Pediatric Distal Radius Fracture Loss of Reduction after In-Situ Immobilization

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INTRODUCTION: The risks for redisplacement after closed reduction of pediatric distal radius fractures have been well described. The purpose of this study was to investigate the rate and factors that influence loss of acceptable alignment following in-situ immobilization of pediatric distal radius fractures.

METHODS: A retrospective review was performed to identify pediatric patients that sustained distal radius fractures between 2011 and 2019. Patient demographics, mechanisms of injury, fracture classification, fracture angulation, immobilization type, cast/splint index, and treatment plan were recorded. Loss of reduction was defined as an increase of five degrees or more in angulation and/or a change in treatment management resulting in a closed reduction attempt or surgical intervention. Simple statistics were performed.

RESULTS:

A total of 105 patients treated with in-situ stabilization were identified. Five patients (4.76%) met the criteria for loss of acceptable alignment and were managed surgically. The average age of loss of alignment patients was 6.5years (SD: 3.35; range: 2.5- 10 years old) compared to 9.71 years in the maintained alignment group (SD: 3.61;Range: 1-17 years old) (t=2.7764, p=0.1058). Four of the loss of alignment patients had extraphyseal distal radius fractures and one had a Salter-Harris II fracture. Two patients had associated ulnar buckle fractures and one had an ulnar styloid fracture. All five patients were initially treated with long arm cast immobilization.

At initial presentation, the average angulation of the fractures losing alignment was 16.14 degrees of dorsal angulation (SD:6.92; Range: 7.9-24.4 degrees) compared to an average of 11.99 degrees of angulation (SD:6.37; range:1.9-41.3 degrees) in the maintained alignment group. At first follow up, the loss of alignment group had an average angulation of 27.58 degrees (SD: 14.11; range: 13.5-51 degrees) and an average change in angulation of 11.44 degrees (SD: 12.44; range: -0.7-30.2degrees) compared to 10.19 degrees of angulation (SD: 5.88; range: 0.9-29.4 degrees) and -0.79 degrees change in angulation (SD: 7.02; range:{-28.7}-29.4degrees) in the maintained alignment group. After surgical intervention, average angulation was 8.24 degrees (SD: 2.25; Range 4.8-10.3 degrees). Of the five patients that lost alignment and were treated surgically, no additional complications occurred.

DISCUSSION AND CONCLUSION: Approximately 5% of patients treated with in-situ immobilization after a pediatric distal radius fracture will lose acceptable alignment. There are no clear factors or variables that indicate a loss of reduction in pediatric distal radius fractures treated with in-situ immobilization. Patients that lose alignment can be treated with surgical intervention without further complications.