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Comparison of non-operative and surgical treatment of displaced calcaneal fractures

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Abstract

Background: In the literature controversy exists as to whether operative or non-operative treatment is better for intra-articular fractures of the calcaneum.
Objective: To assess if there was any difference in outcome between surgical and non-surgical intervention in displaced intra-articular fractures of the calcaneum.
Method: From 2000 to 2005, 40 patients, with displaced calcaneal fractures were identified. After exclusion for co-morbidities and loss to follow-up, two groups of 14 patients with similar age, sex, length of follow-up, fracture type (Essex-Lopresti classification) were compared using the SF-36 questionnaire.
Results: All eight SF-36 outcome scales showed highly significant differences favouring operative intervention when compared to the non-operative group. There was no significant difference between the surgical and non-surgical groups for age, sex, length of follow-up and fracture type.
Conclusion: The authors acknowledge the numbers involved in this study are small but recommend internal fixation for displaced intra-articular calcaneal fractures.

Keywords: Calcaneal fracture; SF-36 outcome score

1. Introduction

The management of displaced intra-articular calcaneal fractures is controversial. Our study was designed to assess if there is any outcome difference between non-surgical and surgical treatment of displaced calcaneal fractures. Earlier, in a large randomised prospective multicentre trial in 2002 Buckley et al. showed equivalent results for non-operative and operative treatment, without unmasking of patients receiving workers compensation, using the SF-36 in a non validated way as an outcome measure [1].

Several authors have reported good results for internal fixation of calcaneal fractures. Sanders et al. showed 70–73% good to excellent results in 120 patients [2] while Zwipp et al. had 61% good to excellent results of 123 patients treated with internal fixation [3]. However, Pozo et al. had previously shown good long-term results in 76% of patients with calcaneal fractures treated non-operatively with early active mobilisation after an average follow up of 14.6 years [4]. Other studies have found that conservative treatment of calcaneal fractures produced satisfactory outcomes and lower morbidity than surgically treated fractures when plaster cast immobilisation was used as a conservative tool [5].

In 1951 Essex-Lopresti hoped to demonstrate that reduction of these fractures was possible and gave better results [6] but, despite modern imaging and operative techniques, a meta-analysis by Randle et al. did not demonstrate significantly improved outcome with surgical intervention [7] and in 2005 a systematic review concluded there was no

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significant difference in pain and functional outcome between the those fractures treated with conservative or surgical treatment [8].

2. Methods

Between 2000 and 2005, 40 patients with displaced fractures of the calcaneum were treated by the senior author (MJI) at Walsall Manor Hospital. There were two groups of patients consented for either operative (18 patients) or non-operative intervention (22 patients). Four patients with chronic airways disease were excluded from the conservatively treated group, as this would bias the SF-36 score, and four patients in each group were lost to follow up.

After an appropriate time period to allow swelling to settle, the surgical treatment group underwent fixation, with a tourniquet under antibiotic cover, using an AO calcaneal (non-locking) plate via an extended lateral approach as described by Eastwood and Atkins [9]. A bone graft was used in two cases when it was deemed prudent. An image intensifier was used to check satisfactory reduction and the wound closed over suction drainage. The drain was removed at 24–48 h and a plaster back-slab was applied for 48 h. Early active range of movement exercises were then commenced thereafter, provided the wound was satisfactory. All patients were non-weight bearing for 6 weeks and partial weight bearing for a further 6 weeks.

The non-surgical group was treated with rest, ice, elevation, and ankle exercises in an effort to prevent joint stiffness. This group of patients were non-weight bearing for 6 weeks and partial weight bearing for a further 6 weeks. All patients were then followed up at 2, 6, 12 and 24 weeks provided there were no complications. Metalwork was removed once the fracture had united, if it was symptomatic, at 1 year.

Age, sex, time since injury, fracture type according to the Essex-Lopresti classification [6] (undisplaced, mildly displaced or markedly displaced tongue type or undisplaced, mildly displaced or markedly displaced joint depression type) was recorded for each patient. The fracture classification was determined by a consultant orthopaedic surgeon who, having been shown the initial radiographs, was blinded to the subsequent treatment path of each case. The groups were compared

Table 1
Patient details and results (age, sex, type of fracture and SF-36 scores)

Patient	Age	Sex	Type	PF	RP	BP	GH	V	SF	RE	MH
Surgical group											
1	30	M	C	95	100	84	85	87.5	100	100	85
2	17	M	F	100	100	100	100	100	100	100	100
3	47	M	F	80	75	62	62	75	87.5	83	100
4	48	M	C	80	81.25	74	67	75	75	91.6	100
5	38	M	B	95	93.75	100	72	70	100	100	95
6	25	M	B	100	100	84	90	87.5	100	91.6	100
7	42	M	F	85	93.75	84	82	93.75	100	91.6	100
8	38	M	C	90	80	84	95	93.75	100	100	90
9	41	F	F	95	100	84	82	87.5	87.5	100	95
10	69	M	F	65	75	74	75	81.25	87.5	91.6	100
11	59	M	C	90	93.75	74	57	93.75	100	100	100
12	23	M	C	100	100	100	82	93.75	100	100	80
13	49	M	F	100	100	100	82	70	100	100	75
14	43	M	F	95	93.75	74	60	68.5	100	100	80
Non-surgical group											
15	53	M	B	85	75	41	72	75	100	75	70
16	32	M	F	65	31.25	22	50	43.75	50	41.66	45
17	37	M	F	80	56.25	52	62	62.5	75	50	85
18	39	M	F	70	0	31	52	43.75	62.5	33.3	60
19	57	M	B	60	37.5	31	25	50	50	33.3	45
20	25	F	F	40	25	10	42	56.25	37.5	50	35
21	61	M	F	75	75	62	47	50	75	66.6	80
22	55	M	F	65	56.25	42	20	43.75	25	66.6	45
23	50	M	E	85	68.75	52	45	43.75	75	58.33	75
24	34	F	D	100	93.75	72	80	68.75	100	91.66	95
25	59	M	F	95	75	80	67	75	100	66.6	85
26	51	M	B	85	75	80	67	75	87.5	75	85
27	39	M	F	70	25	11.1	55	43.75	25	41.66	65
28	52	M	E	80	50	34.4	47	75	75	66.6	75

Essex-Lopresti fracture types [18]: A: undisplaced tongue type, B: mildly displaced tongue type, C: markedly displaced tongue type, D: undisplaced joint depression, E: mildly displaced joint depression, F: markedly displaced joint depression.
SF-36 scales [9]: PF: physical functioning, RP: role physical, BP: bodily pain, GH: general health, V: vitality, SF: social functioning, RE: role emotional, MH: mental health.