Single Versus Both Bone Fixation: A Retrospective Review of 10 Years of Pediatric Forearm Fractures

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Purpose: Traditionally, operative management of pediatric forearm fractures consists of fixation of both the radius and ulna, although single bone fixation may be a viable alternative. This study compares the treatment outcomes of single versus both bone fixation of surgical pediatric forearm fractures.

Methods: This is a retrospective study investigating patients under the age of 18 years undergoing operative fixation of all 21-M, 22-D, and 23-M both bone forearm fractures between 2003 and 2013 at a single institution. The decision to use single bone fixation was physician preference based on intraoperative stability following fixation of the first bone. Charts were reviewed for clinical and radiographic data through multiple time intervals. Comparative analysis of time to union, loss of reduction, tourniquet time, and overall cost of treatment were examined across each fixation type and zone of injury. Complication rates (including need for revision surgery, neurovascular injury, malunion, nonunion, and symptomatic hardware) were also investigated.

Results: A total of 369 patients met inclusion criteria: 302 patients (82%) received fixation of both radius and ulna fractures while 67 (18%) received fixation of only the radius or ulna. There was no significant difference between gender and proportion of open injury, single bone fixation groups were younger (8.8 vs 11.4 years; $P < 0.001$) and were more often treated with distal (23-M) fracture patterns (40 vs 19%; $P < 0.001$). There was no significant difference in the number of patients that achieved union by 210 days between both bone and single bone fixation groups (87 vs 82%; $P = 0.370$). Patients undergoing single bone fixation had a shorter time to radiographic union (132 vs 153 days; $P = 0.014$) and shorter operative time (65 vs 96 minutes; $P < 0.001$). Reduction was stable across all fixation types and time periods with the exception of early loss of reduction of 5° in the radius for ulna-only fixation ($P = 0.002$). Hospital encounter costs were lower for single bone fixation ($11,400 vs $18,500; $P < 0.001$). The complication rate was not significantly different for single bone fixation (27% vs 20%; $P = 0.204$).

Conclusion: The use of single bone fixation of pediatric both bone forearm fractures remains controversial. This study demonstrates that single bone fixation may have a shorter time to union, shorter operative time, and less overall cost, without compromising stability or increasing complication rate.