



COMPARATIVE STUDY OF DISPLACED CALCANEUM FRACTURE TREATED WITH CONSERVATIVE OR OPERATIVE MODALITIES

Medicine

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ABSTRACT

Introduction and Background: Calcaneum is the largest tarsal bone and more likely to get fractured. 60 % of tarsal bone fracture belong to calcaneum among them most are intra articular and displaced. Before recent advance it was treated conservative but now trend has changed to operative management.

Material and Methods : A prospective type of study conducted from December 2015 to November 2016. Sample size consist of 50 patients they were treated either conservative or operatively. Patients followed up at 1 month and 3 months and 6 months. Results were assessed using American Orthopaedics Foot and Ankle Hind Score and Visual Analogue Score at each follow-up.

Results: In this study mean age of patient was 35.68 years. Among them 39 were male and 11 were female. Most common mode of injury is fall down from height i.e. 70% of total. 34(68%) patients were having Joint depression type while 16(32%) patients were having tongue type fractures according to Essex Lopresti classification system. Among 50 patients 20 were managed conservative while 30 were operated. Mean VAS at 6 months in conservative treated group was 5 while in operative treated group it was 3.56. According to AOFAS In patients treated conservative patients 18 fair, and 2 poor results were obtained. According to AOFAS In operative treated patients 3 excellent, 19 good & 8 fair results were obtained. In 6 cases there was malunion, in 1 case blisters were developed and in 2 case there was pin site infection.

KEYWORDS

Calcaneus fracture, American Foot and Ankle Score, Visual Analogue Score,

Introduction and Background:

The calcaneus is the largest tarsal bone and it is more commonly get fractured. It is the major weight bearing bone of the foot. It plays important role in weight bearing of foot. It is of at most importance for normal ambulation. So, any displaced fracture of calcaneum having intra articular extension can cause subtalar arthritis if not treated properly.

60 % of tarsal bone fracture belong to calcaneum among them most are intra articular and displaced. 10% of patient with calcaneum fracture have associated spine fractures and 26% of them are associated with other extremity injuries¹.

Historically management of calcaneus fracture was a great challenge to orthopaedic surgeons and most of them were treated conservatively. With advancement of radiological technique including CT scan and fluoroscopy trend is changing towards operative management as these technologies help in better understandings of fracture pattern. Disadvantages of operative management like infection, implant failure are reduced with improvement in surgical and fixation techniques, and prophylactic antibiotics. In recent days operative treatment of acute fractures has become the standard of care and they are having good outcomes.

Aims and objective:

This study is aimed to compare the results operative and conservative management of displaced fracture of the calcaneus by using AOFAS hind foot score and VAS pain score and to study the known complication of them.

Material and Methods

A prospective type of study conducted from December 2015 to November 2016 for the period of one year. Sample size consist of 50 patients they were treated either conservative or operatively. Patients followed up at 1 month and 3 months and 6 months. Results were assessed using American Orthopaedics Foot and Ankle Hind Score and Visual Analogue Score at each followup.

Young patients (>18 years) with closed fracture having displaced fractures and giving consent to participate were included in the study while patients having compound fractures, any other fractures in the same limb, fracture more than three weeks old were excluded. Patients who are not medically fit were also excluded from the study.

After the primary management of the patient's injuries standard lateral and AP view of the foot with Harris Axial view are obtained and fracture is classified according to Essex Lopresti classification system in either joint depression or tongue type. All selected patients were briefed about the nature of the study, the intervention if any to be carried out and written informed consent was obtained.

Based on the patient's fracture pattern and patient's consent they were treated either operative of conservative modality. Conservative treatment include below knee slab for 2 weeks followed by below knee cast for 6 weeks followed by subtalar and ankle range of motion will be started and partial weight bearing started after 10 weeks and gradually full weight bearing will be allowed. Operative management include either closed reduction with ST pin elevation or k wire fixation or mini open reduction and screw fixation or open reduction and plate fixation. ST pin or K-wires were removed at 6 to 8 weeks and physio therapy was started. Partial weight bearing allowed at 12 weeks gradually increasing to full weight bearing. Patients will be followed using American Orthopaedics Foot and Ankle Hind Score and Visual Analogue Score at 1 month and 3 months and 6 months. All the collected data were analysed and results were obtained.

Results:

Maximum number of patients are in age group of 21 to 40 with mean age of 35.67 years. With minimum age being 18 years and maximum age being 52 years and standard deviation of 8.9 years. Among the patients 39(78%) were male and 11(22%) were females in this study.

Among the patients 21 (42%) of the patients were labourer while 13 (26%) were farmer, 5 (10%) were students and 2(4%) were housewife. 9(18%) patients were having some other occupation apart from mentioned before.

In this fractures were classified by Essex Lopresti classification system. 34(68%) patients were having Joint depression type while 16(32%) patients were having tongue type fractures.

In this study most common mode of injury was fall down from height that constitute 70% of the total injury. Road traffic accidents are 2nd most common cause of trauma constituting about 20% and domestic fall is 3rd common cause of calcaneum fracture in this study constituting 10% of all cases.

Out of 50 patients 20 were managed conservative while 30 were operated for calcaneum fracture. Among 30 they were treated by closed reduction or mini open reduction or open reduction and internal or percutaneous pin or wire fixation. Out of 20 patients treated Conservatively 2 patients were not medically fit for operative management and 17 patient did not give consent for operative management. In this study Average injury operation interval is 5.9 days.

Among the complications 5 of the 20 patients managed conservative had malunion and 1 had blisters while 1 of the 30 patients managed operatively had malunion and 2 patient had pin site infection.

Mean Visual analogue score at 6 months interval is shown in table no 1.

Table 1 Mean VAS along with modalities of treatment

Modality of treatment	Mean Visual analogue score at 6 months
Conservative	5.0
Operative	3.5

Results of fractures among conservative and operatively managed patients in a comparative way according to AOFAS is shown in table 2.

Table 2 Showing Outcomes of calcaneum fracture according to AOFAS Score. AOFAS 90-100 Excellent, 75-90 Good, 50-74 Fair, <50 Poor

AOFAS at 6 Months	Conservative	Operative
Excellent	0	3
Good	0	19
Fair	18	8
Poor	2	0

Discussion:

Calcaneal fractures usually affect economically reproductive groups, which can impose a great individual, social and economic loss. Calcaneal fractures account for approximately 2% of all fractures. As intra articular fractures are common as compared to extra articular fractures, hence the importance of anatomical reduction to decrease the possibility of joint incongruity and subtalar arthritis.

In 2002 Buckley R et al² conducted study on 424 patients with 471 displaced intra-articular fracture. Out of 424 patients 218 treated conservative while 206 were treated operative. Mean age of patient was 40 years with male to female ratio was 381:43. Results were measured by SF-36 & VAS. In conservative treated group mean VAS was 64.3 & mean SF-36 score was 64.7 while in operative treated group mean vas was 68.6 and mean SF-36 score was 68.7. Among the operative managed patients 16% had wound related complications.

In 2014 Griffin D³ et al has conducted study and compared results among operated and conservative managed patients. In study conduct by Griffin D. et al sample size consisted of 151 patients among them 78 patients treated conservative and 71 patients treated by operative method. Mean age of patient was 46.5 years with range being 18 to 80 years. Male to female relationship was 127:24. Fractures were classified using sander's classification system. Results were analysed by AOFAS and Kerr Atkins calcaneal fracture score. On intention to treat analysis the Kerr-Atkins scores were similar between operative (69.8) and non-operative (65.7) groups after two years.

In 2013 Argen PH⁴ et al has conducted multicentre prospective randomised control trial to compare operative and non-operative management of displaced calcaneum fracture. Total 82 patients were selected for the study and out of them 42 were in the operative treatment group while 40 were in the conservative treatment group. The primary outcome measures were a visual analog scale (VAS) for pain and function and the self-administrated Short Form (SF)-36 general health outcome questionnaire. The secondary outcome measures were residual pain evaluated with a VAS, the American Orthopaedic Foot & Ankle Society (AOFAS) scale, and the Olerud-Molander (OM) scale. Seventy-six patients were available for follow-up at one year and fifty-eight at eight to twelve years. The primary and secondary outcome measures did not differ significantly between the two treatment groups at one year of follow-up. At eight to twelve years of follow-up, there was a trend toward better scores on the patient-reported primary VAS score for pain and function ($p = 0.07$) and the physical component of the SF-36 ($p = 0.06$) in the operative group.

This study includes 50 patients with displaced fracture with mean age of patient being 35.68 years and male to female ratio being 39:11. Most common mode of trauma was fall from height. Fractures were classified using Essex lopresti classification and results were obtained using VAS for hind foot and AOFAS hind foot score. At 6 months Mean VAS in conservative treated group was 5, while in operative treated group mean VAS was 3.5. According to AOFAS In patients treated conservative patients 18 fair, and 2 poor results were obtained. According to AOFAS In operative treated patients 3 excellent, 19 good, 8 fair, and 0 poor results were obtained. In 6 cases there was malunion, in 1 case blisters were developed and in 2 case there was pin site infection.

Conclusion:

From this study we conclude that displaced intra articular fracture require good anatomical reduction with stable fixation to achieve favourable results. Result of operative management of calcaneum fractures are good compared to conservative treatment, however complication related to operative management can be reduced with proper selection of time for operation, good surgical skill and proper antibiotic coverage. American Orthopaedics Foot and Ankle Score is considered as a good tool to evaluate the results. To evaluate long term results a long follow-up and more samples are necessary.

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