed percutaneous screw fixation or open reduction and internal fixation with plates.

MATERIALS AND METHODS:

In this study we include 25 male patients with age range of 20 years to 65 years, having intraarticular calcaneum fracture treated surgically and they are followed for minimum one year postoperatively. Among them one patient has bilateral calcaneum fracture and rest of them having unilateral fracture. 13 patients having right sided and 11 having left sided fracture. Fall from height was reason for injury for 18 patients and rest of the 7 had sustained injury due to road traffic accident.

We classified these fractures according to Essex-Lopresti classification. Twenty-one (84%) patients with joint depression type of variety and Four(16%) patients having tongue-type of variety.

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Surgical technique:

The patient was placed on a radiolucent table in the lateral decubitis position so that the fractured extremity would face upwards.

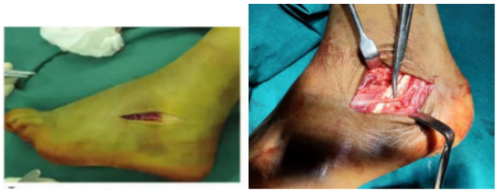
1. Closed reduction and Percutaneous screw fixation.

For tongue type calcaneal fractures, **Essex-Lopresti method** was used. Inserting the Steinmann pin into the tongue fragment axially under c arm guide upto fracture site. Manipulating the fracture fragment with pin and progressing it forward under c arm done. Pins are replaced with cortico cancellous screws.

2. Open reduction and internal fixation.

A. Limited sinus tarsi approach:

lateral incision is 5-6 cm long, beginning from the anterolateral corner of the calcaneocuboid joint and extends posteriorly in straight line to ankle up to 1-2 cm anterior to the Tendo Achilles. dissection is carried down to the sheath of the peroneal tendon. The sural nerve and the short saphenous vein are isolated and protected. The sheath of peroneal tendon is now opened. This exposes anterolateral border of sinus tarsi. The extensor digitorum brevis is elevated distally to expose calcaneocuboid joint. By sharp dissection the lateral wall of calcaneum is exposed. At the posterior border the calcaneofibular ligament and lateral talocalcaneal ligament are excised en-block. These ligaments along with the sheath of the peroneal tendon are now retracted to get more exposure of the posterior aspect of the subtalar joint. The lateral wall along with soft tissue are retracted as a trap door. The posterior facet now be inspected. It is technically difficult to visualize medial fracture of the posterior facet, and to reduce the medial wall fracture, which are done under imaging and in a closed manner. Once reduction achieved it is fixed primarily with k-wires and subsequently with cortico cancellous screws.



B. Extensile lateral approach:
The extended lateral incision was used in all patients. The fractured lateral wall was lifted followed by reduction of the sustencalum calcanei, anterior process, tuberosity and then the posterior facet. Once the correction was checked with the c-arm and found to be accurate then internal fixation was performed using a plate.

POSTOPERATIVE PROTOCOL:
At 15 days postoperatively, the sutures were removed and the posterior splint was discharged and active ankle range of motion and non weight bearing walking was started. The patients were allowed to bear weight by an average of 12 weeks after the surgical treatment.

RESULTS:
Functional outcomes of treatment of intra-articular calcaneus fracture measured using AOFAS Score in which Thirteen (52%) Patients having excellent results, Ten (40%) patients having good, Two (8%) patients having fair results and none having poor outcomes.

Radiological union appear between 2-3 months in all the patients.

Mean of Bohler's and Gissane's angle measured pre and post-operatively is shown below.

Mean bohler's angle;
right side : pre operative -20.5
post operative-32.64
left side : pre operative-31.92
post operative-37.56

mean gissane's angle;
right side: pre operative-124.68
post operative-112.6
left side: pre operative-122.6
post operative-113.9

Two patients having wound dehiscence and managed with oral antibiotics and wound care. Two patients having heel widening and one having peroneal tendinitis.

DISCUSSION:
In this present study, all intra-articular calcaneus fractures occur in male. This shown that high magnitude of outdoor activities, sports as well as driving among male population. Nambiar[10] also noted male to female ratio 10:1 and Paley[21] also shows male female sexual ratio 6:1.

In this study, we found Eighty Four percent of patients with joint depression-type and Sixteen percent patients with tongue-type. According to Essex-Lopresti's[14] classification, joint depression variety more common in intra-articular calcaneus fractures[11,12,13]. Ehrendorfer et al[15] observed that 55.5% of patients had tongue shaped and 44.5% of patients had joint depression type of intra-articular fracture.

The Bohler's angle[20], considered as normal within measurements ranging from 20° to 40°. In this study, we found post-operative mean Bohler angle of 34.74 degree. The value of this angle showed correlation with the quality of outcome. Paley and Hall[21] stated that Bohler's angle is an indirect reflection of both calcaneal height and the arch angle, a small Bohler's angle is associated with poor result. This implies that preservation of calcaneal height and arch angle is important.

In this study , outcomes measured with AOFAS Score and we found Excellent results in 13(52%)patients, Good in 10 (40%) patients, Fair in 2 (8%) patients with none having poor outcomes and we compared this with series of Biz et al[19] who also measured outcomes with AOFAS score and he found excellent results (90–100 points) in 11 (12.6 %) patients, good results (75–89 points) in 46 (52.9 %) patients, fair results (50–74 points) in 26 (29.9 %) patients, while 4 (4.6 %) patients were graded as failures (<50points). We also compared our outcomes of AOFAS Score with Voclav et al[17] who also found excellent results in 24(32%) patients, Good in 28(37%) patients, Fair in 14(18%) patients and Poor results in 10(13%) patients. We also compared our outcomes with other series of Gusic et al[18] and Mohammed et al[16].Though we compared our results with other series but our sample size small and follow-up of results not so prolonged.

In Our study, operative outcomes of intra-articular calcaneus fracture with all modalities of fixation shows better results. So, in final we conclude that internal fixation seems to be effective in treatment of intra-articular calcaneus fractures.

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