Closed Reduction and Percutaneous Pinning Versus Open Reduction and Internal Fixation of Mildly Displaced Humeral Lateral Condyle Fractures

Andrew Pennock, MD[1]*; Lissette Salgueiro Canetti, MD*[2]*; Vidyadhar Upasani, MD*[1]*; Tracey Bastrom, MA*[1]*; Burt Yaszay, MD*[1]*;*
[1]*Rady Children's Hospital, San Diego, California, USA;*
[2]*University District Hospital, San Juan, PUERTO RICO*

Purpose: The optimal treatment for pediatric lateral condyle fractures that are mildly displaced is unclear. The purpose of this study was to assess clinical and radiographic outcomes and complication rates of patients undergoing open reduction and internal fixation (ORIF) versus closed reduction and percutaneous pin fixation (CRPP) of mildly displaced lateral condyle fractures.

Methods: A retrospective review of all children with acute lateral condyle fractures with 2-5 mm of displacement measured at the lateral cortex and no significant rotational displacement or joint surface incongruity treated at a single Level I trauma center from 2006 to 2014 was performed. A total of 74 patients were treated who met inclusion criteria; 51 underwent ORIF and 23 underwent CRPP. No differences existed between the two groups with respect to age, gender, extremity, mechanism of injury, time to treatment, fracture displacement, or fracture classification. Charts and radiographs were reviewed and the following parameters were documented: operating room (OR) time, time to union, return to activities, magnitude of lateral spurring, and complications. Major complications were defined as those with presumptive long-term effects or requiring reoperation.

Results: The average follow-up for the entire cohort was 6 months. All fractures healed within 12 weeks of surgery, regardless of treatment type, and no differences were observed in time to union between the groups. OR time averaged 30 minutes faster for the CRPP group ($P < 0.001$). Nearly 10% of patients in each group developed elbow stiffness, requiring formal therapy. The overall complication rates were 25% for the ORIF group and 13% for the CRPP group ($P = 0.36$). No major complications were observed in the CRPP group, whereas 3 (6%) were observed in the ORIF group, including one case of osteonecrosis with a fishtail deformity, one case of osteomyelitis requiring two surgical debridements complicated by a premature physeal closure and angular deformity, and one refracture requiring surgery.

Conclusion: Surgical treatment of lateral condyle fractures mildly displaced 2-5 mm has good outcomes regardless of treatment. CRPP, however, minimizes surgical time, is more cosmetic, and potentially reduces complications. Further studies with additional patients, better assessment of articular surface displacement, and longer follow-up will be necessary to corroborate these findings. However, our results provide guidance to physicians treating mildly displaced lateral condyle fractures requiring surgery.

See pages 47 - 108 for financial disclosure information.