



“MANAGEMENT OF CLOSED SUPRACONDYLAR FRACTURES OF HUMERUS IN CHILDREN ”

Orthopaedics

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ABSTRACT

Each case of supracondylar fracture of humerus in children has its peculiarities and hence the choice of most suitable method for a given case depends on its merits. Methods of management must be adapted that prove practical and successful. In the treatment of displaced supracondylar fracture one must keep in mind the principle of treatment of juxtra-articular fractures namely perfect anatomic restoration. This is difficult and almost impossible to achieve by closed means. The reason are not only bio-mechanical, often these fractures are accompanied by severe soft tissue swelling which make conservative treatment cumbersome and difficult as far as nursing care is concerned and imprecise and inaccurate as far as anatomical reconstruction is concerned. Here in this study of 30 patients we study the pattern of supracondylar fracture of humerus in children. We evaluate the results of treatment of supracondylar fracture by closed and open reduction. We also assess the efficacy and advantage of this treatment.

KEYWORDS

supracondylar fracture of humerus ,management in children , closed and open reduction

1. INTRODUCTION:

Supracondylar fracture of humerus is one of the most common injuries in children. The undisplaced ones have gratifying results. Every orthopaedic surgeon is confronted with supracondylar fracture of the humerus with or without complications and his skill is put to test in managing such cases. Even an apparently uncomplicated fracture may lead to complication if not treated properly. The local swelling , deformity and neurovascular complication if any, vary from case to case. All these fracture demand an accurate assessment and precise planning in the mode of treatment. An anticipation of likely complication is mandatory to diagnose and manage them perfectly. Radiographs of elbow are difficult to interpret due to rotational deformity. Primary open reduction of supracondylar fracture and fixation with cross Kirschner's wire combine the advantage of early soft tissue decompression with corrected anatomical restoration.

2. MATERIAL AND METHODS:

Permission from ethical committee was taken. 30 cases of supracondylar fracture of humerus were studied , patient admitted in medical college were included in study.

TYPE I (UNDISPLACED) SUPRACONDYLAR FRACTURE OF HUMERUS:

Undisplaced supracondylar fracture of humerus were treated by simple above elbow slab in 90 degree flexion and collar & cuff support. By three weeks after injury the pain and swelling usually were significantly subsided to allow protected active range of motion. X-ray evaluation at this time usually reveal periosteal new bone formation in supracondylar area of humerus.

TYPE II (MINIMALLY DISPLACED) SUPRACONDYLAR FRACTURES OF HUMERUS:

Supracondylar fracture of humerus were treated by closed reduction under general anesthesia. This is done by giving longitudinal traction-counter traction which achieves length. Forward pressure is applied on elbow as well medial and lateral displacements can be corrected at this time and then elbow is flexed gradually. The arm must be immobilised in sufficient flexion with forearm in full pronation to maintain reduction. The arm was immobilised with posterior splint. Clinical and radiological evaluation was done. This splint was removed at 3 weeks and physiotherapy was begun.

TYPE III (COMPLETELY DISPLACED) SUPRACONDYLAR FRACTURES:

Unstable supracondylar fracture of humerus in children in which reduction was difficult to maintain with closed reduction were treated by open reduction and internal fixation with crossed K-wires.

Surgical procedure: After general anesthesia , lateral position was given with arm flexed to 90° supported over bolster. Tourniquets applied and painting and drapping done from axilla to fingertips. Posterior skin incision was used. Mobilise the triceps from medial and lateral sides. Ulnar nerve identified. Traumatic anatomy was studied and note of pillar anatomy was made with special reference to medial or lateral pillar communitation. Realignment of the was carried out with anatomic restoration of Olecranon fossa as index of correct fragment and pillar orientation.

Fractures were fixed with two Kirschner's wire 1.5 to 2mm through medial and lateral condyle. Special care taken and identified the ulnar nerve. The wire cut short long to skin and bend to avoid migration. Skin closure done after negative suction and posterior splint applied after removal of tourniquet at 90° flexion of elbow. Posterior splint kept for 3 weeks .K-wires removed at 3-4 weeks. Physiotherapy started as tolerated.

Fig.1: Posterior skin incision on elbow:



Fig.2: Triceps elevated from both sides and K-wire fixation after reduction:



3.RESULTS : Criteria of grading results:

Flynn criteria:

Excellent: Loss of carrying angle 0-5 degree
 Loss of movement 0-5 degree
 Good: Loss of carrying angle 6-10 degree
 Loss of movement 6-10 degree
 Fair: Loss of carrying angle 11-15 degree
 Loss of movement 11-15 degree
 Poor: Loss of carrying angle more than 15 degree
 Loss of movement more than 15 degree

Table 1: Outcomes of the cases

Result	According to Carrying angle loss		According to movement angle	
	No Of Cases	Percentage (%)	No Of Cases	Percentage (%)
Excellent	8	26.7	9	30.0
Good	18	60.0	17	56.7
Fair	4	13.3	4	13.3
Poor	Nil	Nil	Nil	Nil
Total	30	100	30	100

Table 2: Complications following treatment

Complication	Number of cases	Percentage (%)
Superficial infection	2	6.7
Nerve injury	-	-
Restriction of movement 11°-15°	4	13.3
Cubitus varus	1	3.3
Myositis ossificans	-	-

4.DISCUSSION:

Alwyn Swesons observed in patients with extensive swelling, elbow flexion much beyond a right angle may obliterate the radial pulse or shut off the venous return whereas immobilisation in the safer right angle position will frequently allow fracture to slip. Flexion type supracondylar fracture may be difficult to reduce and hold so he advised open reduction and internal fixation with K-wires.[4]

Danioosson and Petterson observed in their series that with vascular impairment, evacuation of haematoma, reduction of fracture and division of fascia of forearm caused a return of radial pulse.[9]

Laud(1986) observed that a transcondylar or bicondylar fracture of humerus offered the most important stumbling block to reduction due to difficulty in maintaining reduction.[12]

Baltimore and Andrew studied the result of open reduction and internal fixation and concluded residual medial tilt after reduction as the most important factor in varus angulation. They noted that the limitation of movement in these cases may have been due to soft tissue damage at the time of injury, trauma from repeated closed manipulation or injurious surgical approaches.[14]

J.V.Fowels, Montreat, Canada and *M.T.* concluded that for satisfactory results ,supracondylar fractures should be reduced accurately and stabilised.[18]

Lyman-Smith found fracture alignment as of paramount importance in final results. It is difficult to judge alignment and rotations on radiograph. This is the prime reason for the high incidence of change in the carrying angle. For these reasons open reduction and internal fixation of these fractures might appeal to some surgeon as the surest method of direct observation and control of the position of the fragments.[22]

Martin Gruber concluded that immediate open reduction is mandatory for open fracture and in presence of intractable circulatory deficit, circulation is not deemed adequate unless the hand is warm, there is good capillary filling in the nail bed and full active extension of the finger is possible. The radial pulse is not considered an important criteria.[25]

A Nassar (Winnipeg Canada) observed that cubitus varus after supracondylar fracture resulted from medial angulation, but medial rotation predisposed to medial angulation, medial rotation as well as medial angulation must be corrected to eliminate the deformity, which is possible only by open reduction and internal fixation with K-wire.[31]

Kumta Laud concluded the considerable soft tissue oedema is an

expression of the underlying injury and its severity and it indicates a regional vascular compromise. Immediate exploration in these achieves good soft tissue decompression, allows ease of reduction and as a result anatomic restoration. The progression of edema is arrested.[32]

In our series of study we tried to provide excellent functional result and elbow of normal appearance with as little risk as possible for the patient. Open reduction as a form of treatment meets these criteria. In this series type I case of supracondylar fracture of humerus is treated by above elbow slab in full flexion. Type II case of supracondylar fractures of humerus were treated by closed reduction under general anaesthesia. Type III case of supracondylar fractures of humerus were treated by open reduction and fixation with cross K-wire. Our series had Excellent to good results in 86.4%, Fair results in 13.3% and Poor results in 0% cases.

5. CONCLUSION:

Careful clinical and radiological examination is mandatory to define type of fracture. Prior manipulation had bad result and also case presented late had bad results. Open reduction and internal fixation with "K" wire is good method for the severely displaced supracondylar fracture of humerus and for those with severe oedema and for compound fractures. Result of open reduction are predictable and good and achieves soft tissue decompression. In open reduction all the elements of displacement including rotation can be corrected under vision hence chance for deformities were minimal. Internal fixation also allows early mobilisation thus decreased chances of joint stiffness.

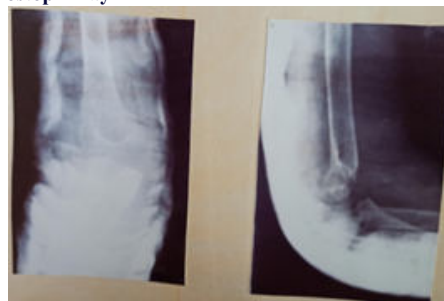
Case 1 : Type II supracondylar fracture**Fig.3: Preop X-ray****Fig.4: Postop X-ray****Case 2 : Type III supracondylar fracture****Fig.5: Preop X-ray**

Fig.6: Postop X-ray**REFERENCES:**

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