



Orthopaedics

SURGICAL MANAGEMENT IN FRACTURE OF SUPRACONDYLAR HUMERUS IN CHILDREN TREATED WITH PERCUTANEOUS K-WIRE FIXATION.

Dr A Pavana Kumar Babu

Assistant Professor, Dept Of Orthopaedics, Kurnool Medical College

Dr Indla Ashok Kumar*

Orthopaedics Resident, Kurnool Medical College *Corresponding Author

Dr Bandam Srinivas

Orthopaedics Resident, Kurnool Medical College

ABSTRACT Supracondylar fractures of the Humerus are the most common injuries in children, and they make up to 60% of all the elbow injuries. As the age increases these injuries become less common. The treatment of the undisplaced type Supracondylar fractures is well established and treated conservatively. The treatment of completely displaced fractures is controversial and has many open like blind pinning after reduction, or percutaneous pinning or open reduction and pinning. In this study, 20 patients (age < 15 years) with displaced supracondylar fracture humerus were treated with Closed reduction and Percutaneous K-wire Fixation. The study was carried out between September 2018 and February 2020. The results were evaluated with the Mitchell and Adam criteria. The results showed 60% good result, 30% fair and 10% poor results. Supracondylar fracture fixation with closed reduction and percutaneous K-wire fixation provides an accurate, stable reduction and easy to perform and had found to give consistent results.

KEYWORDS :

INTRODUCTION

Supracondylar fractures of the Humerus are the most common injuries in children, and they make up to 60% of all the elbow injuries¹. As age increases, these fractures become progressively uncommon. The average age group of these patients being seven and a half years. Supracondylar fractures involve the lower end of Humerus, usually involves the thin portion of Humerus through the olecranon fossa or just above the fossa or through the metaphysis.

The Supracondylar fractures are associated with severe complications such as Myositis Ossificans, Volkmann's ischemic contracture (VIC), stiffness, nerve injuries and malunion.

Supracondylar injuries need attention because of their vascular damage and nerve injury they cause than the other injuries in the body².

There are no controversies regarding the treatment of undisplaced and partially displaced fractures. However, the treatment of completely displaced fractures is not one but many. Sandegard and Holmberg (1945), Judet (1947) preferred surgical intervention for the displaced type of fractures^{3,4}. Swenson introduced percutaneous pinning methods⁵. Some have devised blind pinning after reduction or Pinning under the C-arm guidance. The Supracondylar fractures, however, are often treated more aggressively, when indicated with operative management.

OBJECTIVES OF THE STUDY

To evaluate the results of Supracondylar fractures treated by closed reduction and percutaneous K-wire fixation under the guidance of C-arm. And to evaluate the postoperative complications.

MATERIALS AND METHODS

In the present study, Twenty cases of Supracondylar fracture that were completely displaced were studied. The study was done on children up to the age of 15 years, between September 2018 and February 2020 at Government General Hospital, Kurnool.

Of the 20 Supracondylar fractures, most of the cases had a history of fall on the outstretched hand. All the patients presented with pain, swelling as well as S-shaped deformity around the elbow. On examination, all patient had diffuse swelling around the elbow. Puckering of the skin was present in a few patients and a very few developed fracture blebs. All these patients had shortening of the arm on the fracture side.

The mean age of being presented is 7.4 years. The study included 14 boys and 6 girls—12 patients presented with involvement of the left side and 8 patients on the right side.

DISCUSSION

The supracondylar fractures of Humerus are common injuries around the elbow joint in children. Complete displacement of the fragments occurs in many of the cases. Though vascular complications were preventable to a greater extent, Cubitus varus deformity seems to be the most common complication with any method of treatment of the Supracondylar fractures.

The upper fragment and the lower fragments are rotated in relation to each other. The fractures at this level have a narrow edge (rarely more than 4-5mm). The reduction was obtained by rotating the fragments, and that results in their locking. These reductions eventually result in deformity. These observations were collaborated by Mitchell and Adams study.

In the year 1960, out of 83 patients, 38 patients had the varus deformity after the treatment by manipulative reduction and immobilization (around 60%). Among these 38 patients, 18% were treated with Dunlop's traction. Furthermore, the average change in the carrying angle was great among the patients treated with manipulation and immobilization only.

Skeletal traction is the only method other than surgery, which can prevent the error of the internal or rarely external rotation errors. However, this requires precise management of the traction system and confines the child to the bed.

In our study series, the cases had been followed for one and a half years. A few cases have received a local massage by an osteopath, known from history, but they showed no evidence it clinically and radiographically. Considerable soft tissue oedema obviates the underlying injuries severity and resulting vascular compromise. Early exploration in these cases showed good soft tissue decompression and allowed for ease of reduction of the fracture.

Flexions types of Supracondylar fractures are less common than the extension types, and they ranged between 1% to 10 % of Supracondylar Humerus Fractures. In the flexion type injuries, the posterior periosteum torn and anterior periosteum acts as the tension band but extending the elbow is useless. Open reduction and pinning recommended in these cases.

Three cases of Median nerve injury were noted in the study, and two recovered spontaneously within ten weeks. Pin tract infection was noted in 1 case, and it is treated with appropriated antibiotics. There were no complications like Myositis ossificans or Volkmann's ischemic contracture.

The study was conducted on 14 boys (70%) and six girls (30%). Twelve patients present with left-sided injury (60%) and eight patient with right-sided injury (40%). Aronson DD. Et al. reported 65% fractures on the left side and 35% fractures on the right side.⁶

The average period from injury to presentation at casualty was around 12 hours. 7.4 years was the mean age of the patients in our study. A very few cases have a history of massage. Among all cases, only one case was extension type.

Three cases of traumatic Median nerve injury and one case of Radial nerve injury were noted (recovered over 12 weeks). In Boyd's et al. study, where they documented one ulnar and two interosseous nerve palsies and 2 cases of iatrogenic palsies, all nerve palsies had completely recovered by the time of the follow-up evaluation.⁷

All the cases were fixed with Percutaneous K-wire fixation under the guidance of C-arm. The average time taken from injury to surgery was about 30 hours. Care was taken while introducing K wires anteriorly into the medial epicondyle.

Immediate post complication was pin tract infection in one case which was treated with specific antibiotics. Flynn et al., in their study of 52 patients, reported no pin tract infections, broken pins or growth disturbances.⁸

1 (5%) case had decreased range of motion by 30 degrees, and 2 cases (10%) had a decreased range of motion 10 degrees. In Nacht JL. et al. study noted a mean loss of range of motion of elbow about 7.8 degrees.⁹

Mitchel and Adam (1961) have proposed the criteria for evaluation of the end results of supracondylar fractures¹⁰. Based on the it-our study showed 60% Good results, 30% fair results and 10% Poor results. These results were based on the resultant change in the carrying angle; however, most cases showed a good range of elbow motion at the end of 12 months. The results in our study were comparable with the results observed by other authors in literature. The results in other studies were better than or equivalent to the results in the current series.

CONCLUSION

The results of the Closed reduction with percutaneous K-wire fixation are predictable and excellent if the anatomical restoration is achieved. Percutaneous fixation mostly eliminates the complications of conservative management. If the associated vascular injury is present, it warrants a more aggressive approach by surgical exploration, to avoid complications like Volkmann's Ischemic contracture. Most patients would regain full range of motion if mobilization started early. Another complication is residual cubitus varus deformity, and this can be avoided by keeping the implant in situ still the X-ray shows callus formation. Closed reduction with percutaneous pin fixation provides an accurate, stable reduction and easy to perform and had found to give consistent good outcomes.

This study strongly advocates the closed reduction of the Displaced supracondylar fractures of Humerus in children with Percutaneous K wire fixation.

REFERENCES

1. Mostafavi HR, Spero C. Crossed pin fixation of displaced supracondylar humerus fractures in children. *Clin Orthop Relat Res.* 2000 Jul;(376):56-61. doi: 10.1097/00003086-200007000-00009. PMID: 10906858.
2. Hanlon CR, Ester WL. Fractures in children: a statistical analysis. *Am J Surg.* 1954;87:312.
3. Sandegard E. Fractures of lower and end of Humerus in children treatment and end results. *Acta Chir Scand.* 1944;89-116.
4. Holmberg L. Fractures in children. *Acta Chir Scand.* 1945;103.
5. SWENSON AL. The treatment of supracondylar fractures of the Humerus by Kirschner-wire transfixion. *J Bone Joint Surg Am.* 1948 Oct;30A(4):993-7. PMID: 18887307.
6. Aronson DD, Prager BI. Supracondylar fractures of the Humerus in children. A modified technique for closed pinning. *Clin Orthop Relat Res.* 1987;219:174-84.
7. Boyd H.B. and Attenberg A.R. : Fractures about elbow in children's Arch. *Surg.* 1944: 49: 231-224.
8. Nacht JL, Ecker ML, Chung SM, Lotke PA, Das M. Supracondylar fractures of the Humerus in children treated by closed reduction and percutaneous pinning. *Clin Orthop Relat Res.* 1983 Jul-Aug;(177):203-9. PMID: 6861398.
9. Flynn JC, Mathews JG, Benoit RL Blind pinning of displaced supracondylar fractures of the Humerus in children. *J Bone Joint Surg Am* 1974 56:263-273
10. Mitchell WJ, Adam JP. Supracondylar fractures of Humerus in children, a ten year review. *JAMA* 1961;175:573-7