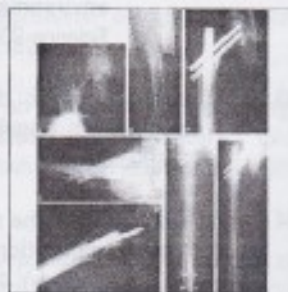


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PROF-999

SUPRACONDYLAR FRACTURES; COMPARISON OF MEDIAL AND LATERAL APPROACH FOR FIXATION OF OF HUMERUS IN CHILDREN



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ABSTRACT ... Objective:- To determine the surgical approach most suited in our setup and evaluate the results based on the functional and cosmetic outcome especially in the range of motion, the subsequent deformity, if any, and the carrying angle. **Setting** Orthopaedic surgery, Nishtar Hospital, Multan. **Duration** Two years. **Study design** Quasi experimental type of study. **Material & Methods** Thirty patients. **Sampling technique** Non-probability technique. **Results** The age of the patients included in our study ranged from 4-10 years with a mean age of 5.93 years in group A and 6.66 years in group B. Out of 30 patients in group-A, 3 (20%) males and 4(26.6%) in group-B had fracture on right side where as 12(80%) females in group-A and 11(73.3%) in group-B had fracture on left side. Majority of the patients i.e. 12(80%) in group-A and 11(73.3%) in group-B got injured due to fall from height. One (6.66%) patients from group-A and B had superficial wound infection. Pin tract infection was found in 1(6.66%) in group A and 2(13.33%) patients in group-B. **Conclusion:** This technique was easy to perform and proved to be safe, although hospitalization time was minimum in both groups. So we recommend medial approach for open reduction and internal fixation of all displaced supra-condylar fractures of humerus in children with appropriate indications.

Key words: Supracondylar fracture humerus, Children, Open reduction.

INTRODUCTION

Elbow injuries are more common in the skeletally immature than in older people because children tend to protect themselves with their out stretched arms when they fall, thus accounting for the vulnerability of the elbow region to fractures¹. A supracondylar fracture of the humerus is the second most common fracture in children (16.6%) and the most frequent before the age of 7

years². Supracondylar fractures occur as two types¹: (1) Extension type (common). (2) Flexion type (rare).

A supracondylar fracture of the distal humerus in children continues to pose therapeutic challenge and if not treated properly leads to ugly deformity¹. A variety of methods of treatment for displaced fractures have been recommended including²;

Closed reduction and immobilization.

Traction by various methods.

Closed reduction and percutaneous pinning.

Open reduction & stabilization with Kirschner wires.

The aim of treatment is to gain a functional and cosmetically acceptable upper limb with a normal range of motion². In some studies the different treatment modalities were analyzed and percutaneous fixation of supracondylar fractures was reported to be a good technique but open reduction and internal fixation of severely displaced fractures is still a widely acceptable method^{2,3}. Anatomical reduction, rigid fixation and immediate mobilization give the best functional outcome⁴.

Treatment of supracondylar fracture was controversial, technically difficult and often associated with high complication rate². In the past some of the orthopaedic surgeons were reluctant to use this form of treatment as a primary method because of operative complications¹.

Although these complications are the results of excessive manipulation and not because of operative procedure itself^{5,6} but according to other studies major complication of surgical management of supracondylar fractures of distal humerus appears to be a loss of range of motion and the reason given in the past for this was the use of a posterior approach^{1,7}. Re-displacement of the fracture has been reported to be significant after the use of lateral wires⁷. With improvement in operative techniques and more experience with surgical intervention, primary open reduction is rapidly becoming an acceptable method of treatment in severely displaced supracondylar fracture of the humerus in children¹. Different surgical approaches have been described in the literature including posterior, anterolateral, anteromedial, medial and lateral³. But open reduction and internal fixation of supracondylar fractures through a medial approach is preferred because it provides a better exposure for identification of ulnar nerve thus minimizing the chances of damage and the ideal reduction of the fracture is achieved because the commonly seen medial displacement and internal rotation can be conveniently reduced under vision^{2,3,8,9,10}. The medial approach also produces a cosmetically acceptable scar over a concealed area. This approach has been favoured in different studies for the treatment

of supracondylar fractures^{2,3,11}.

In different studies good results were reported with primary open reduction and internal fixation of severely displaced and complicated supracondylar fractures of humerus in children with^{2,3,12,13,14,15,16}.

The advantages of open reduction and internal fixation for type III supracondylar fracture of humerus includes reduced hospital time, more stable fixation and good anatomical reduction with minimal complications². So the objectives of this study are to determine the surgical approach most suitable for these fractures by comparing the results of medial approach with the lateral approach. Evaluation of the results is based upon the functional outcome and elbow cosmesis.

PURPOSE OF STUDY

The aim of our study is to compare the results of medial and lateral approaches regarding per-operative technique and functional outcome. So the objectives of our study are to: (1) To Determine the surgical approach most suited in our setup. (2) To evaluate the results based on the functional and cosmetic outcome especially in the range of motion, the subsequent deformity, if any, and the carrying angle.

MATERIAL AND METHOD

Thirty patients were included in this study and study was carried out in the department of Orthopaedic surgery, Nishtar Hospital, Multan during the period of two years.

Inclusion criteria

Patients between 4-12 years of age were included in the study. Both male and female patients were included. All patients with severely displaced Gartland type-III extension type supracondylar fractures of humerus were included.

Exclusion criteria

All patients with Gartland type-I and II fractures. All open fractures. Patients with associated injuries like head injury and polytrauma patients.

Statistical analysis

The statistical analysis was done with the help of SPSS-

Famopsin

Famotidine 40mg / 20mg



DOSAGE:

Active Duodenal Ulcer : The recommended initial dose is 40mg Famopsin daily at bed time for 4 to 8 weeks (Most patients heal within 4 weeks.).

Prevention of Relapse of Duodenal Ulcer : Famopsin 20mg daily at bed time.

Benign Gastric Ulcer : The recommended dose of Famopsin is one 40 mg tablet daily taken at night. Treatment should continue for 4-8 weeks, unless endoscopy reveals earlier healing.

Persistent Dyspepsia/Pancreatic Insufficiency : The recommended dosage is one Famopsin 20mg tablet only once or twice daily before meal.

Gastroesophageal Reflux Diseases : One Famopsin 20mg tablet twice a day preferably with meal for as long as clinically indicated.

Zollinger-Ellison Syndrome : The recommended initial dosage by mouth is one Famopsin 20mg/40mg tablet every 6 hours. Doses should be adjusted to individual patients needs and should continue as long as clinically indicated.

Contra-indications : Famopsin is contra-indicated in patients with a history of previous hypersensitivity to Famotidine.

Side Effects: Famopsin is generally well tolerated, however, headache, dizziness, constipation and diarrhoea have been reported rarely.

Presentation: Famopsin tablets are available in 20mg and 40mg strengths for oral use in blister pack of 20's and 10's respectively.



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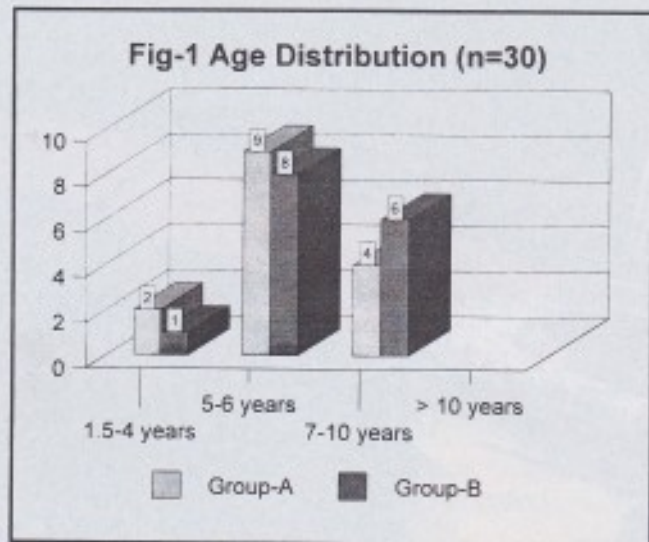


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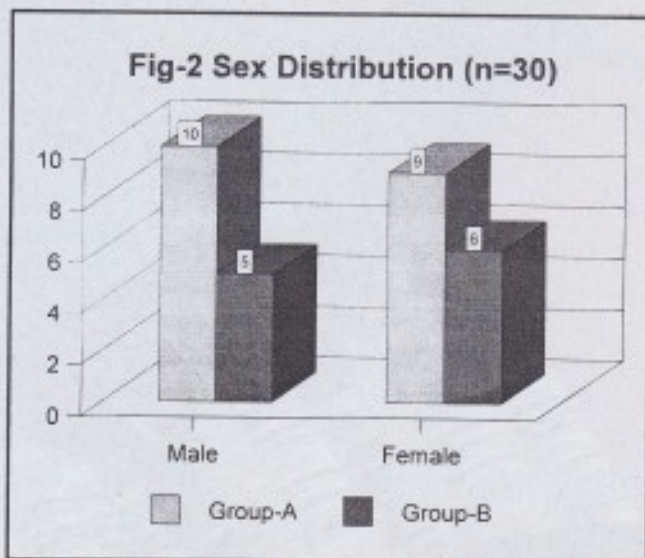
10 and frequencies and percentages were calculated.

RESULTS

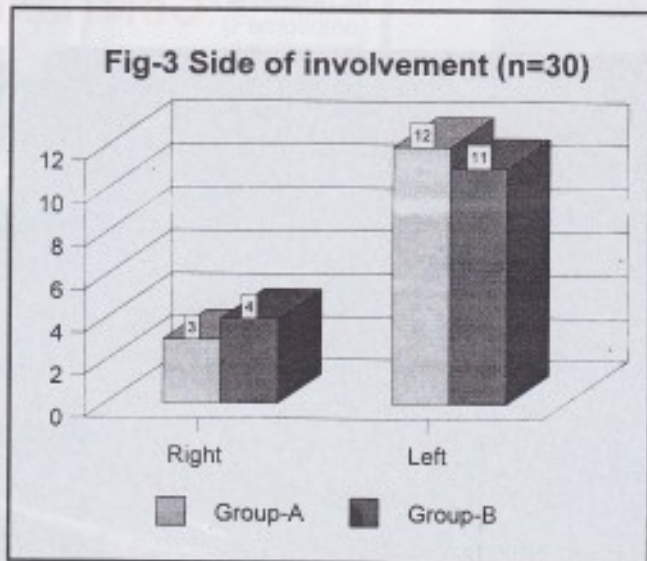
The age of the patients included in our study ranged from 4-10 years with a mean age of 5.93 years in group A and 6.66 years in group B. All the patients were relatively healthy before injury and causes of the injuries included fall from heights/bicycle (76.6%) and motor vehicle accident (23.3%) in both groups (Fig-1).



Out of 30 patients, 10 males in group-A and 9 in group B where as 5 females in group-A and 6 females in group B were found (Fig-2).



Fracture was found in right side in 3 cases from group-A and 4 cases from group B, whereas left side involvement was found in 12 cases from group-A and 11 cases from group-B (Fig-3).



All the patients were relatively healthy before injury and causes of the injuries included fall from heights/bicycle (76.6%) and motor vehicle accident (23.3%) in both groups (Table-I).

Mode of injury	Group A	Group B	%age
Fall from height	12 (73.3%)	11 ((80%)	76.66%
Motor vehicle accident	3(20%)	4(26.6%)	23.33%
Miscellaneous	-	-	-

The average delay between the injury and operation was 12 hours and average operation time ranged from 45 minutes to one hour in both groups. According to Flynn et al criteria, on evaluation of these cases at final follow-up 11 patients (73.3%) showed an excellent results with a 0°-135° range of motion at elbow and a loss of less than 5° of carrying angle (Table-II).

Three patients (20.2%) showed a good results and one patient (6.66%) showed fair results in group A. In group B nine patients (60.0%) showed excellent results, four

patients (26.6%) showed a good results and two patients (13.3%) showed fair results. Opposite healthy limb was used as a control. Few minor complications were noted in this study including pin tract infection and superficial wound infection in both groups. These were superficial infections which were controlled with wound wash and use of appropriate antibiotics. All the fractures were healed (Table-III & IV).

DISCUSSION

Primary open reduction is rapidly becoming an acceptable method of treatment in completely displaced supra condylura fracture of the humerus in children^{2,3,15}. In the past most of the orthopaedic surgeon were not using this form of treatment as a primary method because of high rate of operative complications¹, although these complications are the results of excessive manipulation leading to soft tissue damage and not because of operative procedure itself⁶. It has now become a safe and effective procedure for certain appropriate indication³. Open reduction and internal fixation is still a relatively less expensive method and

patient's hospital stay is minimal². Open reduction has become an essential mode of treatment in Gartland type-III supracondylar fracture of humerus now a days. In different studies good results were reported with primary open reduction and internal fixation of displaced and complicated supracondylar fracture of humerus in children^{2,3,15,17}.

Table-II. Complications of surgery (n= 30)

Complications	Group A	%age	Group B	%age
Superficial wound infection	1	66.66	1	6.66
Deep wound infection	-	-	-	-
Myositis ossifican	-	-	-	--
Pin tract infection	1	6.66	2	13.33
VIC	-	-	-	-

Table-III. Evaluation of results in group-A (n = 15)

Overall grade	Elbow function loss of flexion/extension(degrees)	Elbow cosmesis carrying angle change (degree)	Group A	%age
Excellent	0 - 5	0 - 5	11	73.33%
Good	6 - 10	6 - 10	3	20%
Fair	11 - 15	11-15	1	6.66%
Poor	>15	>15	0	0

Table-IV. Evaluation of results in group-B (n = 15)

Overall grade	Elbow function loss of flexion/extension(degrees)	Elbow cosmesis carrying angle change (degree)	Group B	%age
Excellent	0 - 5	0 - 5	9	60%
Good	6 - 10	6 - 10	4	26.66%
Fair	11 - 15	11-15	2	13.33%
Poor	>15	>15	0	0

Table-V. Details of cases in group a operated through medial approach

Case	Age	Sex	Side	Mode of injury	Complications	Elbow function loss (Degree)	Carrying angle change (degree)	Overall grades						
1	5	M	R	Fall	Nil	5	5	Excellent						
2	4	F	L	Fall	Nil	4	0	Excellent						
3	6	F	L	Fall	Pin tract infection	10	8	Good						
4	4	M	L	MVA	Nil	5	4	Excellent						
5	5	M	R	Fall	Nil	4	0	Excellent						
6	7	M	L	Fall	Nil	0	5	Excellent						
7	8	F	L	Fall	Nil	0	5	Excellent						
8	6	M	L	Fall	Superficial wound infection	12	11	Fair						
9	5	M	L	MVA	Nil	4	5	Excellent						
10	9	F	L	Fall	Nil	5	0	Excellent						
11	8	F	L	Fall	Nil	0	4	Excellent						
12	6	M	L	Fall	Nil	5	5	Excellent						
13	5	M	R	MVA	Nil	8	7	Good						
14	5	M	L	Fall	Nil	10	8	Good						
15	6	M	L	Fall	Nil	4	0	Excellent						
Mean loss of elbow function (degrees) :			4.46			Mean change of carrying angle (degrees):			5.06			Mean age: 5.93 years		

Table-VI. Details of cases in group b operated through lateral approach

Case	Age	Sex	Side	Mode of injury	Complications	Elbow function loss (Degree)	Carrying angle change (degree)	Overall grades						
1	4	F	L	MVA	Nil	5	4	Excellent						
2	5	M	R	Fall	Nil	8	7	Good						
3	7	M	L	Fall	Nil	4	0	Excellent						
4	6	M	L	Fall	Nil	5	5	Excellent						
5	8	F	L	MVA	Pin tract infection	13	12	Fair						
6	5	F	R	Fall	Nil	4	5	Excellent						
7	6	M	L	Fall	Nil	6	8	Good						
8	6	F	L	Fall	Nil	0	5	Excellent						
9	9	M	R	Fall	Pin tract infection	11	12	Fair						
10	6	F	L	MVA	Nil	5	4	Excellent						
11	8	M	R	Fall	Nil	5	0	Excellent						
12	5	M	L	Fall	Nil	0	5	Excellent						
13	10	M	L	Fall	Superficial wound infection	10	8	Good						
14	6	F	L	MVA	Nil	5	3	Excellent						
15	9	M	L	Fall	Nil	8	7	Good						
Mean loss of elbow function (degrees) =			5.66			Mean change of carrying angle (degrees) =			5.93			Mean age = 6.66 years		

Incidence of infection, neurovascular injury and myositis ossification has been reported minimal in surgical experience by many authors¹⁹.

In this study 15 patients were treated with open reduction and internal fixation through medial approach and 15 patients through lateral approach respectively. There was no significant statistical difference and the results showed a satisfactory clinical outcome in both groups. Although there was no significant difference in both groups regarding range of motion but there were many per-operative advantages in group A like identification of ulnar nerve and its protection during placement of crossed Kirschner wires^{2,3,9} and a cosmetically acceptable scar in cases operated through medial approach as compared to the cases of lateral approach¹¹.

The lateral approach has been favoured by different authors in the literature including Weiland, Pirone^{19,20}. Crossed K-wire fixation is biomechanically more stable as compared to the two lateral wires²¹.

Mazda K showed excellent results in 92% of cases, O Hara LJ, Danielsson L, Khan T, Shifrin and Rehana gave good results with a medial approach^{2,3,8,9,10,11}.

Gruber & Hudson, Alonso Llamas, Ramsey & Griz and Shifrin favoured open reduction and internal fixation for supracondylar fractures of humerus^{5,6,10,14}. Open reduction and internal fixation is a safe and effective mode of treatment with a less hospitalization time, more stable fixation and with decreased rate of complications².

CONCLUSIONS

Open reduction & internal fixation of displaced supracondylar fractures of humerus is an acceptable method of treatment in our setup. Statistical difference was insignificant between medial and lateral approaches but medial approach has significant clinical difference regarding per operative advantages and cosmetic outcome. Medial approach is preferred in order to visualize the ulnar nerve during reduction, with the minimum of dissection. Cross pinning is used as the method of fixation and the medial wire is introduced on the anterior aspect of the medial epicondyle because it is easy and safe. There is also a biomechanical advantage

of crossed pins as opposed to two lateral pin fixation.

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**NOTHING CAN HARM A GOOD MAN,
EITHER IN LIFE OR AFTER DEATH.**

Socrates