Research Article

Primary Subtalar Arthrodesis In Comminuted Calcaneal Fractures

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Introduction

Calcaneal fractures represent about 60% of tarsal fractures, mostly in males in their productive age resulting in a considerable economic impact, often leave severe daily disabilities and also affect working capacity. (1)

These fractures are still a major challenge for orthopedic surgeons because of the controversy in terms of management.(2)
Calcaneal fractures are almost always the result of high-energy injuries mostly resulting from fall from a height, other causes include motor car accidents, suicidal attempts and sports injuries. (3)

Calcaneal fractures are divided into two broad categories; intra-articular and extra-articular fractures. While the treatment of the extra-articular fractures is relatively simple, numerous controversies surround the understanding of the treatment of the intra-articular calcaneal fractures. (4)

Conservative treatment could be considered in extra-articular fractures and in minor displaced intra-articular fractures. Surgically unfit patients should receive conservative treatment.(5)

Open reduction and internal fixation is gaining much popularity for the treatment of the displaced intra-articular calcaneal fractures at many orthopedic trauma centers.(6)

As a better understanding of fracture patterns with recent advances in imaging, modern surgical techniques and hardware had improved outcomes and lowered morbidity, a trend has developed toward ORIF for displaced intra-articular calcaneal fractures. (7)

The key to achieve best results in the displaced calcaneal fractures is anatomic reconstruction of the entire calcaneum. This includes restoration of the articular surface, height, length and alignment of the calcaneus and a function directed postoperative management. (8)

Intra-articular calcaneal fractures often result in a varus deformity with heel widening, loss of calcaneal height, and subtalar articular incongruency. ORIF can be used to address these deformities, restoring the anatomic morphology of the calcaneus and thereby the biomechanics and function of the hindfoot.(9)

Restoring heel width prevents chronic peroneal tendinitis secondary to impingement from lateral wall blow-out of the calcaneus (10),(11),(12) and restoring length and alignment of the Achilles tendon maintains plantar-flexion strength.(13)
ORIF also provides the opportunity for anatomic reduction and rigid internal fixation of the subtalar joint. (9)

However, all cases treated conservatively & many cases treated with ORIF usually end in subtalar arthritis which may finally lead to subtalar arthrodesiss. (14)

Aim of the work

- To evaluate the results of primary subtalar arthrodesis in management of comminuted intra-articular calceneal fractures.
- To evaluate post-operative time for return to patient activity.

Patients and Methods

After the approval from the hospital ethical committee and a written informed consent of the individual patients were obtained, 15 patients with comminuted intra-articular calceneal fractures Sander's III & IV were incorporated in an interventional prospective randomized study from October 2015 to March 2017.

Patients' demographic data were collected using case notes (Table 1). There were 8 males and 7 females with 18 involved heels (9 left & 9 right). The mean age at presentation was 27.33 years (20: 40 years). The mean follow up period was 8 months (4:12 months).

All patients were consented for the study and the ethical committee of the hospital was asked for the approval for this study.

Inclusion criteria:

The inclusion criteria were adult patients with average age of 20:40 years with isolated closed comminuted intra-articular calceneal fractures Sander's type III & IV.

Exclusion criteria:

The exclusion criteria included open calceneal fractures, smokers, non controlled diabetics, presence of concomitant spinal fracture with neurological deficit, pre-existing foot deformity or bad skin condition.

Results

This study included fifteen patients suffering from comminuted calceneal fracture & managed with open reduction & primary subtalar arthrodesis.

The mean age at presentation was 27.33 years (20:40 years). Eight males and seven females. Three of them were bilateral. So we 9 ankles on the right side & 9 ankles on the left side.

All demographic data are presented in table (1).

Table 1: Demographic data.

SI. NO	*Age (years)*	*Sex*	*Side*	*Type of fracture*	*Timing of surgery*
1	32	M	LT	Sander's IV	7th day
2	33	F	RT	Sander's III	2nd day
3	20	F	RT & LT	RT Sander's IV LTSsnder's IV	10th day
4	21	M	LT	Sander's IV	14th day
5	31	M	RT	Sander's III	5th day
6	24	F	RT	Sander's IV	1st day
7	20	M	RT & LT	RT Sander's III LT Sander's IV	7th day
8	26	M	RT	Sander's IV	8th day
9	29	F	LT	Sander's III	6th day
10	27	F	RT	Sander's IV	9th day
11	22	M	LT	Sander's IV	12th day
12	40	F	RT	Sander's IV	6th day
13	22	M	LT	Sander's IV	10th day
14	38	F	RT & LT	RT Sander's III LT Sander's III	7th day
15	27	M	LT	Sander's IV	8th day

The mean follow-up period was 8 months (range 4:12) .The mean time between injury operative interference was 7.21 days (range 1:14). The mean operative time was 75 minutes (60:90). The mean amount of blood loss was about 75 ml (50:100) ml.

Discussion

Calcaneal fracture accounts for 2% of all fractures and are the most common tarsal bone fracture in adults. Moreover, 70% of them are displaced intra-articular fractures. Most of patients are young athletes or laborers of working age. Some of these patients can experience persisting disability for several years, resulting in a delay in resuming work and causing considerable economic impact. Many calcaneal fractures are intra-articular, involving the posterior facet of the subtalar joint which is the major weight bearing surface of the human heel.

The optimal treatment of displaced intra-articular calcaneal fractures (DIACFs) remains unclear because the currently available evidence has failed to demonstrate substantial benefits for any single treatment option.

The treatment goal is to restore the walking ability and eliminate standing pain or even to enable the patient to wear a pair of normal shoes.

Conclusion

Primary subtalar arthrodesis is a good option for comminuted intra-articular calcaneal fractures Sander's type III & IV with good patient satisfaction with compar-able ACFAS scores in patients who undergo arthrodesis following conservative or ORIF for comminuted intra-articular calcaneal fractures and comparable time for return to daily activities but with only one procedure instead of 2 procedures, so when there is techniqual facilities, it is better to perform primary subtalar arthrodesis in comminuted intra-articular calcaneal fractures Sander's type IV or type III not reduced intra-operatively specially if we used bone graft in cases of poor bone stalk.

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