OPEN REDUCTION OF PROXIMAL HUMERUS FRACTURES IN THE ADOLESCENT POPULATION

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Purpose: Proximal humerus fractures in the pediatric population are a relatively uncommon injury; with the majority of injuries treated in a closed fashion due to the tremendous remodeling potential of the proximal humerus in the skeletally immature. Yet, in adolescent patients open treatment is at times necessary due to unsatisfactory alignment following a closed reduction, loss of previously achieved closed reduction, and limited remodeling when close to skeletal maturity. The purpose of our study was to examine open reduction of adolescent proximal humerus fractures.

Methods: A retrospective radiographic and clinical review of the outcomes of proximal humerus fractures in the adolescent population which were consecutively treated at our institution with open reduction was performed.

Results: Ten children met the inclusion criteria with a mean age of 14.3 (± 1.3) years and a mean weight of 60.7 (± 14.9) kilograms at the time of injury. There were 7 Salter-Harris 2 fractures, and 3 Salter Harris 1 fractures. The largest mean angulation was 55.0 (± 33.9) degrees and the largest mean displacement was 87.0 (± 22.8) percent. Intra-operatively, impediments to closed reduction within the fracture site which were found included: periosteum (90.0%), biceps tendon (90.0%), deltoid muscle (70.0%), and comminuted bone (10.0%). K-wire fixation was most commonly used (70.0%) followed by flexible nails (20.0%), and cannulated screws (10.0%) fixation. All patients achieved radiographic union at a mean of 4.0 (± 0.7) weeks, had non-painful full shoulder range of motion and rotator cuff strength at final follow-up (mean 7.7 ± 4.6 months), and returned to pre-injury sporting activities. No premature physeal closures or growth disturbances were seen with up to 0.83% of the surface area of the physis violated by the implants utilized for fracture fixation.

Conclusion: Operative treatment of proximal humerus fractures, particularly in adolescents with severe displacement / angulation having failed closed methods of treatment, is increasingly considered to be an acceptable modality of treatment. In addition to the long head of the biceps, periosteum, deltoid muscle, and bone fragments in combination can prevent fracture reduction. Surgeon preference and skill should dictate implant choice, and the risk of physeal damage utilizing these implants in this age-group is low.

Significance: Proximal humerus fractures in the adolescent population can be successfully treated with open reduction and internal fixation resulting in excellent clinical, functional, and radiographic outcomes with minimal risk of physeal damage.