Int. j. adv. multidisc. res. stud. 2025; 5(1):1169-1171

Received: 02-01-2025
Accepted: 12-02-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Epidemiological Characteristics of Type III Paediatric Supracondylar Humerus Fractures in a Tertiary Hospital

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DOI: https://doi.org/10.62225/2583049X.2025.5.1.3779
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Abstract

Objective

The aim of the present study was to assess the epidemiological characteristics of type III paediatric supracondylar humerus fracture in a tertiary hospital.

Methodology

This prospective study was carried out at the Department of Orthopedic Surgery at Chittagong Medical College Hospital, Chittagong within the defined period from January 2020 to February 2022. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. The results were expressed as percentage and mean ± SD and $p<0.05$ was considered as the level of significant.

Result

Among 30 patients, the mean ± SD age of the children was 7.7 ± 2.2 years. The youngest and the oldest patient were 4.5 and 11.5 years. About 17 patients (56.7%) were male and 13 patients (43.3%) were female. Left humerus was affected in maximum cases (63.3%). Most of the (60%) displacement was at posteromedial region.

Conclusion

As evidenced by the obtained results, paediatric supracondylar fracture has the highest incidence at the age of almost seven years. The incidence of paediatric supracondylar fracture is higher in males.

Keywords: Epidemiology, Paediatric, Supracondylar Humerus Fracture

Introduction

Supracondylar fractures of the humerus in children are common paediatric injuries treated by orthopaedic surgeons [1]. Supracondylar fractures of the humerus represent a significant burden of injuries in children, accounting for 12-17% of all paediatric fractures [2]. The incidence peaks between the ages of 5-8 years [3, 4]. These injuries are associated with immediate and late complications like compartment syndrome, neurovascular damage, Volkman's ischaemic contracture and malunion [5, 6, 7]. The modified Gartland's classification is commonly accepted where Type I: Undisplaced fracture, Type II: Fractures have an intact posterior hinge, Type III: Fractures have complete displacement, A type IV injury has been described in which there is complete loss of the anterior and posterior periosteal hinge, making it unstable in both flexion and extension. Type II fracture is further classified as IIA: A less severe injury with the distal fragment merely angulated and IIB: Is severe injury; the fragment is both angulated and malrotated. It was Wilkins, who further classified Type III fractures on the basis of coronal displacement as Type- IIIA (posteromedial) and IIIB (posterolateral) [8]. The most frequent fracture mechanism is represented by a force in extension; usually a fall on the outstretched hand. As a matter of fact, supracondylar fractures in extension correspond to approximately 95-98% of all lesions. In the rarer lesions caused by a flexion force (2-5%) the distal fragment

displaced anteriorly. Supracondylar fracture occurs at the supracondylar area or the metaphysis of the distal humerus. Among all the fracture in upper limb, supracondylar fracture of humerus is not only the most common injury but also it may cause serious complications if not treated appropriately [9]. Various treatment options have been described each having its own advantages and disadvantages. The most common and widely accepted method of treatment consists of closed reduction, if needed, with percutaneous Kirschner wire fixation [10]. Closed reduction and percutaneous osteosynthesis with Kirschner wires (Kwire) with the patient in supine position is a common and widely accepted procedure for type III fractures [11].

Materials & method

This Prospective Interventional Study study was carried out among 30 patients attending at the department of Orthopaedic Surgery at Chittagong Medical College Hospital, Chittagong for the treatment displaced paediatric supracondylar of humerus fracture within the defined period from January 2020 to February 2022. Ethical clearance was obtained from the Institutional Review Board (IRB) of CMCH. Purposive sampling was done according to availability of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the epidemiological characteristics of displaced paediatric supracondylar of humerus fracture.

Results

Out of 30 patients, the mean ± SD age of the patients was 7.7 ± 2.2 years. The youngest and the oldest patient were 4.5 and 11.5 years. About 17 (56.7%) were male and 13 (43.3%) were female. (Table 1)

Table 1: Age and Gender Distribution of the study patients (n=30)

Parameter	Mean ± SD	Range
Age (years)	7.7 ± 2.2	4.5-11.5
Gender Distribution	**Number**	**Percentage**
Male	17	56.7
Female	13	43.3

Data was expressed as frequency (%) or mean ± SD (range)

In the present study, out of 30 cases, left humerus was affected in maximum cases (63.3%). Most of the (60%) displacement was at posteromedial region. (Table 2)

Table 2: Fracture profile of the study population (n=30)

Parameter	Number	Percentage
Side of Injury		
Right	11	36.7%
Left	19	63.3%
Displacement		
Posterior	07	23.3%
Postero-medial	18	60%
Postero-lateral	05	16.7%

Three Kirschner-wire was needed in 80% cases, cross pin was used in 73.3% cases and mean ± SD pin size was 1.6 ± 0.15 (range: 1.5-1.8) mm (Table 3).

Table 3: Kirschner-wire (k-wire) description

Parameter	Number	Percentage
Kirschner-wire number		
02	06	20%
03	24	80%
Kirschner-wire configuration		
Cross pin	22	73.3%
Lateral pin	08	26.7%
K-wire size (mm)	Mean ± SD 1.6 ± 0.15	Range 1.5-1.8

Discussion

The results of current study demonstrate, the mean (± SD) age of the patients was 7.7 ± 2.2 years. The youngest and the oldest patient were 4.5 and 11.5 years. Similarly, Gular *et al*. (2016) found the mean ± SD age was 6.9 ± 1.5 years among the patients of prone position in their study [12]. Present study shows, among 30 patients, 17 (56.7%) were male and 13 (43.3%) were female. Similarly, male prominence was found in the study by Venkatadass *et al*. (2015). The study population consisted of 26 patients, where 20 were boys and 06 were girls [13]. Regarding the side of injury, out of 30 cases, left humerus was affected in 19 (63.3%) and right side was affected in 11 (36.7%) cases. Similarly, Kao *et al*. (2014) found 12 children had right-side involvement and 22 had left-side involvement [14]. Most of the displacement, among 18 (60%) patients, was at posteromedial, 7 (23.3%) was at posterior and 5 (16.7%) was at posterolateral region in present study. Kao *et al*. (2014) showed the displacement was posteromedial in 16 of the 34 (47.1%) children, posterolateral in 5 (14.7%), and posterior in 13 (38.2%) children [14]. Venkatadass *et al*. (2015) found the displacement was posteromedial in 13 children, posterolateral in 6, and posterior in 5 children [13]. Three Kirschner-wire was needed in 80% cases, cross pin was used in 73.3% cases, mean ± SD pin size was 1.6 ± 0.15 (range: 1.5-1.8) mm and mean time for removal of the K-wire was 4 weeks (Table 2). In the study by Kao *et al*. (2014), the K-wires were removed at a mean of 36.1 days (range, 22–45 days) [14].

Conclusion

paediatric supracondylar fracture has the highest incidence at the age of almost seven years. The incidence of paediatric supracondylar fracture is higher in males. left humerus was affected in maximum cases. Most of the displacement was at posteromedial region.

Acknowledgements

The authors are grateful to the entire staff of department of Orthopaedic Surgery at Chittagong Medical College Hospital, Chittagong during the study period.

Conflict of Interest

Authors declare no conflict of Interest.

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