

OUTCOME OF OPEN REDUCTION AND INTERNAL FIXATION OF FRACTURES LATERAL CONDYLE OF HUMERUS

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ABSTRACT

Objectives: To know the outcome of fracture lateral condyle of humerus in children treated by open reduction and K-wire fixation.

Material and Methods: It was a prospective study was conducted in the orthopedic unit at Khyber Teaching Hospital, Peshawar from March 2006 to January 2007. A total 30 patients were included who presented with isolated injuries of Lateral Condyle of Humerus, patients with open reduction, multiple fractures, and floating elbow were excluded.

Results: We had study of 30 patients admitted in our unit with the fracture of lateral condyle of humerus, type I, type II (i.e. displaced) and type III (displaced + rotated). There was no associated injury like dislocation of elbow, fracture of olecranon or radial head or of humerus. Two patients disappeared from follow up. 28 patients were followed upto 4 months post operatively. Elbow stiffness was seen in 12 (40%) patients and managed easily with physiotherapy.

Conclusion: Every patient with fracture lateral condyle of humerus in children should be follow- up for risk of open reduction and K-wire fixation as part of the standard procedure for hospital attendance.

Key Words: Fracture, Lateral Condyle, Humerus, open reduction, internal fixation.

INTRODUCTION

Fractures around elbow are challenging because of abundant ossification centers and high potential for damage to Neurovascular structures. It is an important fracture because it may involve growth plate and is an intra articular fracture, therefore, early diagnosis, perfect anatomical reduction and stable timely internal fixation is required to avoid many complications. Fractures of the lateral condyle of the humerus accounts for 17% of all distal humerus fractures. It is the commonest distal humerus physeal fracture and is the second commonest fracture around the elbow, next to supra-condylar fractures.¹ This fracture is typically caused by a fall on an outstretched hand.² The lateral condyle is either avulsed by varus stress or displaced by the radial head under valgus stress.

It is an important fracture because it may involve growth plate and is an intra articular fracture, therefore, early diagnosis, perfect anatomical reduction and stable timely internal fixation is required to avoid many complications.³ Lateral condyle fractures are called "Fracture of Necessity", because the results of close reduction (conservative treatment) are so poor that open reduction and internal fixation is almost always required. Children with these fractures complain of

pain and decreased range of motion at elbow joint. In some patients with minimally displaced fractures, localized lateral tenderness may be noted. The most common radiographic finding is the presence of a posteriorly displaced metaphyseal fragment. Fractures lateral condyle of humerus are classified on the basis of displacement into (Jaboc) type I, II and type III, on the basis of location of fracture line into Milch type I and II and radiographically classified into (Badelon) stage A, B and C.

Minimally displaced fractures may not be evident, and oblique view X-rays may be helpful. Even undisplaced fractures are unstable and can displace later on, needing close follow up during conservative treatment. Fractures around elbow are challenging because of abundant ossification centers and high potential for damage to Neurovascular structures (which are difficult to assess early in children). The potential complications associated with lateral condyle fractures are growth arrest, premature physeal closure, range of motion restriction, angular deformity of elbow and tardy ulnar nerve palsy.⁴

MATERIAL AND METHODS

All patients presenting to orthopedic ward Khyber Medical Teaching Hospital, Peshawar from March 2006 to January 2007 were included in the study. Total of 30 patients were admitted during the study period. Those patients with fracture Lateral Condyle of Humerus of either sex, with age range of 2-10 years were included in the study. Those patients with multiple fractures or open fractures were excluded from the study. All the patients

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brought to our unit had X-ray of elbow antero posterior and lateral views. Displacement was measured on the antero- posterior radiograph as the gap between lateral Cortices or on the lateral radiograph as the gap between posterior cortices. The greater gap was chosen for the measurement of displacement. All the patients were treated with open reduction and internal fixation with K-wires and followed upto four months. Complication observed in these four months were recorded.

Patients were discharged on 2nd post op day with full instructions of follow up. First follow up after two weeks was advised in which the condition of the wound was checked, stitches were removed and radiograph was taken for assessment of fracture site. Backslab and K-wires removed in the 2nd follow up after 1 month in the operation theater. Dressing was done and patient was instructed to gently mobilize the elbow actively. Patients were instructed to come again after 8 weeks (2 months) for 3rd follow up. These patients were followed in fourth visit after 4 months for any stiffness, deformity, delayed union, mal-union, and non-union.

RESULTS

We studied 30 patients admitted in our unit with the fracture of lateral condyle of humerus, type I, type II (i.e. displaced) and type III (displaced + rotated). There was no associated injury like dislocation of elbow, fracture of olecranon or radial head or of humerus. We treated all of them by open reduction and internal fixation with two smooth Kirchner wires parallel to each other. The age and gender wise distribution is shown in Table 1.

Results were assessed both clinically and radiologically. Clinical evaluation was done regarding elbow

Table 1: Age Gender Wise Distribution

Variables		No. of patients and percentage
Age group in years	0-4	4(13.3%)
	5-8	24(80%)
	9-10	2(6.66%)
Total		30(100%)
Gender	Male	25(83.5%)
	Female	5(16.5%)
Total	Total	30(100%)

Table 2: Side and type fracture

Side and type of fracture		No. of patients and percentage
Side	Lt side	18(40%)
	Rt side	12(60%)
Type	Type I	2(6.6%)
	Type II	12(40%)
	Type III	16(53.3%)

function, cosmetic outcome and carrying angles. There was some degree of stiffness after removal of plaster and K-wires but later on managed by physiotherapy, this was managed conservatively and obtained good results. Carrying angle obtained was checked and compared with the opposite (Normal side). Two patients disappeared from follow up. Twenty-eight patients were followed upto 4 months post-operatively. Side and distribution of various types of fractures are shown in Table 2.

DISCUSSION

A fracture of the lateral condyle in children is one of the commonest example of distal humerus physeal fracture. This fracture is more common in first decade of life with peak incidence in 6-8 years. They are caused primarily by forced varus angulations with the elbow extended and supinated.

Elbow fractures are challenging because of the abundance of un-ossified cartilage and the high potential for limb threatening damage to neurovascular structure. Therefore proper knowledge of the elbow anatomy, is necessary so as to maximize the good outcome of management. Time factor is very important as when these fractures are treated well in time have excellent results. But when the treatment is done beyond critical time (beyond 3rd week time) then it is of no use to treat it or not to treat it. Most of the authors agreed upon the point that to treat the fractures of lateral condyle of humerus after 03 weeks are no better than those of no treatment at all and may cause avascular necrosis of the lateral condyle fragment by damaging its blood supply. In the cases where tardy ulnar nerve palsy, and other symptomatic complications can occur, which are then treated accordingly. e.g. anterior transposition of the ulnar nerve is recommended, operation for the fracture itself being of less benefit. These fractures should be handled properly to prevent complications like elbow stiffness, non-union, mal-union, varus or valgus deformity, avascular necrosis of the fractured fragment. Proper assessment of the patients should be done after admission in the hospital by taking proper history, clinical examination and followed by investigations for confirmation. Even un-displaced fractures are unstable, can be displaced. Doubtful cases or secondary displaced fracture are treated as "displaced", with early open reduction and internal fixation. Follow up is also very important after surgical treatment of Open Reduction and Internal Fixation (ORIF).

Based SC et al, in which he fixed the fracture of the lateral condyle of humerus with partially threaded 4 mm cancellous screws. 37 children with fracture of the lateral condyle of humerus were included in the study. The results were: Painless, full elbow movements were obtained in 36 cases. Delayed union, with loss of 10 degrees or elbow motion was observed in one case (2.72%). Radiologically less than 4 degree of varus deviation compared with the normal side was found in four cases (10.8%). Mild fishtailing was observed in

three cases (8.18%). Non- Union, avascular necrosis or clinically significant premature physeal fusion was not observed and excellent elbow function was achieved.⁵

Town Send DJ⁶ studied 104 patients treated with 3 weeks Kirschner wire fixation had following results. One non union 1 case = 1 % Infection 2 cases = 2% Late return of 63 children (61%) showed abnormalities of elbow shape in 28(44%) and wide surgical scar in 43(68%). He concluded that abnormality of elbow shape were mainly due to overgrowth of lateral humeral condyle, to the formation of excessive amounts of bone over the outer surface of condyl or both. According to the author three weeks period is sufficient for smooth kirschner wire fixation.

Skaggs D et al⁷ diagnosed 66 fractures, and treated it by open reduction and internal fixation with a metaphyseal lag screw in case of displacement. 55 cases were reviewed with an average length of follow up of 10 years to assess all for sequels of growth disturbances. This screw osteosynthesis led to anatomical union, symmetric carrying angle, and full range of motion in all 27 cases operated and proved to prevent stimulating growth disturbance contrary to the common but relatively unstable fixation with Kirschner wire.^{8,9}

We treated our patients by open reduction and internal fixation; we obtained very good results in all patients as they presented us relatively early. Elbow stiffness occurred in 12 (40%) of cases as our patients do not follow the instructions postoperatively strictly, they do not mobilize elbow due to fear of fracture displacement. In our patients follow up were usually poor and many patients come late with stiff elbow. Rate of infection was 7% (2 patients), due to our poor operation theatre environment. Avascular, non-union and Cubitus valgus not seen. It occurs in approximately 42% of cases of lateral condylar fracture regardless of treatment in a study conducted by Nishikant K et al¹⁰.

CONCLUSION

Every patient with fracture lateral condyle of

humerus in children should be regularly follow-up for risk of open reduction and K-wire fixation as part of the standard procedure for hospital attendance.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Khan AS:	Main idea.
Shah SDBA:	Idea and review.
Hayat U:	Data collection.
Khan HU:	Manuscript writing.
Khan MS:	Statistics.
Ullah Z:	Follow up.
Askar Z:	Over all supervision.

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