Complications After Operatively Treated Both-Bone Forearm Fractures with ESIN in Childhood and Adolescence: A Two Center Study

Marcel Dudda, MD[1]*; Pamela Bunge, MD; Clifford B. Jones, MD*[2,3]*;*
Thomas A. Schildhauer, MD[1]*; Christiane Kruppa, MD*[1,4]*;*
[1]*Department of Surgery, University Hospital Bergmannsheil, Ruhr, University of Bochum, Bochum, Germany;*
[2]*Michigan State University/CHM, Grand Rapids, Michigan, USA;*
[3]*Orthopaedic Associates of Michigan, Grand Rapids, Michigan, USA;*
[4]*Grand Rapids Medical Education Partners, Grand Rapids, Michigan, USA*

Purpose: Both-bone forearm fractures are frequent injuries in childhood and adolescence. Operative treatment is frequently performed using intramedullary stabilization such as elastic stable intramedullary nails (ESIN). The purpose of this study was to analyze complication rates after intramedullary stabilization of both-bone forearm fractures in childhood and adolescence retrospectively at two Level I teaching trauma centers.

Methods: At both centers operatively treated both-bone forearm fractures with ESIN were retrospectively evaluated over 10 to 12 years, respectively. Patients included had a diaphyseal both-bone forearm fracture until the age of 15 and 17 years, respectively. Complications and necessity of further treatment intervention were analyzed. At Center 1, 59 patients with an average age of 11.0 years (range, 5-15) were included. The study population at Center 2 consisted of 180 patients with 181 fractures. Average age was 9.7 years (range, 3-17). A total of 23 (9.6%) fractures were open. 202 (84.2%) fractures were treated with ESIN radial and ulnar. In 26 (10.8%) both-bone fractures the radius was stabilized isolated, in 8 (3.3%) fractures the ulna. Three (1.3%) fractures were stabilized with intramedullary Kirschner wires (K-wires). One was stabilized (0.4%) with ESIN ulnar and K-wire stabilization radial.

Results: 204 both-bone forearm fractures had a total of 15 complications: 4 superficial wound infections, 4 refractures after early hardware removal, 2 malunions, 2 ruptures of the extensor pollicis longus (EPL) tendon, and 1 compartment syndrome. In 2 cases, reoperation with extramedullary stabilization was performed without further intervention.

Conclusion: Intramedullary nailing of unstable both-bone forearm fractures is the method of choice in case operative treatment is required. The complication rate in our study population of 240 included fractures is low; therefore, ESIN can be considered as a safe procedure. Some complications such as EPL tendon rupture and refracture could be avoided by improvement of the operation technique and careful consideration of the time of hardware removal.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.