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Original article:

Study of surgical management of fracture supracondylar humerus with closed reduction and percutaneous crossed k wires fixation

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ABSTRACT

INTRODUCTION: Supracondylar fractures of the humerus are the most common type of elbow fractures in children. The treatment is often technically difficult and done to gain a functional and cosmetically acceptable upper limb with a normal range of move ment.

AIM: The Clinical and Radiological evaluation of the fracture supracondylar of humerus with closed reduction and percutaneous crossed k wires fixation in children.

METHODS: Study was conducted on 25 patients below the age of 12 years with closed fractures of type 2nd, 3rd fracture Supracondylar humerus consecutively admitted in the Department of Orthopaedic surgery, S P Medical College and PBM hospital Bikaner during January 2018 to December 2019. The final assessment was done at final follow up using Modified Flynn's criteria, at 6 month.

RESULTS: Age range was 2.5 to 15 years with mean age of 5.43±2.17 year, 60% male, most common mode of injury was fall on the ground (84%), left side (68%) and 80% were operated within 24 hours after injury. The average loss of motion was 6.96°, carrying angle was 5.13°, bauman angle was 3.96° in majority (92%) of patients loss of pronation/supination was (1°-2°) and 36% patients showed excellent and 56% patients showed good results when recovery was assessed.

CONCLUSION: The closed reduction with percutaneous pinning in supracondylar fracture of humerus in children provide stable fixation to achieve good functional & cosmetic results with minimal complications.

KEYWORDS: Supracondylar fracture, Crossed k wires.

INTRODUCTION

Supracondylar fractures of the humerus are the most common type of elbow fractures in children, accounting for 50-70% of all fractures about the elbow.[1]The peak age range in which most supracondylar fractures occur is 5 to 6 years[2] Although the incidence of these fractures generally has been reported to be higher in boys, more recent

reports indicate that the frequencies of supracondylar humeral fractures in girls and boys seem to be equalizing, and some series actually have reported higher rates in girls. The left or nondominant side is most frequently injured in almost all studies.[3,4,5,6] They usually are caused by a fall onto the outstretched hand with the elbow in full extension. According to Garteland's criteria, are classified as non displaced fractures (type I), hinged fractures with the posterior cortex intact (type II) and completely displaced fractures (type III).[7] Cubitus varus is the most frequent problem with a mean incidence of 30% in the series reviewed by Smith.[8] Injury to any of the three major nerves around the elbow occurs in 6% to 16% of cases.[9] The radial pulse is absent in about 3% after reduction of the fracture.[10] Volkmann's ischaemic contracture is rare, with an incidence of 1.1 in 1000,[11] but is still seen.[12-14] The anterior interosseous nerve brach of median nerve appears to be the most commonly injured nerve with extension-type fractures[15-18]. Treatment is controversial and often technically difficult. A variety of methods of treatment for displaced fractures has been recommended including closed reduction and immobilization,[19] traction by various methods[20-22] and closed[23] or open reduction[24] stabilised by Kirsch- ner (K-) wires. The aim of treatment is to gain a functional and cosmetically acceptable upper limb with a normal range of move ment.[60] Ideally, this should be achieved by one definitive procedure. The aim of this study is to evaluate the results of the fracture supracondylar of humerus with closed reduction and percutaneous crossed k wires fixation in children.

AIM: The Clinical and Radiological evaluation of the fracture supracondylar of humerus with closed reduction and percutaneous crossed k wires fixation in children.

METHODS:

prospective study was conducted on 25 patients below the age of 12 years with closed fractures of type 2nd, 3rd fracture Supracondylar humerus consecutively admitted in the Department of Orthopaedic surgery, S P Medical College and PBM hospital Bikaner during January 2018 to December 2019. At the time of admission, antero-posterior and lateral radiographs of elbow were taken for all the patients. Color Doppler was advised if distal pulse not palpable in affected limb and extremity is cold. All cases were classified as per modified Garteland classification system. Initially in the injured limb above elbow slab was applied and limb was kept elevated to reduce the swelling. Each patient was subjected to pre anaesthetic check up and General anesthesia [GA] was put and closed reduction and percutaneous crossed k wires fixation was done. Post operative radiographs were taken, fracture reduction and implant position were checked. At follow up X-ray's were taken to check fracture alignment, Baumann's angle, carrying angle and position of anterior humeral line in relation to capitellum in lateral view. The final assessment were done at final follow up using Modified Flynn's criteria, at 6 month.

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Modified Flynn's criteria to evaluate outcome of treatment- Criteria For Grading

Result	Rating	Cosmetic Factor : Carrying Angle Loss (Degree)	Functional Factor : Motion Loss (Degree)
Satisfactory	Excellent	0-5	0-5
	Good	5-10	5-10
	Fair	10-15	10-15
Unsatisfactory	Poor	Over 15	Over 15

RESULTS

Age range was 2.5 to 15 years with mean age of 5.43±2.17 year in which 60% male and 40% female, most common mode of injury was fall on the ground (84%) and 16% were RTA. 68% had left side injury and all patients were having extension type of injury. 80% were operated within 24 hours after injury. Average hospital stay of patients was 5.12±1.64 days. 92% of patients, pin duration were 3 weeks and radiological union in maximum 68% of patients was 6 weeks. The average loss of motion was 6.96°, carrying angle was 5.13°, bauman angle was 3.96° in majority (92%) of patients loss of pronation/supination was (1°-2°) and 36% patients showed excellent and 56% patients showed good results when recovery was assessed. Only 8% had pin tract infection other were healthy.

Table: 1.

AGE	NO. OF PATIENTS	PERCENTAGE
2 -5	11	44%
6-10	10	40%
11-12	4	16%
SEX		
MALE	15	60%
FEMALE	10	40%

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Table: 2.

Types OF FRACTURE	NO. OF PATIENTS	PERCENTAGE
GARTELAND TYPE 2	3	12%
GARTELAND TYPE 3	22	88%
TYPE OF DISPLACEMENS		
POSTEROMEDIALLY	20	80%
POSTEROLATERALLY	5	20%

Table: 3

LOSS OF MOTION [FLEXION /EXTENSION]	**NO.OF PATIENTS**	**PERCENTAGE**
0-5°	9	36%
6°-10°	14	56%
11°-15°	1	4%
16°-20°	1	4%
LOSS OF CARRYING ANGLE		
0°-5°	20	80%
6°-10°	4	16%
11°-15°	1	4%
LOSS OF BAUMAN ANGLE		
1°-2°	13	52%
3°-5°	12	48%
LOSS OF SUPINATION/PRONATION		
1°-2°	23	92%
3°-5°	1	4%
6°-10°	1	4%

Mean bauman angle in affected limb was (69.92°) and in normal limb was (73.92°).

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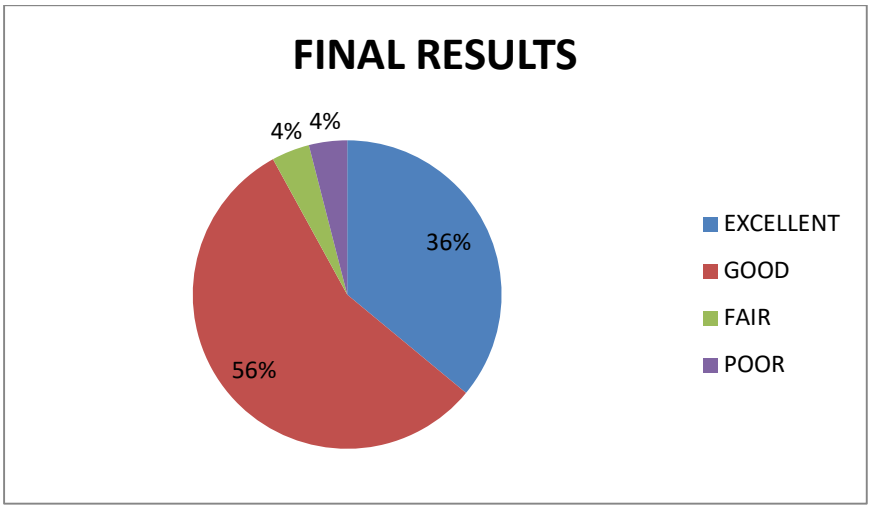
Graph 1



DISCUSSION

Supracondylar fracture of Humerus in children is a common injury and needs proper treatment to prevent complications like cubitus varus, elbow stiffness, neurovascular compromise and compartment syndrome.[25] There is no uniformity of opinion concerning the ideal method of treatment of displaced supracondylar fractures. Closed reduction and cast immobilization is the least invasive method provided the reduction is maintained.[26]

Average age in study was 5.43±2.17 year (range 2.5-15 year) with peak incidence 6-10 year which is similar to other workers (Pathania VP et al, Musa M et al)[1, 27]. Majority of patients were male, 60% of patients and ratio of male to female in this series was 1.5:1 which is lower than other studies- V P Pathania[1], Bharti SA[28], Praveen SK[29], Hakeem A[30].The majority of patients (84%) were injured due to fall on the ground and (16%) were injured due to road side accident in the present study. Similar findings were observed by V P Pathania[1], Hakeem A[30].32% cases were having right limb injury whereas 68% were having left side injury. Similar observations were made by Kocher MS[31] & Balakumar B[32]. Contrary observation (noted by, Maj Gen) V P Pathania[1].

All patients were having extension type of injury. Not a single case of flexion type of injury was recorded in the present study. In other studies similar results were found by Bharti SA[28], Praveen SK[29], Hakeem A[30].In our series the majority (88%) were Garteland type 3 and 12% were garteland type 2 fractures. In our study majority (80%) of patients had psteromedially displacements. Similar findings were observed by V P Pathania[1], Hakeem A.[30]

80% patients were operated within 24 hours after injury with average hospital stay of 5.12±1.64 days. 92% of patients had pin duration of 3 weeks (mean 4.14± 0.82 weeks). Radiological union in 68% of patients was 6 weeks (mean 6.8±3.08 weeks). Majority of cases (56 %) loss of motion was (6°-10°). The average loss of motion was 6.96°.In present study, the majority of patients (80%) loss of carrying angle was 0°- 5°. Mean loss of carrying angle was 5.13°. In our study 48% patients had loss of bauman angle of (3°-5°). The mean loss of bauman angle was 3.96°. 92% of patients loss of pronation/supination was (1°-2°). 36% patients showed excellent results when recovery was assessed. 56% patients showed good results, 4% showed fair results whereas only 4% patient had

unsatisfactory outcome. Only 8% had pin tract infection other were healthy whereas Gupta K et al. (2006)[33] observed no complications in their study.

CONCLUSION

The closed reduction with percutaneous pinning in supracondylar fracture of humerus in children provide skeletal stability with minimal soft tissue damage& loss of reduction, thus efficient, safe and cost effective method. Its demerits are radiation exposure, pin tract infection, ulnar nerve damage. Overall it provides stable fixation to achieve good functional & cosmetic results with minimal complications.

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