Frequency of Supracondylar Humerus Fracture in Pediatric Patients at A Tertiary Care Hospital.

Raja Adnan Ashraf[1], Kamran Asghar[2], Ahmed Javed[3], Hamza Fareed[4], Muhammad Mobushir[5]

[1]Department of Orthopaedics, Pakistan Railway General Hospital, Islamic International Medical College, Rawalpindi
[2]Department of Orthopaedics. Fauji Foundation Hospital, Rawalpindi.
[3]Department of Orthopaedics, Pakistan Railway General Hospital, Islamic International Medical College, Rawalpindi
[4]Department of Orthopaedics, Foundation University Medical College, Islamabad
[5]Department of Orthopaedics, Foundation University Medical College, Islamabad

Authorship and contribution Declaration:
Each author of this article fulfilled ALL 04 Criteria of Authorship:
1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.
4. All authors agree to be responsible for all aspects of their research work

Corresponding author:
Raja Adnan Ashraf
E-mail: dr.addi79@yahoo.com

ABSTRACT

Objectives: To determine the epidemiology of types of supracondylar humerus fracture in children with regards to treatment given, mechanism of fall and time of fracture.

Material and Methods: This descriptive, cross-sectional study was carried out between 1st April 2018 and 1st April 2020 at the Department of Orthopaedics, Pakistan Railway General Hospital, Rawalpindi, Pakistan. The research involved patients up to the age of 12 years presenting the Emergency and Out patient Department with supracondylar humerus fractures for management. Age, gender, afflicted side, season in which fracture occurred, place of fall, type of Gartland's classification and the treatment given were noted on a predesigned proforma. The collected data were then statistically analyzed using SPSS.

Results: Out of the 60 patients, mean age was 5.2±3.8 years. Majority of patients had fracture of the left elbow (n=36, 60%). Regarding gender distribution, it mostly affected the males (n=33, 55%). Regarding the type of fracture, majority of patients had Gartland type-III fracture (n=25, 41.67%). Majority of patients had a fall in the park (n=31, 51%), followed by home (n=13, 22%). Mostly these fractures occurred in the summer season (n=27, 45%).

Conclusion: Gartland type-III are the commonest supracondylar humeral fractures in children. Mostly these fractures occur in summer season due to a fall.

Keywords: Epidemiology, Gartland classification, supracondylar humerus fracture.

This article may be cited as: Ashraf R A, Asghar K, Javed A, Fareed H, Mobushir M. Frequency of Supracondylar Humerus Fracture in Pediatric Patients at A Tertiary Care Hospital J. Pak. Orthop. Assoc.2023;35(2):

INTRODUCTION

Supracondylar distal humeral fractures are one of the most common types of fractures in children, having a peak incidence at 6 - 7 years of age.[1] There are many categorization systems for these fractures and their treatment, but Gartland's classification is the most often utilised in everyday clinical practise.[2]

Indirect injury is the most common kind, which includes a fall with the elbow in extension, and hence the distal fragment is displaced posteromedially.[3] Conservative treatment is acceptable for undisplaced or fractures with slight displacement, but those with significant displacement, rotational malalignment, or neurovascular compromise should undergo surgery to stabilise.[4] Due to the close proximity of tissues such as the brachial artery, these fractures are at high risk of neuro-vascular injuries. They account for between 5% and 19% of displaced fractures.[5] They are often linked with ipsilateral radial and distal ulna fractures, although to a lesser extent.[6] The most often seen complications include elbow varus or valgus deformity and limited range of motion.[7]

Historically, increases in fracture frequency have been associated with vacation periods and park activities.[8] However, just a few studies have established scientifically these occurrences. As a result, the following were the goals of this study: What caused these fractures, how severe they were based on Gartland's scale, and how they were treated in a tertiary hospital. Also, to find out what time of year there are more children with supracondylar elbow

fractures. By studying the frequency of this type of fracture, doctors, traumatologists, physiotherapists, and other caregivers may be able to figure out the best way to treat it and, in the long run, improve primary prevention.

METHODOLOGY

This descriptive, cross-sectional study included all children under the age of 12 who were seen in the Emergency and Outpatient Department of a tertiary hospital for supracondylar distal humerus fractures during a 2-year period (1st April 2018 to 1st April 2020). Patients with all other fractures around the elbow were excluded from the study. The study was commenced after approval from the ethical review board of the hospital. Age, gender, afflicted side, season in which fracture occurred, place of fall, type of Gartland's categorization and the treatment given were noted on a predesigned proforma. The following criteria were used to determine treatment indications: type-I and type-II fractures did not require reduction; type-II fractures required closed reduction; type-III fractures and those in flexion required closed reduction and fixation with percutaneous Kirschner pins; and irreducible fractures required open reduction and fixation.

SPSS version 17 was used to input and evaluate the data collected. For quantitative data such as age, type of Gartland's categorization, the mean and standard deviation were given. Frequency and percentages presented for qualitative data like gender, afflicted side, season in which fracture occurred, place of fall, and treatment given. Statistical significance was defined as a P value of 0.05. P value of 0.05 was considered statistically significant.

RESULTS

Out of the 60 patients included, mean age was 5.2±3.8 years. Majority of patients had fracture of the left elbow (60%). Regarding gender distribution, it mostly affected the males (55%) (as shown in Table-1).

Table-1: Side and Gender distribution

		No. of patients (n)	Percentage (%)
Side of fracture	Left	36	60%
	Right	24	40%
Gender	Male	33	55%
	Female	27	45%

Regarding the type of fracture, majority of patients had Gartland type 3 fracture (41.67%) (as shown in Table-2).

Table-2: Type of fracture and treatment given

Gartland type	Conservative	Closed reduction ± k-wire fixation	Open reduction with k-wire fixation
I	22	0	0
II	4	9	0
III	0	11	14
Total	26	20	14

Majority of patients had a fall in the park (51%), followed by home (22%) (as shown in Figure-1). Mostly these fractures occurred in the summer season (45%).

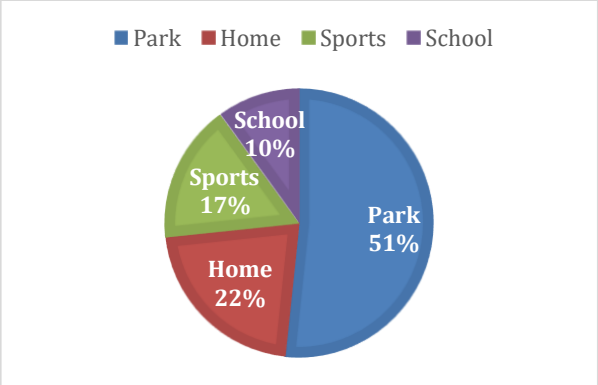

Figure-1: Mechanism of fall

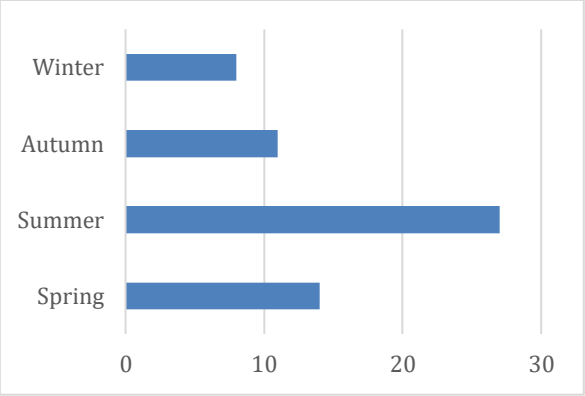

Figure-2: Fracture distribution according to season

DISCUSSION

Around 6 years of age is when the rate of supracondylar humeral fractures in paediatric age peaks in the literature.[9] However, this peak happened somewhat sooner in our dataset (5.2±3.8 years). The mean age in our study was comparable to a study done by Ihsanullah et al. in which mean age was 4.90±2.48 years.[10] Our research found no evidence of the previously reported male gender preponderance or laterality. Gartland's type-III fractures were the most significant, followed by type-I fractures. Prior study has not consistently reported on this data. The results of this fracture having equal frequency in both genders was also reinforced by the research done by LiBrizzi.[11] This was in accordance to the study undertaken by Martinez et al. in which the frequency of type-III fractures was 39.3%.[12] This variance in fracture type according to Gartland's classification may be explained by differences in the energy level of activity performed by the groups examined or by the enhanced radiological detection of non-displaced fractures in recent years.[13]

In our study, 44% of type-III fractures and 69% of type-II fractures were treated with closed reduction ± k-wire fixation, suggesting that the more severe the fracture, the more aggressive the treatment approach is likely to be. Similarly, the frequency of problems associated with a more displaced fracture rises substantially. Xianglu Ji et al. performed a retrospective analysis on 188 children who had distal humeral supracondylar fractures. They found 28 instances (15%) of neurological abnormalities, the most common of which was median nerve neuroapraxia.[14] Yuyan Na et al. described a total of 50 patients with Gartland's type-II and type-III supracondylar humerus fractures who had surgical treatment with a cross-pin (n=27) or lateral fixation (n=23). Six cases of ulnar nerve lesion were found in a group of children who had Kirschner cross pin surgery, and it was recommended that the medial epicondylitis be palpated properly to avoid this complication.[15] Fatima et al. in his study found percutaneous cross pinning to be more advantageous than two lateral pins.[16] Carrazzone et al. found that 23 of 188 infants with displaced supracondylar fractures had a varus of the elbow deformity (12%).[17] Picado et al. in his study found secondary displacement in 5% and a cubitus varus deformity in 2% of patients after surgery for type-III fractures.[18]

Only a few research have been published on the epidemiology of various kinds of fractures.[19,20] The most noticeable feature is that the bulk of falls occur inside the park rather than other sites. This was confirmed in our research, as parks accounted for 51% of falls, followed by falls at home and when engaging in sports, with similar percentages for the latter two. It's worth emphasising that, at least in our series, the home does not have a role in fracture prevention. School is the least frequent site for falls in children that result in supracondylar elbow fractures. These statistics were somewhat similar to a study undertaken by Sharma et al. in which 47.27% fractures were due to road-side accidents, 35.45% domestic-violence and 17.27% from a fall.[21] The majority of fractures occurred during the summer season (45%) and spring (23.33%), most likely as a result of an increase in the number of youngsters visiting the park due to better weather conditions. The results were similar to a study conducted by Nordin et al. and Woo et al.[22,23]

Our research concluded that late spring falls are more common, coinciding with summer vacations and better weather conditions. Apart from simple preventative measures, however, there is little that can be done to offset the increased incidence during these times.[24] These may include improving park conditions, which account for the bulk of falls, and ensuring that games are properly supervised. This may have a significant effect on the prevention of supracondylar elbow fractures in children.

CONCLUSION

Gartland type-III are the commonest supracondylar humeral fractures in children. Mostly these fractures occur in summer season due to a fall.

Conflict of Interest: None

Grants/Funding: None

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