



Health Outcomes of Elbow Fractures in Iraqi Children and Assessment of Risk Factors

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Abstract: Background: Fractures of the elbow are the most common, accounting for 14 percent of fractures in children.

Objective: We contributed to the evaluation of health findings related to children with elbow fractures and the identification of risk factors and effects on children who participated in this study.

Methods: A cross-sectional study was conducted on Iraqi paediatric patients with elbow fractures who attended the emergency department of hospitals in Baghdad, Iraq. The patients were aged between 5 and 16 years old, and a total of 72 samples were included in the study. This study documented the clinical and demographic outcomes of paediatric patients. A univariate analysis was conducted to identify the risk factors affecting the health status of Iraqi children.

Results: A total of 72 children were included in the study, with the objective of analysing the clinical outcomes of elbow fractures. The age group with the highest number of recorded cases was that of 13- to 16-year-olds, representing 44.44% of the total. There were 47 cases of boys and 25 cases of girls. The most common type of elbow fracture was the supracondylar fracture, which accounted for 47.22% of cases, followed by the right elbow fracture (56.94%) and the left elbow fracture. The most common cause of elbow fractures was identified as falls onto an outstretched arm, accounting for 43.06% of cases. Among the patients who underwent intervention, 40 underwent open reduction, and 32 underwent internal fixation (ORIF). The success rate was 76.39%.

Conclusion: In general, ORIF and CRPP are the best procedures among all others for treating fractures in the elbow of children.

Key words: Elbow fractures; Iraqi children; Risk factors; and Complications.



1. INTRODUCTION

Elbow injuries are a common occurrence in the paediatric population, accounting for 5 to 10% of all fractures in children [1]. They are more prevalent in males, with the majority of cases resulting from falls with the limb in extension. [2,3]

Supracondylar fractures, T-condyle, lateral condyle, capitellum, medial condyle, trochlea, medial epicondyle, lateral epicondyle, olecranon, the radius neck, and Monteggia luxation fractures are among the injuries that can be seen in the elbow region of the pediatric population [4,5,6]. The medial epicondyle, lateral condyle, and supracondylar fractures are the three most prevalent kinds. [7]

Between sixty-five and seventy percent of all pediatric fractures are upper limb fractures, with 8 to 10 percent affecting the elbow area [8]. A trauma hospital must be involved in the treatment of pediatric elbow fractures because they provide a serious challenge [9, 10]. Elbow fractures occurred at a rate of 30.8 per 10,000 people annually [11]. A fall caused by an extended hand is the primary cause of most injuries [12]. Elbow fracture complications include stiffness, neurovascular damage, particularly to the ulnar nerve, and faulty consolidation or pseudoarthrosis in the fracture fragments. Determining the aetiology is essential because children's activities varied significantly among nations. [13, 14]

2. PATIENTS AND METHODS

During a one-year follow-up period from January 2023 to August 2024, 72 pediatric patients having elbow fractures who visited emergency surgery departments at hospitals in Baghdad, Iraq, were selected for this cross-sectional study. Children below 16 years old, those who had surgery with 24 hours of the incident, and those who had previously sustained an elbow injury were all considered for inclusion. However, people with chronic bone disease, fractures that are open, and significant neurovascular damage caused by trauma were excluded. Patients with more than two years of follow-up and type 4 or type 5 fractures were not included. Preoperative internal oblique radiography of every patient were taken, quantified for displacement, and documented.

Several experienced orthopedic surgeons (MDs) performed the surgery. All clinical evaluations and radiological measures were carried out by a skilled orthopedic surgeon that was not engaged in the procedure. At Baghdad Hospital in Iraq, 72 people had surgeries between 2023 and 2024. The surgical team decided either to perform an open or closed reduction. All diagnosed patients underwent a neurovascular assessment and had outcomes recorded after arriving at the emergency room.

Within 24 hours after arriving at the hospital, patients had surgery. Nonetheless, C-arm scopy was utilized for all operations, and the patient was always in the supine position. Each patient received a tourniquet, which was only inflated in the event that closed reduction was not possible. In every instance, closed reduction was tried. Open reduction was used to continue the process. Percutaneous lateral pinning was done after a lateral incision in individuals who needed open reduction. The limb was splinted in 80–90 degrees in flexion for four weeks after surgery. At six weeks, patients come back for follow-up.

3. RESULTS

Table 1. Identify demographic and basic characteristics of children with elbow fractures.

Items	Parameters	Patients, 72	Percentage, %
Age	5 – 8	18	25.0%
	9 – 12	22	30.56%
	13 – 16	32	44.44%
Gender			



	Boys	47	65.28%
	Girls	25	34.72%
BMI, Kg/m ²			
	Underweight	6	8.33%
	Normal weight	41	56.94%
	Overweight	15	20.83%
	Obese	10	13.89%
ASA classification			
	ASA I	14	19.44%
	ASA II	28	38.89%
	ASA III	30	41.67%
Socioeconomics			
	Lower – class	16	22.22%
	Middle – class	36	50.0%
	High – class	20	27.78%
Income status, \$			
	< 600	13	18.06%
	600 – 1000	42	58.33%
	> 1000	17	23.61%

Table 2. Elbow fractures data.

Items	Classifications	Patients, 72	Percentage, %
Types			
	Supracondylar	34	47.22%
	Type 1	20	27.78%
	Type 2	10	13.89%
	Type 3	4	5.56%
	Olecranon	24	33.33%
	Radial head	14	19.44%
Location			
	Right	41	56.94%
	Left	31	43.06%
Causes			
	Falls onto an outstretched arm	24	33.33%
	Direct impact to the elbow	16	22.22%
	Sports-related injuries	20	27.78%
	Accidents such as bicycle falls or playground mishaps	12	16.67%

Table 3. Enrol data of children with elbow fractures in terms of radiologic and clinical outcomes.

Items	Classifications	Patients, 72	Percentage, %
Intervention			
	Open reduction and internal fixation (ORIF)	40	55.56%
	Closed reduction with percutaneous pinning	32	44.44%
Lateral Spur			
	Yes	34	47.22%



	No	38	52.78%
Fishtail Deformity			
	Yes	7	9.72%
	No	65	90.28%
Deformity			
	Varus	58	80.56%
	Valgus	19	26.39%
Satisfaction status			
	Excellent	55	76.39%
	Very good	8	11.11%
	Moderate	5	6.94%
	Poor	4	5.56%
Displacement (mm)		3.42 ± 1.21	
Ulnohumeral Angle (mm)		11.62 ± 5.20	

Table 4. Postoperative complications.

Complications	Patients, 72	Percentage, %
Infection	4	5.56%
Delayed healing	1	1.39%
Avascular necrosis	1	1.39%
Nonunion	0	0.0%
Fishtail deformity	1	1.39%
Lateral spurs	2	2.78%
Total	9	12.5%

Table 5. A univariate analysis of risk factors affecting children with elbow fractures.

Risk factors	Univariate analysis	
	OR	CI 95%
Types of fractures	2.18	1.44 – 4.86
Causes	1.19	0.71 – 2.94
Density of bones	3.71	2.81 – 5.64
Location	2.64	1.79 – 3.23
Intervention	3.71	2.89 – 4.38
Infection	4.90	2.77 – 6.05
Stiffness in the joint	3.56	2.65 – 5.99

4. DISCUSSION

Our study's conclusions show that, when it comes to orthopaedic treatments, there is no discernible difference in the effectiveness in closed reduction with percutaneous pinning (CRPP) and open reduction with internal fixation (ORIF). The results really show that CRPP can be a less invasive surgery that requires less anesthesia and leaves fewer scars.

[15,16,17,18] An older source, from which the literature evaluation was derived, said that CRPP is the recommended therapy for all stage 3 fractures and that conservative care would be appropriate for fractures in phases 1 or 2. While open reduction is mostly appropriate for stage 5 fractures, either



closed as well as open reductions are advised for stage 4 fractures. In our clinic, fractures that are categorized as phases 1, 2, and 3 are managed conservatively. Those in stages 4 and 5, on the other hand, are treated in phases.

In our study, we found that the problems associated with surgically treating elbow fractures were rather modest, affecting just 12.5% in patients, of whom two experienced lateral spurs and four experienced infections.

The results of the research show that the development of lateral spurs was the most common complication seen in individuals who had orthopedic surgeries. [19, 20] The development of lateral spurs was observed in 36% of the individuals who had surgery. Thankfully, our results show that individuals who had open surgery had a significantly higher incidence of lateral spurs. It was a noteworthy bad incident, nevertheless. There was no need for surgery during the following follow-up period since the disease did not cause any limitations in function that were clinically significant.

[21,22,23] In accordance with several studies, most people that indicate having a fishtail deformity suffer from discomfort and limited mobility. It was determined that people having radial head dislocation had worse clinical outcomes, requiring surgical repair. A different study, however, found no functional or clinical damage as a result of this abnormality.[24] According to another study, fishtail deformity may eventually result in early-onset osteoarthritis, even if it does not cause any problems in the early stages.

[25, 26, 27] According to several research, the majority of the 15 individuals who had fishtail deformity had discomfort and mobility restrictions. They said that individuals having radial head dislocation had poor clinical results and required surgery to fix the problem. However, according to different research, there were no functional or clinical restrictions brought on by this abnormality. While fishtail deformity is not problematic in the early stages, it may eventually result in early arthrosis, according to another report [28].

The majority of the fifteen people who had a fishtail deformity who came in complained of discomfort and restricted mobility. The majority of patients suffering radial head dislocation experienced poor clinical outcomes, according to another research; in these circumstances, surgical correction was required [29,30,31]. However, according to different research [32], there are no functional or clinical limitations caused by this particular malformation. Although fishtail deformity doesn't cause any issues in its early stages, it eventually causes early arthrosis, according to another source [33]. Fishtail deformity was observed in 1.39% of the participants in the current investigation. Approximately 76.39% in these patients received an exceptional rating, while 11.11% received a decent rating based on the Hardacre criterion.

5. CONCLUSION

Both ORIF and CRPP appear to be the most effective procedures for treating elbow fractures in children, based on their accurate and successful clinical results, which include high healing rates, rapid recovery, a low complication rate (12.5%), and a high satisfaction rate (76.39%).

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