Risk of Refracture in Proximal Both Bone Forearm Fractures in Children

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INTRODUCTION:

Pediatric patients with proximal both bone forearm fractures appear to be at risk of refracture. We evaluated if initial treatment strategy, and increasing volar angulation of the radius is associated with an increased need for re-reduction or additional refractures.

METHODS:

We performed a retrospective chart review of patients treated for a proximal both bone forearm fracture at a regional level one pediatric hospital. Skeletally immature patients with open physes and a proximal one-third fracture of the radius with associated ulna fracture were included. Patients with less than three weeks follow-up, single bone fracture, missing radiographs, or midshaft, distal, and Monteggia fractures were excluded. We performed a Fisher's exact test to evaluate the association of initial management strategy with refractures. A t-test compared volar angulation of the radius between refracture and no refracture groups. A logistic regression model evaluated the odds of refracture given volar angulation deformity of the radius during follow-up.

RESULTS:

We identified 147 patients with a mean age of 7.9 years (SD: 3.3), approximately 55% were male. Mean follow-up was 150 days. Initial management maintained reduction in 79.6% of cases with only 20.4% of cases required additional treatment via cast wedging, closed re-reduction, or surgical intervention. There were 15 refractures (10.2%). Initial management strategies: splinting/casting in situ, closed reduction and casting, or surgical intervention, were not associated with risk of refracture. Mean volar angulation of the radius was highest among refractures at third follow up visit (mean: 6 weeks) (15.8 vs 6.9 degrees, p=0.0039) among non-operatively treated patients. Every one degree increase in volar angulation deformity of the radius at the third follow-up visit was associated with a 1.12 times higher odds of refracture (OR 1.12, 95% CI: 1.02-1.23, P=0.013).

DISCUSSION AND CONCLUSION:

Increasing volar angulation of the radius at union was significantly predictive of future refracture risk. Refracture risk was not associated with initial treatment strategy. Surgeons should consider a volar angulation cutoff of less than 10 degrees for nonoperative management of the radius.

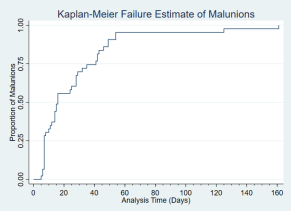

Table 4: Change in Radial Angulation through Follow-up – Lateral View

Volar-Dorsal Angulation, mean (SD)	Average Days since Initial Treatment	No Refracture N=132	Refracture N=15	P-value
Initial Visit – Degrees		18.9 (SD: 13.0)	19.2 (SD: 7.5)	0.85
Post Reduction – Degrees		8.1 (SD: 6.3)	8.7 (SD: 5.6)	0.82
Follow up 1 – Degrees	7 (SD: 5.6)	7.3 (SD:6.1)	9.9 (SD: 6.9)	0.13
Follow up 2 – Degrees	22 (SD: 12.1)	8.2 (SD: 6.7)	12.3 (SD: 7.4)	**0.04**
Follow up 3 – Degrees	42 (SD: 27.1)	6.9 (SD: 7.0)	15.8 (9.5)	**0.0039**
Final Visit – Degrees	98 (SD: 96.1)	6.2 (SD: 6.2)	11.7 (SD: 6.2)	**0.0012**