Editorial

Displaced Intraarticular Calcaneus fractures: To Fix or not to Fix? That is the question

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Displaced intraarticular calcaneus fractures (DIACFs) are a source of devastating disability to the patient, a potential hornet's nest for the average orthopedic surgeon and a potential economic burden on the society. Till today, no single treatment approach is universally applicable to all patients and all fracture types.[1] The goal of treatment has been anatomical reduction, stable fixation, and early functional rehabilitation. However, it is also well understood that surgeon factors, such as faulty surgical technique, improper timing, inexperience, or patient factors like preexisting comorbidities, such as peripheral vascular disease, diabetes, and smoking adversely affect wound healing and can lead to terrible soft tissue complications, increased morbidity, and delayed healing.[2,3] It has been well established that patients with DIACFs have poorer functional results than those for other orthopedic conditions.[4]

More than a decade ago, Buckley et al[2] set the cat among the pigeons when they reported that, in their randomized controlled trial in 2002, the functional results of operative or nonoperative treatment of DIACFs were similar. However, looking beyond the headline, it was pointed out by the authors that women, younger patients (<29 years old), those not receiving workers' compensation, those with a lighter workload and with anatomical reduction intraoperatively (a step-off <2 mm) had significantly better functional scores following surgery.

More recently, Bruce and Sutherland[5] in their Cochrane review published in 2013 stated that there was insufficient high-quality evidence to establish whether surgical or nonoperative treatment is better for DIACFs. A total of four trials were included with data published across multiple (n = 20) publications.[2,6-8]The trials in the review were published between 1993 and 2002. The largest trial[2] had recruited 426 participants between 1991 and 1997. The authors stated that the trial by Buckley et al[2] formed a large part of the review. The authors reiterated that, once the workers' compensation cases were excluded, surgical outcomes improved in subgroup analysis. They also suggested that, as subgroup analysis were conducted and presented across multiple publications, it resulted in different sample sizes and different time to follow-up with reanalysis of primary outcomes. Thus, as the evidence in this review was largely driven by Buckley's study, the Cochrane review could not find any difference between operative *vs* nonoperative intervention for DIACFs. The authors also mentioned that data from *the then* just concluded multicentric UK Heel fracture trial were not included in the review and its results were eagerly anticipated.

The UK Heel Fracture Trial by Griffin et al[9] was published in July, 2014, in the BMJ as a pragmatic, multicentric, randomized controlled trial with the conclusion that operative treatment compared with nonoperative care showed no symptomatic or functional advantage after 2 years in patients with DIACFs, and the risk of complications was higher after surgery. Thus, open reduction and internal fixation was not recommended for calcaneus fractures.

The trial's sensational claim lead to a furor of responses and the trial was severely criticized by several researchers for obviously faulty methodology. It was pointed out that selection bias was a key factor. Only 502 of 2,006 patients with calcaneal fractures were found eligible for randomization in this study. This was because all fractures with a severe valgus or varus deformity of the heel, requiring operative intervention, had actually been excluded from the study. Furthermore, only 151 of the remaining 502 patients agreed to take part in the study, representing a paltry 7.5% of all of the calcaneal fractures presenting to hospitals. A total of 27 surgeons in 22 different hospitals operated on average of only two fractures for this study.

In his response, Buckley in 2015[10] stated that younger patients with simple DIACFs and without workers' compensation definitely do well surgically. He stressed that DIACFs need to be managed by specialty foot and ankle surgeons and that nonoperative treatment of DIACFs will lead to more subtalar fusions.

In conclusion, RCTs and inconclusive meta-analyses prove that no single treatment approach can be

applied as a generalization to all calcaneal fractures. DIACFs are injuries which need foot and ankle specialist assessment and intervention with a patient-centric, fracture-tailored approach. Operative intervention with defined indications, anatomical reduction, and meticulous soft tissue dissection in the well-selected patients yield favorable outcomes. Minimally invasive or limited open approaches, using either image intensifier or arthroscopy assisted, have shown promising results. As Buckley has stated, future trends point toward limited open reductions with smaller incisions, thus, ensuring a lower risk of complications while obtaining and ensuring anatomical fracture reduction.

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