GMR
The Original

CLINICAL OUTCOMES AND COMPLICATION PROFILE OF DELAYED PRESENTATION IN PEDIATRIC SUPRACONDYLAR HUMERUS FRACTURES

Muhammad Ali Shah[1]*, Yousaf Gul[2], Dr Altaf Ahmed[3], Muhammad Ali[4], Umer Hayat[5], Naeem Hayat[6], Malik Basit[7]

[1]Professor and HOD Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan, dralishah72@gmail.com
[2]Associate Professor Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan
[3]Training Registrar Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan
[4]Trainee Medical Officer Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan
[5]Trainee Medical Officer Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan
[6]Trainee Registrar Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail khan
[7]Medical Officer Deportment of Orthopedic DHQ Teaching Hospital Gomal Medical College Dera Ismail kha

ABSTRACT

Objective: To determine the clinical outcomes and complication profile of delayed presentation in pediatric supracondylar humerus fractures.

Methods: The descriptive case series was carried out in the Orthopedic Ward and Trauma Center of DHQ Teaching Hospital, Deras Ismail Khan, from January 2024 to July 2025. Children aged 2–14 years with supracondylar humerus fractures who presented more than 24 hours after injury were consecutively sampled into the study (n = 171). All data were analyzed using SPSS version 26.0, and a p-value <0.05 was defined as statistically significant.

Results: In the present study, the mean age of participants was 7.8 ± 2.6 years, with a greater male predominance. The most common mechanism of injury was during a fall while playing, and the most common fracture was a Gartland type III fracture. Most patients were treated by closed reduction with percutaneous Kirschner-wire fixation, while one-third underwent open reduction. In almost all cases, fracture union occurred. The most frequent postoperative complications were pin tract infection and elbow stiffness.

Conclusion: Appropriate surgical management of delayed supracondylar humerus fractures can provide satisfactory clinical and functional results, despite the added operative complexity. Prompt treatment and early referral are crucial to reduce complications and to maximize recovery.

KEYWORDS: Pediatric supracondylar humerus fracture; Delayed presentation; Clinical outcomes; Complications

INTRODUCTION

Supracondylar humerus fractures constitute about 50-70% of children's elbow fractures, and nearly 15-20% of all fractures in childhood.[1] These are most commonly found in children aged 5 to 10 years, as the distal humerus is structurally weak at this stage and is a very active age group.[2] These fractures are broadly classified into Gartland types based on the displacement of the fracture, which helps to determine the treatment approach, which can be conservative or urgent surgical fixation.[3] The displaced fracture must be quickly detected and treated, as neurovascular compromise, compartment syndrome, malunion, and long-term functional impairment can rapidly develop.[4]

In recent years, the care of a supracondylar fracture in children has been significantly improved by the development of pediatric orthopedic surgery, anesthetic and imaging techniques.[5] The treatment guidelines now recommend prompt reduction and stabilization for fractures, especially those that are displaced, to restore the anatomical alignment and to reduce the incidence of complications.[6] The treatment for the majority of displaced injuries is closed reduction with percutaneous Kirschner-wire fixation, and the results are often very good when done within the proper time period, as to the functional and cosmetic results.[7] Delayed presentation, however, is a major problem in clinical practice, especially in low- and middle-income countries, where factors including lack of access to healthcare facilities, lack of referral system, transportation issues, initial consultation with traditional bone setters, and financial constraints often delay definitive treatment.[8] This means that fractures which might initially have been simply treated with relatively simple procedures are now technically more challenging and are linked to higher morbidity rates.[6]

Paediatric fractures are an important health burden across the world, with upper limb fractures accounting for the largest proportion of presentations to the Emergency Department (ED) for orthopaedics.[9] Delayed presentation of supracondylar humerus fractures is associated with a higher incidence of soft tissue swelling, difficulty with closed reduction, higher need for open reduction, longer operative time, longer hospital stays and higher risk of complications such as pin tract infection, elbow stiffness, iatrogenic nerve injury, vascular compromise, myositis ossificans and poor functional recovery.[10, 11] Delayed presentation occurs less often in high-income nations, where good trauma systems are in place, and is more common in developing areas where delays of more than 24–72 hours after injury are not uncommon.[12] Such differences demonstrate the impact of access to health care and socioeconomic factors on treatment outcomes and the need for evidence produced from local populations.[13]

Considering these, the present study was conducted to systematically review the clinical outcomes and complication rates of delayed presentation in pediatric supracondylar humerus fracture. The study seeks to establish evidence regarding postoperative recovery, functional outcome, and treatment-related complications of children who present late and, if possible, inform timely referral pathways, optimize clinical management, and ultimately decrease the incidence of avoidable disability in children. This study aimed to determine the clinical outcomes and complication profile of delayed presentation in pediatric supracondylar humerus fractures.

METHODS

This study was conducted as a descriptive case series with a hospital-based approach in the Orthopedic Ward and Trauma Center, DHQ Teaching Hospital, Dera Ismail Khan, Pakistan. The study period lasted for 30 months from Jan 2024 to July 2025.

The sample size was determined by using OpenEpi Version 3.01 for estimation of a single population proportion, with a 95% confidence level (Z = 1.96), and a 7% absolute precision. The expected proportion was from a previous study where 67.9% of children with late-presenting supracondylar humerus fracture had an excellent functional outcome after surgical management.[10] Using these parameters, the minimum required sample size was calculated to be 171 patients.

A non-probability consecutive sampling technique was used. The study included children aged between 2 and 14 years, who presented to the DHQ Teaching Hospital with a displaced supracondylar humerus fracture, and were managed by definitive surgical management more than 24 hours after the onset of their injury. Patients with closed 'Gartland type II and III fractures' [3] were recruited and included, irrespective of gender, when parents or legal guardians signed a written informed consent.

The following patient groups were excluded from the study: patients that presented more than 24 hours from injury, patients with pathological fractures, patients with open fracture, 'Gustilo-Anderson grade II or III',[14] patients with polytrauma requiring damage control management, patients with the affected elbow having a previous fracture or deformity, patients with associated ipsilateral upper limb fractures that may have influenced functional outcome assessment, patients with congenital neuromuscular disorders, and patients whose clinical records were incomplete or lost to follow-up.

All eligible subjects were included after obtaining informed consent from parents/legal guardians in written form. The orthopedic team on call in the emergency department evaluated all patients with delayed supracondylar humerus fractures. The on-call orthopedic team in the emergency department evaluated all patients with delayed supracondylar humerus fractures. A detailed history was obtained regarding age, sex, mechanism of injury, affected side, time of delayed presentation, previous therapy received, and duration of delayed presentation. A detailed clinical evaluation was conducted to evaluate fracture morphology, soft tissue status, distal neurovascular integrity, and any associated injuries, as well as any preexisting complications.

Elbow anteroposterior and lateral standard radiographs were taken to classify fractures using the Gartland classification. Patients were treated as per institutional treatment protocols for definitive treatment. Closed reduction and percutaneous 'Kirschner-wire fixation' were undertaken as long as possible, and open reduction and internal fixation were undertaken when reduction proved to be satisfactory or clinically indicated. Consultant orthopedic surgeons or senior orthopedic residents operated under consultant supervision, with standard surgical methods being used in all procedures. Perioperative data such as surgical type, operating time, intra-operative findings, requirement of open reduction, and hospital stay were recorded.

Patients were then followed at the outpatient department at regular intervals at about 2 weeks, 6 weeks, 3 months, and 6 months after surgery. In the follow-up visits, clinical examination and radiographic assessment were carried out to assess fracture union, maintenance of reduction of the elbow range of motion, and functional recovery. Postoperative complications recorded were pin tract infection, superficial or deep wound infection, iatrogenic nerve injury, vascular compromise, compartment syndrome, loss of reduction, elbow stiffness, delayed union, nonunion, and revision

surgery. At the final follow-up, functional outcome was evaluated by modified Flynn criteria, which were divided into excellent, good, fair, and poor based on cosmetic and functional criteria.
Data collected were analyzed with Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were displayed as mean ± standard deviation. Categorical data were expressed as frequencies and percentages. The chi-square test was used to find an association between delayed presentation and the clinical outcomes/complications. Continuous variables were compared between groups depending on the normality of the data using an independent-samples t-test. A p-value of < 0.05 was considered statistically significant.

RESULTS

The study was performed on a total of 171 children with supracondylar humerus fracture, with delayed presentation. The patients were mostly boys in the age group 6-10 years. Falls during sporting activities were the most common mechanism of injury, and more frequently involved the right upper limb than the left. The majority of children presented within 49-72 hours of the injury, with almost one third presenting after 72 hours of injury. The majority (more than half) were not treated before visiting the clinic, while the remaining children had been treated by other bone setters or had first been treated by traditional bone setters (Table 1).
Most patients had normal distal neurovascular status and no associated injuries on presentation. There were more fractures of Gartland type III than type II. Closed reduction with percutaneous Kirschner-wire fixation was the most common procedure performed, while about one-third of patients underwent open reduction. The most frequent intraoperative finding was difficult reduction due to soft tissue swelling, and the mean operative time and hospital stay were acceptable (Table 2).
Radiological union was obtained in almost all cases, and the fracture reduction was maintained in practically all the patients at the follow-up period. The majority of children recovered a full range of elbow motion. A small percentage of patients were found to have developed complications after surgery, although these were most commonly related to pin tract infection, elbow stiffness, rare major complications including compartment syndrome, nonunion, vascular compromise, or revision surgery. Most patients had excellent or good functional outcome at the final follow-up based on the modified Flynn criteria (Table 3).
There was a close relationship between the increasing delay in presentation and the requirement of open reduction, and with the postoperative complications. Children who presented 72+ hours after the injury had a higher incidence of both surgical intervention and adverse events after surgery compared to those who presented earlier (Table 4).
Fracture severity was significantly associated with functional outcome. The children with a Gartland Type II fracture had better cosmetic and functional results, as reflected by better Flynn scores, than children with a Gartland Type III fracture, which would suggest that more severe fractures result in worse outcomes (Table 5).
Comparing the operative parameters by treatment modalities showed that patients treated by open reduction were operated on for a significantly longer time period and were therefore hospitalized for a longer duration than patients treated by closed reduction and percutaneous pinning (Table 6).
Factors associated with functional outcome showed that a presentation after 72 hours, Gartland type III fractures, and the need for open reduction were statistically significant, however, at final follow-up (Table 7).

Table 1. Baseline demographic and injury characteristics (n=171)

Variable	**n (%) / Mean ± SD**
Age (years)	7.8 ± 2.6
2–5 years	48 (28.1)
6–10 years	91 (53.2)
11–14 years	32 (18.7)
Gender	
Male	112 (65.5)
Female	59 (34.5)
Affected side	
Right	96 (56.1)
Left	75 (43.9)
Mechanism of injury	
Fall while playing	114 (66.7)
Fall from height	39 (22.8)
Road traffic accident	18 (10.5)
Time to presentation (days)	3.8 ± 1.7

24–48 hours	56 (32.7)
49–72 hours	61 (35.7)
>72 hours	54 (31.6)
Previous treatment received	
None	89 (52.0)
Traditional bone setter	46 (26.9)
Splintage at another hospital	36 (21.1)

Table 2. Preoperative clinical assessment, fracture characteristics and operative findings (n=171)

Variable	**n (%) / Mean ± SD**
Soft tissue condition	
Normal	127 (74.3)
Moderate swelling	35 (20.5)
Severe swelling/blisters	9 (5.3)
Distal neurovascular status	
Intact	145 (84.8)
Nerve injury	18 (10.5)
Vascular compromise	8 (4.7)
Associated injuries	
None	154 (90.1)
Distal radius fracture	9 (5.3)
Forearm fracture	5 (2.9)
Minor head injury	3 (1.8)
Preoperative complications	
None	147 (86.0)
Skin puckering	11 (6.4)
Excessive edema	9 (5.3)
Early nerve palsy	4 (2.3)
Gartland classification	
Type II	54 (31.6)
Type III	117 (68.4)
Type of surgery	
Closed reduction + K-wire	118 (69.0)
Open reduction + K-wire	53 (31.0)
Operative time (minutes)	63.4 ±14.9
Hospital stay (days)	3.5 ±1.4
Intraoperative findings	
Easy reduction	82 (48.0)
Difficult reduction due to edema	56 (32.7)
Soft tissue interposition	21 (12.3)
Fracture instability	12 (7.0)

Table 3. Follow-up outcomes and postoperative complications (n=171)

Variable	**n (%)**
Fracture union	
United	167 (97.7)
Delayed union	4 (2.3)
Maintenance of reduction	
Maintained	166 (97.1)
Loss of reduction	5 (2.9)
Final elbow range of motion	
Full	138 (80.7)
Mild restriction	24 (14.0)
Moderate restriction	9 (5.3)

Postoperative complications	
None	120 (70.2)
Pin tract infection	18 (10.5)
Superficial wound infection	6 (3.5)
Deep wound infection	2 (1.2)
Iatrogenic nerve injury	4 (2.3)
Vascular compromise	1 (0.6)
Compartment syndrome	1 (0.6)
Loss of reduction	5 (2.9)
Cubitus varus	8 (4.7)
Elbow stiffness	14 (8.2)
Delayed union	2 (1.2)
Nonunion	1 (0.6)
Revision surgery	3 (1.8)
Modified Flynn criteria	
Excellent	103 (60.2)
Good	41 (24.0)
Fair	18 (10.5)
Poor	9 (5.3)

Table 4. Association of duration of delayed presentation with treatment modality and postoperative complications

Duration of delayed presentation	**Closed reduction n (%)**	**Open reduction n (%)**	**Complication present n (%)**	**No complication n (%)**	**p-value**
24–48 hours	48 (85.7)	8 (14.3)	10 (17.9)	46 (82.1)	<0.001
49–72 hours	44 (72.1)	17 (27.9)	18 (29.5)	43 (70.5)	
>72 hours	26 (48.1)	28 (51.9)	23 (42.6)	31 (57.4)	

Table 5. Association of Gartland fracture type with functional outcome

Flynn outcome	**Type II n (%)**	**Type III n (%)**	**p-value**
Excellent	43 (79.6)	60 (51.3)	0.001
Good	8 (14.8)	33 (28.2)	
Fair	3 (5.6)	15 (12.8)	
Poor	0	9 (7.7)	

Table 6. Comparison of operative time and hospital stay according to treatment modality

Variable	**Closed reduction (n=118) Mean ± SD**	**Open reduction (n=53) Mean ± SD**	**p-value**
Operative time (minutes)	56.8 ±10.5	78.1 ±12.8	<0.001
Hospital stay (days)	2.9 ±0.9	4.8 ±1.3	<0.001

Table 7. Predictors of poor functional outcome

Variable	**Excellent/Good n (%)**	**Fair/Poor n (%)**	**p-value**
Presentation ≤72 hours (n=117)	101 (86.3)	16 (13.7)	0.041
Presentation >72 hours (n=54)	43 (79.6)	11 (20.4)	
Type II fracture (n=54)	51 (94.4)	3 (5.6)	
Type III fracture (n=117)	93 (79.5)	24 (20.5)	0.018
Closed reduction (n=118)	106 (89.8)	12 (10.2)	
Open reduction (n=53)	38 (71.7)	15 (28.3)	0.006

DISCUSSION

The delayed presentation of supracondylar humerus fractures is a challenge, especially in developing countries with poor care access, delayed referral, financial constraints, and initial consultation with traditional bone setters, which

result in delays in definitive treatment. Most cases in the present study were boys aged 6–10 years and mainly struck or hurt when playing. These findings are consistent with the well-established epidemiology of supracondylar humerus fractures as reported in the recent literature, which shows that these injuries occur more often in school-aged boys, due to increased outdoor activities and exposure to trauma events.[10, 15, 16]

The present study showed that there is a high proportion of delayed presentations of fractures of Gartland grade III and almost a third of the children who were ultimately treated with open reduction as a result of failed closed reduction. This finding aligns with the prospective study conducted by Abdelraheem MA (2024), which assessed neglected supracondylar fractures that presented five days or more after injury and found that severe displacement was common and that open reduction was often indicated due to soft tissue contracture, fibrosis, and challenges in anatomical reduction.[10] Likewise, Das et al. (2022) showed that late presentation correlated with the commencement of technical challenges during the operation, requiring an open reduction in a significant percentage of the patients.[15] These results corroborate our observation that the longer the delay, the less feasible closed reduction will be.

In the present study, findings during the surgery showed that common factors in the late presentation were difficult reduction from edema and soft tissue interposition. In the 2022 prospective cohort study that assessed the anterior approach for supracondylar fracture that occurred later than 14 days after the injury, this edema, fibrosis, and interposed brachialis muscle were the most common challenges to the successful closed reduction.[4] Similarly, Abdelraheem (2024) found that fractures that occurred later often showed large amounts of callus and skin scarring that necessitated meticulous open fracture dissection, which must be performed with care to avoid damage to the neurovascular structures.[10] The similarities indicate that the later the surgical intervention, the more complex the operation, regardless of the surgical approach used.

Despite late presentation, fracture union was achieved in almost all our patients, and most children in our study had excellent or good functional outcomes in terms of modified Flynn criteria. The results were also similar to those of Herzog et al (2023), who found that despite the majority of patients being more than five days after injury, the majority had good cosmetic and functional outcomes after triceps-sparing posterior open reduction and K-wire fixation.[17] Similarly, Kohan et al. (2024) reported excellent or good Flynn outcomes in more than 95% of children treated via the anterior approach, and that simply presenting later should not preclude a satisfactory recovery with anatomic reductions and stable fixation.[18] These studies support our results that normal function can be achieved despite the delay in treatment when adequate surgical care is provided.

The rates of postoperative complications in the present study were, in general, low; the most frequent complications were pin tract infection and elbow stiffness, while only a few patients experienced vascular compromise, nonunion, or compartment syndrome. The same complication rates are described in various recent studies. In 2022, a systematic review and meta-analysis of 14 studies involving over 1200 children showed that there was no significant difference in risk of infection, iatrogenic nerve injury, vascular injury, compartment syndrome, or conversion to open reduction between delayed and early surgery.[16] Similarly, the Mayo Clinic study published in 2023 did not report that there were higher complication rates when treatment occurred after the suggested time limit in otherwise stable supracondylar fractures.[19] These data indicate that careful patient selection and careful surgery may be more important factors than surgery timing alone when vascular compromise or compartment syndrome are not present.

In a retrospective study, Muslu O et al. (2023) evaluated children treated with closed reduction and percutaneous pinning and reported excellent radiological and functional outcomes with low complication rates, emphasizing that stable fixation results in satisfactory recovery in most pediatric supracondylar fractures.[20] The results are comparable to the high fracture union and good Flynn results that were seen in the present study.

In the same way, researchers at Ulus SA and Akar MS compared early surgical intervention with later surgical intervention for Gartland type II and III supracondylar humerus fracture and concluded that they did not observe a significant difference in early postoperative complication rates between early surgery and delayed surgery in children with Gartland type II and III supracondylar humerus fracture.[21] They concluded that delayed surgery does not necessarily result in poor early outcomes when the surgery is performed appropriately, which is similar to the present study, where satisfactory functional recovery was obtained despite a late presentation; however, delayed presentation was associated with an increase in complication rates and the need for open reduction.

Limitations

There were several limitations in the present study. First, it was a single-center study, which may limit the generalizability of the findings to other healthcare settings. Secondly, a selection bias may have been introduced due to the use of non-probability consecutive sampling technique. Third, the lack of a comparison group of patients presenting early after injury prevented direct assessment of the effect of treatment delay. Lastly, the follow-up was for six months, and late complications such as growth disturbances or persistent deformity might not have been captured during this time period.

CONCLUSION

Delayed diagnosis of pediatric supracondylar humerus fractures continues to be a common problem, with increased difficulty of operation, higher rate of open reduction, and a higher incidence of postoperative complications. However, in most patients, appropriate reduction techniques and Kirschner-wire fixation achieved good fracture union with excellent functional outcomes at a timely surgical intervention. Early referral, rapid diagnosis, and avoiding treatment delay may further improve clinical outcomes and minimize preventable complications in children with supracondylar humerus fractures.

REFERENCES

1. Duffy, S., et al., Overview of the contemporary management of supracondylar humeral fractures in children. European Journal of orthopaedic surgery & traumatology, 2021. **31**(5): p. 871-881.
2. Poggiali, P., F.C.S. Nogueira, and M.P.d.M. Nogueira, Management of supracondylar humeral fracture in children. Revista Brasileira de Ortopedia, 2022. **57**: p. 23-32.
3. Barber-Vidal, I., I. Miranda, and F.J. Miranda, Orthopedic or surgical treatment in gartland type ii supracondylar humerus fractures: A systematic review. Indian Journal of Orthopaedics, 2024. **58**(12): p. 1768-1776.
4. Majumdar, A.S. and A.S. Bauer, The open approach to a supracondylar humerus fracture. Journal of the Pediatric Orthopaedic Society of North America, 2022. **4**(1): p. 416.
5. Pavone, V., et al., Current trends in the treatment of supracondylar fractures of the humerus in children: Results of a survey of the members of European Paediatric Orthopaedic Society. Journal of Children's Orthopaedics, 2022. **16**(3): p. 208-219.
6. Surd, A., et al., Modern treatment of supracondylar humeral fractures in children. Children, 2025. **12**(5): p. 556.
7. Sharma, A., Evaluation Of Functional Outcome In Metacarpal Fracture Fixed With Closed Reduction And Internal Fixation With Kirschner-Wire. 2022, SDUAHER.
8. Mubarak, F.S., M.A.M. Anzar, and K. Kanagaratnam, Descriptive study on epidemiology, clinical presentation, treatment, and outcome of supracondylar fractures treated in a base hospital of Sri Lanka: a single-center study. Cureus, 2023. **15**(6).
9. Hoveidaei, A.H., et al., Global burden of pediatric orthopaedic fractures: an epidemiological analysis from 1990 to 2021. Archives of Orthopaedic and Trauma Surgery, 2026. **146**(1): p. 20.
10. Abdelraheem, M.A., Open reduction and fixation of late-presenting pediatric supracondylar humeral fractures: A prospective study. Orthopedic Research and Reviews, 2024: p. 221-231.
11. Magno, G.M. and S. Bosio, Supracondylar fractures of the humerus, in Orthopaedics and Trauma: Current Concepts and Best Practices. 2024, Springer. p. 727-737.
12. Adegoke, B.O., et al., Physical Therapist Management of Fractures. Contemporary and Global Perspectives in Physical Therapy, 2026: p. 271-325.
13. de Siqueira Filha, N.T., et al., The economics of healthcare access: a scoping review on the economic impact of healthcare access for vulnerable urban populations in low-and middle-income countries. International Journal for equity in health, 2022. **21**(1): p. 191.
14. Srivastava, K., et al., Role of Combined Ortho-Plastic Approaches in the Reconstruction of Gustilo–Anderson Grade III Upper Limb Injuries: A Systematic Review. Cureus, 2025. **17**(9).
15. Das, R., et al., Evaluation of anterior approach in failed closed reduction and delayed presentation of supracondylar humerus fractures in children. Journal of orthopaedics, 2022. **30**: p. 51-58.
16. Ismayl, G., et al., Early versus delayed treatment for Gartland type III supracondylar humeral fractures in children: a systematic review and meta-analysis. Indian Journal of Orthopaedics, 2022. **56**(11): p. 1871-1881.
17. Herzog, A.N., T. Wirth, and F.F. Fernandez, Supracondylar dome osteotomy with a posterior triceps-splitting approach for acute correction of posttraumatic cubital axis deformities in adolescent patients. Journal of Pediatric Orthopaedics, 2023. **43**(1): p. e17-e24.
18. Kohan Fortuna Figueira, S.V., et al., Pediatric fracture of the forearm and wrist, in Orthopaedics and Trauma: Current Concepts and Best Practices. 2024, Springer. p. 761-781.
19. Sullivan, M.H., et al., Does shorter time to treatment of pediatric supracondylar humerus fractures impact clinical outcomes? Journal of Pediatric Orthopaedics, 2023. **43**(6): p. 350-354.
20. Muslu, O., et al., Radiological and clinical outcomes of pediatric patients with a supracondylar humerus fracture surgically treated with closed reduction and percutaneous pinning. Cureus, 2023. **15**(11).
21. Ulus, S. and M. Akar, Comparison of complications and results of early vs. delayed surgery for pediatric supracondylar humeral fractures. European Review for Medical & Pharmacological Sciences, 2023. **27**(24).