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Mini-Fragment Internal Fixation of Distal Fibular Fractures Results in Lower Rates of Hardware Removal Without Compromising Healing

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Summary

The question addressed by this study is whether mini-fragment constructs produce results comparable to traditionally utilized small-fragment implants in the treatment of distal fibular fractures. The quality gap addressed here is that small-fragment implants have been shown to produce hardware removal rates of up to 23% and rates of lateral ankle pain overlying the implants of up to 31%; it would be advantageous, therefore, to find constructs for internal fixation producing decreased rates of hardware removal while providing the same stability as the current standard implants.

Introduction

Fractures of the distal fibula are common and in certain situations benefit from operative stabilization. Small-fragment implants used for internal fixation of these fractures may result in local irritation and ultimately require hardware removal. A recent study demonstrated that the mean load at failure of mini-fragment constructs is equivalent to that of small-fragment implants. We describe our experience with mini-fragment constructs in the fixation of ankle fractures involving the lateral malleolus.

Methods

A retrospective chart review of 84 ankle fractures involving the lateral malleolus treated by the senior author at our institution between July 2009 and April 2014 was performed. Of these, mini-fragment non-locking constructs were used to provide internal fixation of the lateral malleolus in 54 cases. Two patients were excluded for a follow-up time of less than four weeks. In some cases, mini-fragment constructs were also used for stabilization of the medial malleolus, posterior malleolus, talus, or tibial plafond. In total, there were 28 isolated fractures of the lateral malleolus, seven bimalleolar fractures, three trimalleolar fractures, nine trimalleolar fractures with only medial and lateral malleolus fixation, two fractures of the lateral and posterior malleoli, one pilon fracture, one lateral malleolus fracture with distal tibia fracture, and one lateral malleolus nonunion treated with mini-fragment internal fixation. The mean time of follow-up was six months (24.3 weeks, range 4 weeks to 3.6 years).

Results

Of 52 ankle fractures involving the distal fibula that were treated with internal fixation using mini-fragment constructs, only three required hardware removal (5.8%). Less than 4% of patients reported lateral ankle pain overlying the hardware. Reasons prompting hardware removal included peroneal tendon irritation in the setting of hardware loosening (n=1), lateral wound dehiscence (n=1), and infection after ORIF of a fracture-dislocation in a diabetic patient (n=1). One patient developed SPN neuritis but did not require hardware removal. All but three patients achieved radiographic union by six weeks, with an average of 6.2 weeks until union. There were no cases of loss of reduction. Mini-

fragment constructs cost the same or less than comparable small fragment constructs.

Conclusion

Mini-fragment constructs yielded excellent results for the fixation of ankle fractures involving the distal fibula at a mean follow-up of 6 months. Only 3 cases required hardware removal. There were no cases with loss of reduction. Our results lend clinical support to recent findings demonstrating that mini-fragment constructs exhibit similar biomechanical function to small-fragment implants in distal fibula supination-external rotation fractures. Importantly, the hardware removal rate of 5.8% is substantially lower than a previously reported rate of 23%. Likewise, the <4% rate of lateral ankle pain overlying the hardware we observed is considerably lower than a previously reported rate of 31%. We conclude that mini-fragment constructs effectively treat uncomplicated lateral malleolar fractures without loss of reduction and with less complications and decreased rate of hardware removal as compared to small-fragment implants. Furthermore, cost analysis shows the mini-fragment implants to be the same or less expensive as comparable small-fragment constructs.

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