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Original Research Article

TO ASSESS THE COMPLICATIONS OF K WIRE USE IN OPEN REDUCTION AND INTERNAL FIXATION IN CALCANEAL FRACTURES

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Abstract

Background: The present study was conducted for assessing the complications of K wire use in open reduction and internal fixation in calcaneal fractures.

Materials & methods: A total of 50 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and pre-treatment radiographic examination was done. Surgical intervention was done using K-wire for open reduction and internal fixation. Postoperative follow-up was done and radiographic examination was carried out. All the results were recorded and analysed using SPSS software.

Results: A total of 61 K-wires were placed in 50 patients sin the present study. Overall, 8 K-wires showed secondary dislocation at one year follow-up. Medial migration of one K-wire was present. Bent was seen at the end of K-wires in 12 patients.

Conclusion: From the above results, the authors concluded that the use of unmodified straight K-wires cut at the lateral cortex should be discouraged.

Key words: Open reduction, Calcaneal fractures, K-wire

Introduction

Calcaneus fractures are rare but potentially debilitating injuries. The calcaneus is one of seven tarsal bones and is part of the hind-foot which includes the calcaneus and the talus. The hindfoot articulates with the tibia and fibula creating the ankle joint. The subtalar or calcaneotalar joint accounts for at least some foot and ankle dorsal/plantar flexion.[1, 2]Calcaneal fractures account for up to 75% of all foot fractures and 1–2% of all fractures, being more common in males and those who work in an industrial profession. This has socio-economic consequences; male labourers who sustain bilateral intra-articular fractures and have support from compensation benefit carry a poorer prognosis.[3, 4]

At present, there are multiple operative procedures for the treatment of calcaneal fractures. The procedures can be differentiated by approach, implant type and whether the treatment is one- or two-stages. Recently, open procedures using internal fixation have been favored for surgical therapy of the calcaneus. A possible complication of an open procedure is the disturbance of

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wound healing with skin and soft tissue necrosis and the possibility of cutaneous flaps. In an effort to reduce the complications that can occur with an open procedure, we have combined and modified previously described closed reduction and internal fixation techniques to create a minimally invasive technique.[5, 6] Hence; the present study was conducted for assessing the complications of K wire use in open reduction and internal fixation in calcaneal fractures.

Materials & methods

The present study was conducted for assessing the complications of K wire use in open reduction and internal fixation in calcaneal fractures. A total of 50 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and pre-treatment radiographic examination was done. Surgical intervention was done using K-wire for open reduction and internal fixation. Postoperative follow-up was done and radiographic examination was carried out. All the results were recorded and analysed using SPSS software.

Results

A total of 50 patients were enrolled. Mean age of the patients was 41.9 years. 70 percent of the patients were males. A total of 61 K-wires were placed in 50 patients sin the present study. Overall, 8 K-wires showed secondary dislocation at one year follow-up. Medial migration of one K-wire was present. Bent was seen at the end of K-wires in 12 patients.

Table 1: Age-wise distribution

Age group (years)	Number of patients	Percentage
Less than 40	18	36
40 to 50	17	34
51 to 60	15	30
Total	50	100

Table 2: Gender-wise distribution

Gender	Number of patients	Percentage
Males	35	70
Females	15	30
Total	50	100

Table 3: K-wire migration during follow-up

Kirschner wire	Placement	Migration
Lost	32	2
Bent	15	0
Straight	14	6
Total	61	8

Discussion

The calcaneus is the greatest tarsal bone, and has the function of sustaining the body. Fractures of the calcaneus represent about 1-2% of all fractures and 60% of the tarsal bones fractures. The mechanism of injury can range from high energy trauma (falls from height) to low energy trauma (sport). There are several causes that determine the calcaneal fractures. Over 60% of the cases are caused by an axial load, usually due to falling from a height with landing on the feet, with a bilateral compromise of less than 10%. To correct deformations of the calcaneus, spare the soft tissue and lower the complication rate, indirect and less invasive reduction and fixation techniques to treat calcaneal fractures have been developed. Besides techniques with percutaneous reduction and internal K-wire fixation percutaneous reduction techniques with

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external fixation are described in the literature.[7- 10]Hence; the present study was conducted for assessing the complications of K wire use in open reduction and internal fixation in calcaneal fractures.

A total of 50 patients were enrolled. Mean age of the patients was 41.9 years. 70 percent of the patients were males. A total of 61 K-wires were placed in 50 patients sin the present study. Overall, 8 K-wires showed secondary dislocation at one year follow-up. Our results were in concordance with the previous authors who also reported similar findings. In a study conducted by Dorr MC et al, authors reported complications of Kirschner Wire Use in Open Reduction and Internal Fixation of Calcaneal Fractures. Data on the number and type of K-wires used, K-wire location, and K-wire migration found on follow-up imaging studies were collected. Of the 279 patients, 69 K-wires had been used in 49 (18%) patients. A total of 25 (36%) lost (buried), 38 (55%) bent, and 6 (9%) unmodified straight K-wires had been placed. Overall, in 4 (5.8%) of 69 K-wires, secondary dislocation was seen. One (4%) of the lost, 3 (50%) of the unmodified, and none of the bent K-wires showed secondary dislocation. K-wire migration was seen in 5.8% of the cases. None of the bent K-wires and only 1 of the lost K-wires had migrated in their study.[11]In another study conducted by Demcoe AR et al, authors evaluated complications when using threaded K-wire fixation for displaced intra-articular calcaneal fractures. Threaded 1.575 mm (0.062 in.) Kirschner wires (K-wires) were used for fixation post-operatively along with standard plates, screws and bone substitute. There were 278 fractures in 246 patients that were treated with ORIF for displaced intra-articular calcaneal fractures during this 9-year period. Standard calcaneal lateral approach and hardware was supplemented with percutaneous threaded K-wires. An average of 5.0 fully threaded 1.575 mm K-wires were inserted per calcaneal fracture. Five (1.8%) patients had a K-wire infection; 0.6% of all K-wires became infected and 3.1% of K-wires broke.[12]

In the present study, medial migration of one K-wire was present. Bent was seen at the end of K-wires in 12 patients. Knapik Derrick M et al, in another study assessed complications and secondary operations in patients treated with either open reduction and internal fixation (ORIF) versus percutaneous fixation of displaced intra-articular calcaneus fractures. Fifty patients with 58 fractures underwent ORIF, and 43 patients with 53 fractures had percutaneous fixation. Mean age was 43 years, and 80% were male. Open fractures and two-part fractures were more often treated percutaneously (26% vs 8%, P = 0.03) and (49% vs 31%, P = 0.02), respectively. Patients undergoing percutaneous fixation were more often tobacco users (58% vs 36%, P = 0.04) and with history of alcohol and other substance abuse. Twenty-seven patients (29%) had 28 complications, including 21% with PTOA, with no differences based on type of treatment. Six patients had secondary procedures, with no difference based on type of treatment. Patients with open fractures (P = 0.001) or tobacco abuse (P = 0.005) were more likely to experience complications.[13]

Conclusion

From the above results, the authors concluded that the use of unmodified straight K-wires cut at the lateral cortex should be discouraged.

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