ORIGINAL ARTICLE

STUDY OF MANAGEMENT OF SUPRACONDYLAR FRACTURES HUMERUS BY PERCUTANEOUS PINNING

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ABSTRACT: Immobilization in cast has been standard treatment for un displaced supracondylar fracture of humerus. Closed reduction and percutaneous pinning provides the best cosmetic and functional results. The fracture can be fixed with pinning in any desired position. Use of medial and lateral pin fixation provides more stability. The pins must continue into the opposite cortex to provide good fixation. Smooth pins are preferred and restoration of movements is full range with closed pinning than open reduction.

KEYWORDS: Percutaneous Pinning.

INTRODUCTION: Government General Hospital, Vijayawada is the one of biggest teaching hospital in the state of Andhra Pradesh. It is premier institute to which patients are referred from Krishna, West Godavari and East Godavari districts. The Department of Orthopedics has been a dynamic specialty rendering its services effectively and efficiently to the patients coming to this hospital. An exhaustive range of fractures around Elbow present themselves at our institution, many of which require accurate reduction and internal fixation. Because of the proximity of crucial Neuro-Vascular structures, a thorough knowledge of anatomy if essential. Accurate reduction and stable fixation of bony injuries can often optimize ultimate function and limit long-term disability. Supracondylar Fractures of Humerus is one of the few fractures which when treated well may not bring credit to a reputed Surgeon, but, if it is not handled properly, it can definitely bring discredit to a well - reputed Surgeon. Supracondylar Fractures of Humerus are most common fracture around elbow in children1. They are one of the largest sources of serious problems and treatment controversy in childhood fractures.

MATERIALS AND METHODS: A prospective study in children with Gartland Type 3/unstable 2 Supracondylar Fractures treated at GGH Vijayawada.23 cases of males and 7 cases of females were studied. Almost all the cases were admitted on the day of injury. We treated all the cases by the method of Percutaneous K-wire fixation under C-arm control.one case developed ulnar nerve neuropraxia which was recovered post-operatively. In 9 cases there was obliteration of carrying angle.

STATISTICAL ANALYSIS OF CASES:

AGE Group (yrs)	No. of Cases	Percentage
4 to 5	15	50
6 to 7	15	50

TABLE 1: AGE Incidence

The majority of patients are in the age group of 4 to 7 years. The average age in 5 years.

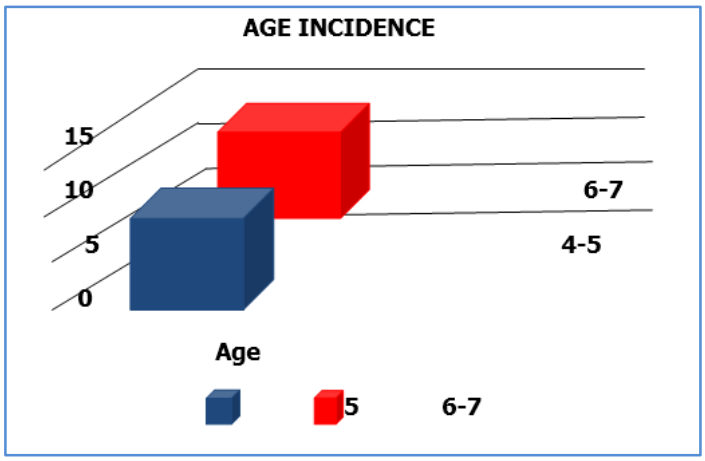

Figure 1

Sex	No. of Cases	Percentage
Male	23	76
Female	7	24

TABLE 2: Sex Incidence

The majority of the patient is male children about 3 times more than the females.

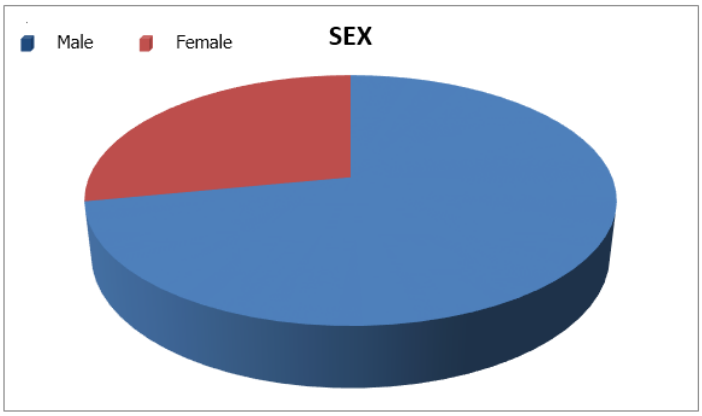

Figure 2

Side	No. of Cases	Percentage (%)
Right	12	40
Left	18	60

TABLE 3: Side Incidence

The left side injuries are more common than the right side injuries.

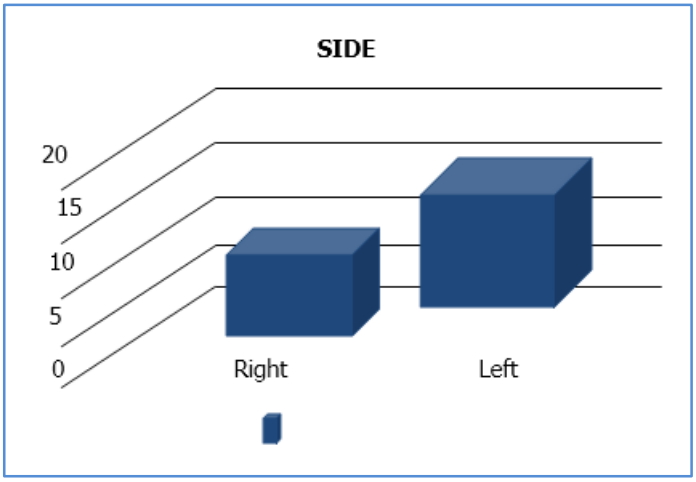

Figure 3

Type	No. of Cases	Percentage (%)
Extension	30	100
Flexion	0	0

TABLE 4: Type of the Supracondylar Fractures

The extension type of supracondylar fractures are more common than flexion type supracondylar fractures.

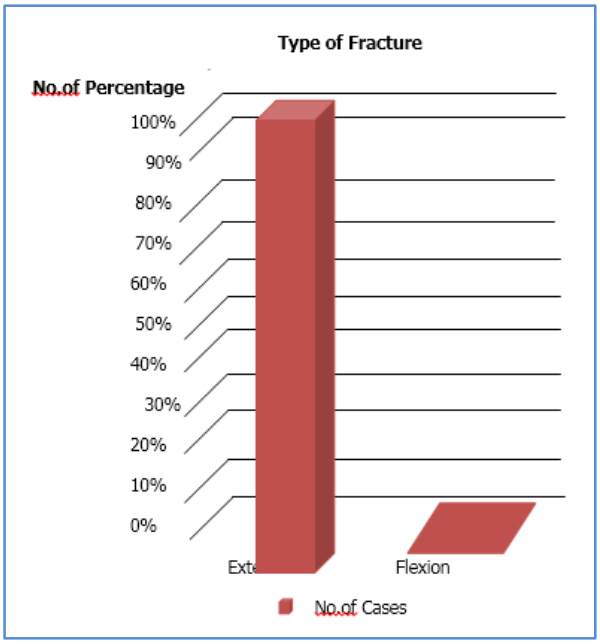

Figure 4

Displacement	No. of Cases	Percentage (%)
Posterolateral	12	40
Posteromedial	18	60

TABLE 5: Type of Displacement

Posteromedial type of displacement more common than Posterolateral type of supracondylar fractures.

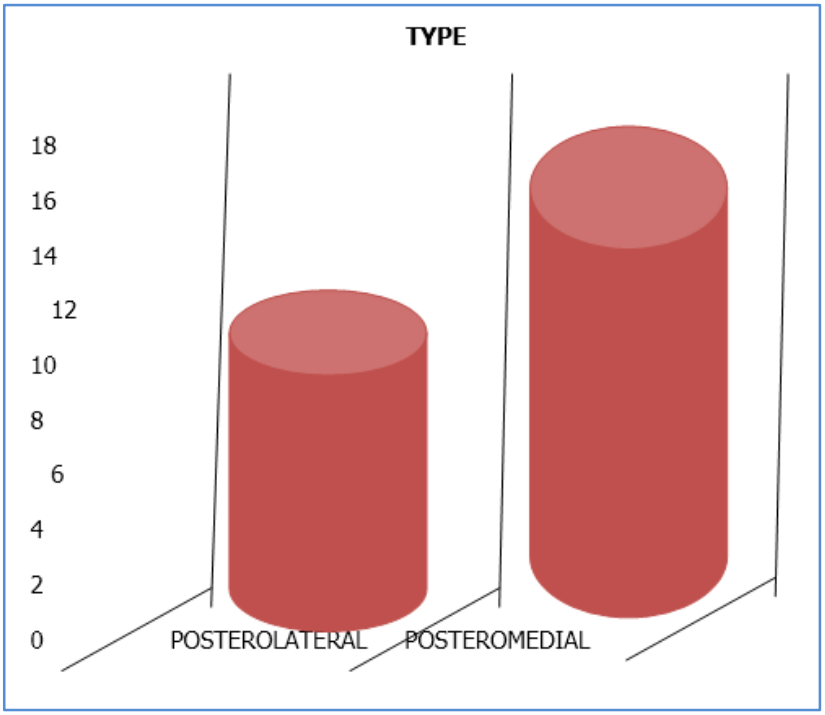

Figure 5

GRADING OF OUTCOME IN SUPRACONDYLAR: FRACTURES OF HUMERUS

Result	Rating	Cosmetic Factor Carrying angle loss	Functional factor Motion Loss
Satisfactory	Excellent Good	0 to 5 5 to 10	0 to 5 5 to 10
Unsatisfactory	Fair Poor	10 to15 Over 15	10 to15 Over 15

TABLE 6: Modified criteria for grading outcomes (Flynn et al)

Treatment of displaced supracondylar fractures of the humerus in children by…
H-Y Lee; S-J Kim.

Journal of Bone and Joint Surgery; May 2007: 5: ProQuest Medical Library.
Pg. 646.

Results are graded according to the following functional gradings.

Excellent: Carrying angle loss 0 to 5^0 restriction of elbow motion 0-5^0.

Good: Carrying angle loss 5 to 10^0 restriction of elbow motion 5-10^0.

Fair: Carrying angle loss 10 to 15^0 restriction of elbow motion 10-15^0.

Poor: Carrying angle loss more than 15^0 restriction of elbow motion more than 15^0.

Grading	Cosmetic factor (Carrying angle Loss)	Functional factor (Range of movement Loss)	(Overall No. (%)
Satisfactory			
Excellent	0^0-5^0	0^0-5^0	26 (87%)
Good	6^0-10^0	6^0-10^0	0 (0%)
Fair	11^0-15^0	11^0-15^0	3 (10%)
Unsatisfactory			
Poor	>15^0	>15^0	1 (3%)

Overall grading of patients according to the Flynn's criteria

Complications	No. of patients
Stiffness (range of movement loss >15^0)	2
Cubitus varus (carrying angle loss >15^0)	3
Nerve palsies	1
Avascular necrosis of trochlea	0
Pin tract infection	1
Compartment syndrome/Volkmann's ischaemic Contracture	0
Myositis ossificans	0

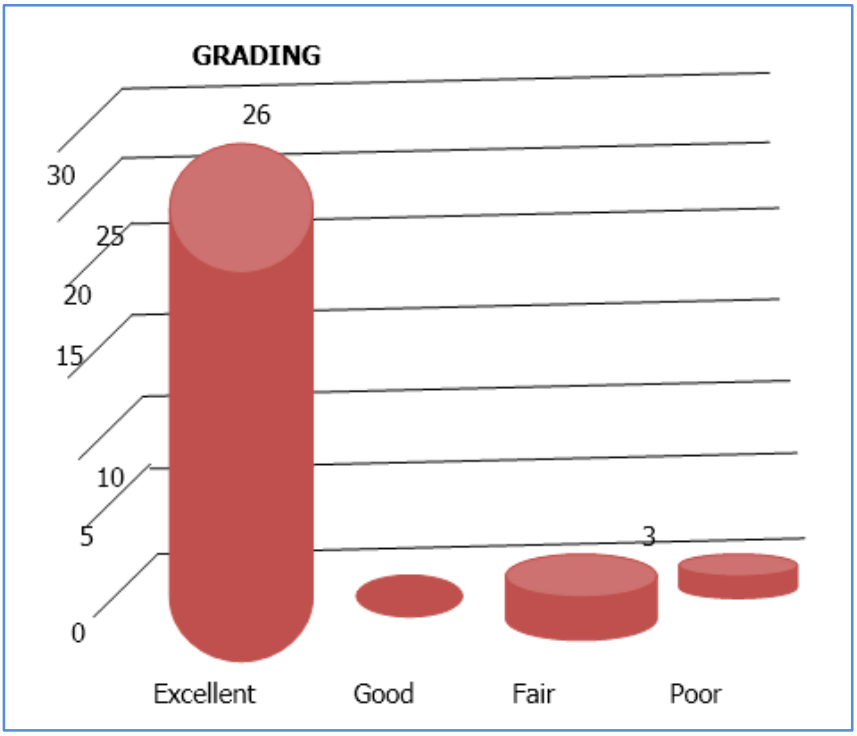

Figure 6

RESULT AND CONCLUSION: The supracondylar fracture fixed with pinning can be put in any desired position. Use of one pin may cause loss of reduction.[1] Use of medial and lateral pin fixation provides more stability than lateral pinning alone. The pins must continue into the opposite cortex to provide solid pin fixation.[2] Smooth pins are preferred and restoration of movements is of full range with closed pinning than open reduction.[3]

DISCUSSION: Immobilisation in cast has been the standard treatment for undisplaced fractures, but for displaced fractures it remains controversial.[4] Closed reduction and percutaneous pinning provides the best cosmetic and functional results.[5] However, some fractures are irreducible by closed means.[6] Open reduction and pinning is therefore recommended for supracondylar fractures and for those with vascular injury or compound fracture.[7] Late presentations, defined as more than 2 days after injury, are commonly treated by continuous traction, with consequent prolonged hospitalization.[8] Alternatively, they are allowed to malunite and treated later by corrective osteotomy.[9] A higher incidence of stiffness, neurological and vascular complications, and failure of closed reductions are encountered in late-presenting cases, particularly after repeated manipulations.[10] Operative interventions risk further stiffness and myositis ossificans. Continuous traction has the disadvantages of prolonged hospitalisation, resort to frequent radiographic analyses, and inadequate reduction.[11]

IMPORTANCE OF ACCURATE REDUCTION: Extension of the elbow joint is limited by the olecranon process locking in the olecranon fossa of humerus.[12] If Supracondylar fracture unites

with the lower fragment of humerus carrying the olecranon fossa tilted forwards 30°, this locking occurs 30° before the normal limit of extension movement is reached.[13] Similarly uncorrected backward tilting of lower fragment causes permanent limitation of flexion. Moreover, if the fracture unites with the lateral tilting of lower fragment, the forearm bones are carried laterally with it and there is corresponding degree of cubitus valgus.[14] None of these tilts were corrected by later growth of bone. Correction of any rotatory deformity is of equal importance to the reduction of antero-posterior and lateral tilt, and can be easily missed unless reduction X-Rays are carefully assessed. If rotatory malalignment is not corrected, it may result in an apparent cubitus varus or it can accentuate the deformity of valgus or varus tilt.[15] It is important therefore, in supracondylar fractures to secure perfect realignment of fragments as far as angulation and rotation are concerned. Lateral or medial shift and anteroposterior displacement alone are not important.[16]

Our series consists of 30 cases of supracondylar fractures of humerus in children, treated by percutaneous pinning of distal humerus under C-arm control. We selected the cases which fall into Gartland Type III/Unstable Type II classification.[17] The average age group was found to be five years. It was found that the injury in children was caused by low energy trauma. Most of them were a fall on outstretched hand. In our series 9 cases while they are going on bicycle, 2 cases fell down while playing at home or school. There was higher incidence of supracondylar fractures in males compare to females, 23 cases were males and 7 cases were females. In our series supracondylar fractures are common on left side with an incidence of 65%. Out of 30 cases 4 cases were compound injury which were of Grade I type.[18] The rest were simple injuries. Almost all cases are admitted on the day of injury. We treated all the supracondylar fractures by the method of percutaneous K - wire fixation under C-arm control. One case developed ulnar nerve neuropraxia which were recovered post operatively. In Nine cases there was obliteration of carrying angle.[19]

COMPARISON OF RESULTS WITH OTHER SERIES:

Prione et al (1988) studied 230 supracondylar fractures in children treated by different methods. In percutaneous K-wire fixation 78%, skeletal traction 67% and open surgery 67% had excellent functional results. 2 patients had pin tract infection. Our study shows 70 % excellent results, 16% good results, 10 % of fair results & 4% of poor results.

Sutton et at (1992) study shows 66% of excellent results and 22% of good results our study shows far better results than this study with low complications.

Herzenberg et at (1988) showed that the application of crossed medial and lateral pins to be a more stable configuration bio-mechanically.

Royce et al reported 4 ulnar nerve palsies caused by the medial pin. In our study two patients had ulnar nerve injuries following medial pining. Out of two patents one had ulnar nerve involvement in immediate post-operative period and one other had delayed ulnar neuropathy. All these nerve injuries resolved spontaneously.

Flynn et al (1974) reported 52 patients treated by closed reduction and blind pining, 98 percent of his patients had satisfactory results. Two patients had loss of reduction and one patient had transient ulnar neuropathy.

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