

# THE RESULTS OF PERCUTANEUS TRANSOLECRANON AND LATERAL KIRSCHNER WIRES FIXATION FOR SUPRACONDYLAR HUMERAL FRACTURES IN CHILDREN

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## INTRODUCTION

Supracondylar fracture is an injury of the distal metaphysis of the humerus which almost always present in children under 10 years old with an immature skeleton. Additionally, the growing skeleton frequently exhibits laxity of the ligaments with elbow hyperextended, which concentrates a bending stress on the vulnerable supracondylar region. Gartland classified supracondylar fractures of the humerus in children into 3 types: Type I undisplaced fracture, type II displaced fracture with intact cortex posteriorly, and type III displaced without cortical contact. Closed reduction and percutaneous fixation by k.wires is the best surgical intervention for displaced pediatric humeral S.C fractures. The best pin configuration is still debatable, even though the existing evidence consistently indicates that a fracture can be stabilised with two or three K-wires. Options include lateral pins only, 2 lateral pins paired with 1 medial pin, or medial and lateral crossing pins. A divergent, parallel, or convergent insertion pattern is possible for lateral pins. Transolecranon and lateral wires is a new technique that can be used.

## AIM OF THE WORK

To evaluate the results of transolecranon and lateral Kirchner wires percutaneous fixation of supracondylar humeral fractures in children.

## PATIENTS AND METHODS

A prospective case series, single Centre study in Alexandria University Hospitals from June 2021 to december 2022. It included 30 patients. Table 1

All the children with displaced supracondylar fractures of humerus were admitted and injured elbow was immobilized in splint with elbow in 90 to 120 degrees of extension, elevation and ice compression were advised. Standard radiographs were done before and after surgery including an anteroposterior (AP), lateral, oblique views and forearm X-rays were done. Surgery is done under general anesthesia. Closed reduction done is done and fter acceptable reduction Two Kirschner wires were inserted for fixation with flexion of elbow to about 90°; The first one was placed from the lateral column in the A-P position with the elbow fully flexed across the fracture at a 30° to 40° angle to the opposing cortex of the humerus. The second wire was placed in lateral position and vertically inserted across the fracture through the olecranon into the humeral metaphysis. (FIG.1)

After assessment of stability, the wires were bent and cut. Elbow was immobilized in a plaster of Paris back slab in 90° of flexion. Postoperatively, wires were removed in 3 or 4 weeks (according to age of the patient) if there was radiological and clinical evidence of bone union. The child returned 6 weeks postoperatively for a range of motion check, and radiography at that time. At the three months follow up children were evaluated for full function according to carrying angle and elbow range of motion using the criteria of Flynn. (table 2)

Table 1: Demographic data

	No. (n=30)	%
Gender		
Male	16	53.3
Female	14	46.7
Age		
Range (Min.-Max.)	3-12	
Mean±SD Median	5.83±2.53	
Side		
Lt	14	46.7
Rt	16	53.3
Mode of trauma		
FOOH	23	76.7
FFH	7	23.3
Gartland type		
II	12	40
III	18	60



Figure 1: Reduction and wires insertion

Table 2: The Flynn grading system

Grade	Cosmetic factor (carrying angle loss)	Functional factor (range of ovement loss)	No. (%) of patients
Satisfactory Excellent	0°–5°	0°–5°	35 (70)
Good	6°–10°	6°–10°	9 (18)
Fair	11°–15°	11°–15°	2 (4)
Unsatisfactory Poor	>15°	>15°	4 (8)

## RESULTS

30 patients with displaced supracondylar humerus fracture were treated and followed up until achieving fracture union, getting functional ROM and recovering from any complication during the study. 12 patients (40%) had the wires removed by 3rd week, 18 patients (60%) the wires removed by 4th week and there is a positive Relationship between age and time of union. The mean follow up was 6 months, patients were assessed according to Flynn's criteria for grading and the final results were: 25 patients had excellent results (83.3%), 3 had good results (10%), 2 had fair results (6.7%). **Table 3** Among the 30 patients, 2 of them had pin tract infection which discovered during removal of the wires and treated by pin site cleaning by removal of crusts and repeated dressing and 1 patient had a mild degree of cubitus varus. Among 12 patients which were type II, 10 had excellent results, 1 had good, 1 fair and no poor results while among 18 patients which were type III, 15 had excellent results, 2 good, 1 fair and no poor results and the type of fracture didn't affect the results and was found to be statistically insignificant. (**table 4**) According to patient's age, Excellent results presented in 9 patients < 5 years, 14 patients aged between 5 and 10 years, and 2 patients > 10 years while good results presented in 3 patients aged between 5 and 10 years, and fair results presented in 1 patient <5 years and 1 patient aged between 5 and 10 years. So Results were not affected by patient's age as it was found to be statistically insignificant. (**Table 5**)

Table 3: Cases according to overall end result (n = 30).

#Overall end result	No.	%
Satisfactory	30	100
Excellent	25	83.3
Good	3	10.0
Fair	2	6.7
Unsatisfactory	0	0.0
Poor	0	0.0

Table 4: Relation between final results and type (n = 30)

	Final results						X <sup>2</sup>	MC <sub>p</sub>
Type (gartland)	Fair (n = 2)		Good (n = 3)		Excellent (n = 25)			
	No.	%	No.	%	No.	%		
II	1	50.0	1	33.3	10	28.0		
III	1	30.0	2	66.7	15	72.0	7.954	0.005

Table 5: Relation between final results and age (years) (n = 30)

	Final results						Test of sig.	P
Age (years)	Fair (n = 2)		Good (n = 3)		Excellent (n = 25)			
	No.	%	No.	%	No.	%		
<5	1	50.0	0	0.0	9	36.0	X <sup>2</sup> = 2.974	MCp= 0.709
5 – 10	1	50.0	3	100.0	14	56.0		
>10	0	0.0	0	0.0	2	8.0		
Min. – Max.	3.0 – 7.0		6.0 – 9.0		3.0 – 12.0		F= 1.305	0.288
Mean ± SD.	5.0 ± 2.83		8.0 ± 1.73		5.64 ± 2.55			
Median	5.0		9.0		5.0			

## CONCLUSION

Transolecranon and lateral Kirschner wires fixation was an effective option that provides good stability with little number of trials in management of supracondylar fracture of the humerus in children, and the risk of nerve injury, or fishtail deformity (Dissolution of distal humerus) were avoided.