

Outcomes of Two Techniques; Crossed K-Wiring VS Lateral K-Wiring in Supracondylar Fractures

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Crossed VS
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in Supracondylar
Fractures

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ABSTRACT

Objective: To determine outcomes of two techniques; crossed k-wiring versus lateral k-wiring in supracondylar fractures in our setup.

Study Design: Descriptive study.

Place and Duration of Study: This study was conducted at the Hanif Hospital, Karachi for period of one year from March 2023 to March 2024.

Methods: The inclusion criteria involved patients presenting in emergency with supracondylar fractures of elbow in children age 5yrs-13yrs. Patients not included were the patients with only soft injury and debridement planned, patients with open fractures or patients with previous history of any other wound infection. The sample size was n=50 patients.

Results: Out of 50 patients analyzed the mean age of patients was 6.82 ± 1.42 yrs. There was n=28(56%) males and n= 22(54%) females. Mostly supracondylar fractures were Gartland type-2 and 3 in both groups A and B, all the patients nearly achieved radiological union and functional union with excellent results mostly according to Flynn's classification of functional outcome and radiological union. Only 1 patient presented with iatrogenic nerve injury in crossed wire technique and with almost superficial minor wound infections in two groups were managed with oral medications and wound care.

Conclusion: Supracondylar fractures are commonest fractures in children and can be managed with both techniques of cross k-wiring and lateral k-wiring with no statistical difference between two techniques and mostly with excellent outcomes and rare complications.

Key Words: Supracondylar, k-wiring, Supracondylar Fractures

Citation of article: Usmani MS, Faisal Z, Zulfiqar F, Zia MK, Jafri SNA, Saad A. Outcomes of Two Techniques; Crossed K-Wiring VS Lateral K-Wiring in Supracondylar Fractures. Med Forum 2024;35(5): 65-68. doi:10.60110/medforum.350514.

INTRODUCTION

Distal supracondylar humeral fractures are the commonest fractures contributing to nearly 60% of all pediatric elbow fractures in children from 5-7yrs of age¹⁻⁵. Incidence was most commonly seen among males with commonest cause is the fall on outstretched hand.

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Received: April, 2024

Accepted: April, 2024

Printed: May, 2024

Generally, the fractures are treated conservatively in children requiring surgical treatment if there is neurovascular compromise, open fractures and epiphyseal injuries. Mostly there are extension type of fractures 70% of cases while in older children flexion type of supracondylar fractures are more common⁵⁻¹⁰. Recent advances in recreational equipment's for reduction of supracondylar fractures have slightly reduced its incidence and still reports of fractures and complications associated with them are reported⁷⁻¹⁰. Nerve involvements (9%), vascular compromise (12%), associated fractures (9%) or malunion, pucker sign (9%)^{5,6}. Li Jin reported in 2020 study favorable prognosis with k-wiring in patients with displaced supracondylar fractures with fracture healing in 10weeks and no complications reported⁷. Khan et al has reported 4-6 weeks' time with patients had outstanding outcomes in 71.43%, 22.86% with good and 5.72% with fair outcomes. Only 3 patients had pin infection while no other postoperative complications were reported with k-wiring⁹. A meta- analysis of patients in 2020 has found increased stabilization and reduction with improved reconstruction in patients undergoing open reduction internal fixation with plating

methods^{10, 11}. In comparative study by Rakha et al has found 89.23% patients in open reduction and those with closed reduction 93.85% in closed reduction group were effectively treated with no statistical difference between two groups was noted¹²

METHODS

This descriptive study was conducted in Hanif hospital for period of one year from March 2023 to March 2024. The ethical committee approval was taken after taking consent. The sample size was n=50 patients. The inclusion criteria involved patients presenting in emergency with supracondylar fractures of elbow in children age 5yrs-13yrs. Patients not included were the patients with only soft injury and debridement planned, patients with open fractures or patients with previous history of any other wound infection. Patients had x-rays done and were then grouped for procedure accordingly in two groups. Patients were grouped into group A undergoing crossed K-Y wiring after reduction of fractures with one wiring done from medial condyle and other from the lateral epicondyle while the other group B after reduction were fixed with lateral condyle with two 2mm K- wires parallelly in a diverging way. The sample size taken was 50 patients with 25 in each group. Patients were followed for the immediate and delayed complications of wound infection, radiological union by Baumann’s angle, functional union categorized according to Flynn’s criteria and iatrogenic nerve injury.

Data was analyzed in SPSS version 22 after analyzing. All the quantitative and qualitative variables were computed and analyzed. The patients’ demographics age, gender, type of fracture with Gartland classification, associated injuries and neurovascular involvement were computed and analyzed. Postoperatively the wound healing in both the groups the functional and radiological union and nerve injury, were also analyzed between the two groups and chi-square testing was applied with p-value <0.05 was taken as significant. Functional and radiological outcome was checked with Baumann’s and Flynn’s criteria classified as excellent, good and fair.

RESULTS

Out of 50 patients analyzed the mean age of patients was 6.82 ±1.42yrs. There was n=28(56%) males and n=22(54%) females with male to female ratio of 1.2:1. the average of male and females was nearly same. Mostly supracondylar fractures were Gartland type 2 and 3 (table 1).

Patients in group A, fractures with crossed k-wires were fixed after reduction, while the group B fractures were with two k-wires in a divergent way with 2mm size wires from lateral epicondyle. image intensifier was used under general anesthesia for reduction of both types of fractures. All the patients nearly achieved

radiological union and functional union with excellent results in n= 15, good results in n=6 and fair results in few n=4 in group A and n=18 excellent, good in n=5 and n=2 fair in group B (fig.1).

Table No.1: Demographic details with frequency and percentage.

Demographics	n= Frequency (percentages)
Age in yrs. ± SD	6.82 ±1.42yrs
Gender	
Male	28(56%)
Female	22 (44%)
Age range	
5-7yrs	38(76%)
8-10yrs	12(24%)
Fractures types	
Gartland type II	23(46%)
Gartland type III	27(54%)
Radiological outcome by Baumann’s angle	72.29± 5.1

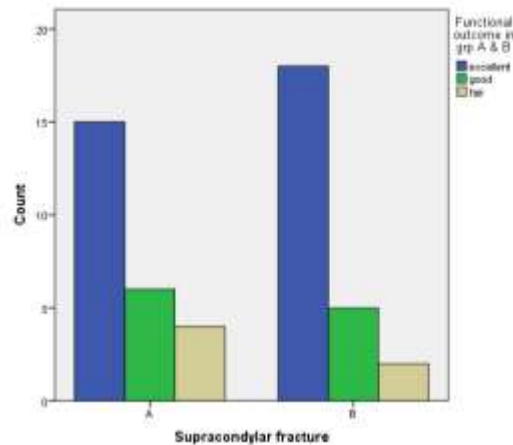


Figure No.1: Supracondylar fracture

Table No.1: Correlation of two groups

Variables	Groups A	Groups B	P value
1. Functional outcome			
Excellent	15	18	0.597
Good	6	5	
Fair	4	2	
2. Radiological outcome By Baumann’s angle			
Normal 61-81°	24	23	0.552
Abnormal > 82°	1	2	
3. Nerve injury			
Yes	1	-	0.312
no	24	25	
4. Wound infection			
Yes	1	1	1.000
No	24	24	

There was no statistically significant correlation between two groups 0.597.(table 2) Our study also showed only n=1 patient who had iatrogenic nerve injury with crossed wire technique but no statistically significant correlation was found between two groups with p-value of 0.312.(table 2) There was mild superficial wound infection found in both groups which was managed with oral antibiotics and local wound care. There was no statistically significant correlation between two groups p-value of 1.000. (table 2)

DISCUSSION

Elbow injuries accounts for 60% of all fractures with commonest site involved in children¹⁰⁻¹⁵. The most common mechanism involved is the low energy traumatic injuries. The main aim of supracondylar fractures is to reduce by closed or open method of reduction and maintaining reduction without any injury to nerve. Most common treatment modality is the closed reduction and pinning with image intensifier¹⁵⁻¹⁷. In our study too, patients presented mostly with Gartland type II and type III supracondylar fractures and were managed with two methods.

Mostly age of children was 6.82 ± 1.42 yrs in our study. Rakha et al¹² has also found most common age to be 7.28 ± 1.74 to 7.37 ± 1.88 yrs in patients enrolled in open and closed reduction done for supracondylar fractures. Raza et al in his descriptive case series has also found most common age to be involved 5-7 yrs with 78.3% males and 21.7% females in patients presenting after fall from playing¹³. In our study the male to female ratio was 1.2:1 which was same as mostly found in other studies¹²⁻¹⁵.

Studies have shown that patients managed with closed technique and open methods done if image intensifier was not available; had no statistical difference between two methods¹⁵⁻²⁰. Another meta-analysis also shows no difference between two techniques however risk of iatrogenic nerve injuries has been seen crossed wire technique compared to lateral wire fixation¹⁷. While some studies have shown Ulnar and median nerve injuries with k wiring method¹⁴⁻¹⁶. Our study also showed only 1 patient who had iatrogenic nerve injury with crossed wire technique but no statistically significant difference between two groups was found.

However, in our study two methods of closed reduction when compared do not show any statistical correlation when compared with functional and radiological outcomes. A study by Shahid et al has found no statistical difference when two methods of closed reduction with crossed wire and lateral pinning method in stabilization and fixation of injury¹⁴. Patients in our study have minor superficial infections which were managed with oral antibiotics and local wound care.

Our study therefore has shown that both methods are useful and show no statistically significant difference between two groups.

CONCLUSION

Supracondylar fractures are most common fractures in children and can be managed with both techniques of cross k-wiring and lateral k-wiring with no statistical difference between two techniques and mostly with excellent outcomes and rare complications.

Author's Contribution:

Concept & Design of Study:	Muhammad Saad Usmani
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Data Analysis:	Muhammad Khurram Zia, Syed Nusrat Ali Jafri, Alvia Saad
Revisiting Critically:	Muhammad Saad Usmani, Zeeshan Faisal
Final Approval of version:	Muhammad Saad Usmani

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 'Nil' dated 15.02.2023

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