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EPIDEMIOLOGY AND SEASONAL PATTERNS OF PAEDIATRIC SUPRACONDYLAR HUMERAL FRACTURES IN ALBANIA

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ABSTRACT: *Supracondylar humeral fractures (SHF) are the most common type of elbow fractures in children, representing as much as 60% of elbow fractures. We aim to evaluate epidemiological evidence and seasonal patterns of SHF occurring, a under researched topic in Albania. A retrospective case series study was conducted during January 2021-November 2022 at University Trauma Hospital, Tirana, Albania. The Mann-Whitney U test was used to assess differences in median age values between male and female patients with SHF. Overall, we included 90 patients with SHF, with a mean age of 7.5±2.8 years. The majority of patients (63.3%) were males, with a mean age of 7.9±2.8 years. The remaining 36.7% were females, with a mean age of 6.8±2.7 years, p=0.09.Our results showed that the highest prevalence of SHF occurred in April and May, with 11.1% and 13.3%, respectively, while the lowest prevalence was in February with only 2.2% of patients. In conclusion, SHF is a common type of elbow fracture in children, with a male predominance and a typical age range of 5-10 years. The study's findings suggest that SHF in children has a seasonal and temporal pattern, with higher prevalence in the spring and summer (during holidays).*

BACKGROUND

Supracondylar humeral fractures (SHF) are the most common type of elbow fractures in children, representing as much as 60% of elbow fractures(1). Elbow fractures often occur, following an attempt by the outstretched arm to protect during fall.Research shows that the most common age of these fractures is around 6 years.The injury mechanism utilizes the point of relative weakness created by the anatomy of the distal humerus, in the supracondylar region(2). 95% of SHF accounts for extension-type mechanism of injury, while the other fractures occurs as flexion-type(3).99.5% of HSFs are attributed to accidental injuries, while a very negligible proportion have non-accidental causes (e.g. child abuse) (4).Falls from playground equipment is the most common cause which leads to SHF (5).30% of the cases can occur as open fractures(6).In Albania, this is a very under researched topic, so epidemiological evidence and seasonal patterns are very important to understand how these traumas are caused, in terms of prevention and management.

METHODS

A retrospective case series study was conducted during January 2021-November 2022 at University Trauma Hospital, Tirana, Albania. We recruited 90 patients after clinical records'sreview with the following inclusion criteria: 1. Patients admitted in emergency or recommended by regional hospitals in Albania, and 2. Patients diagnosed with SHF

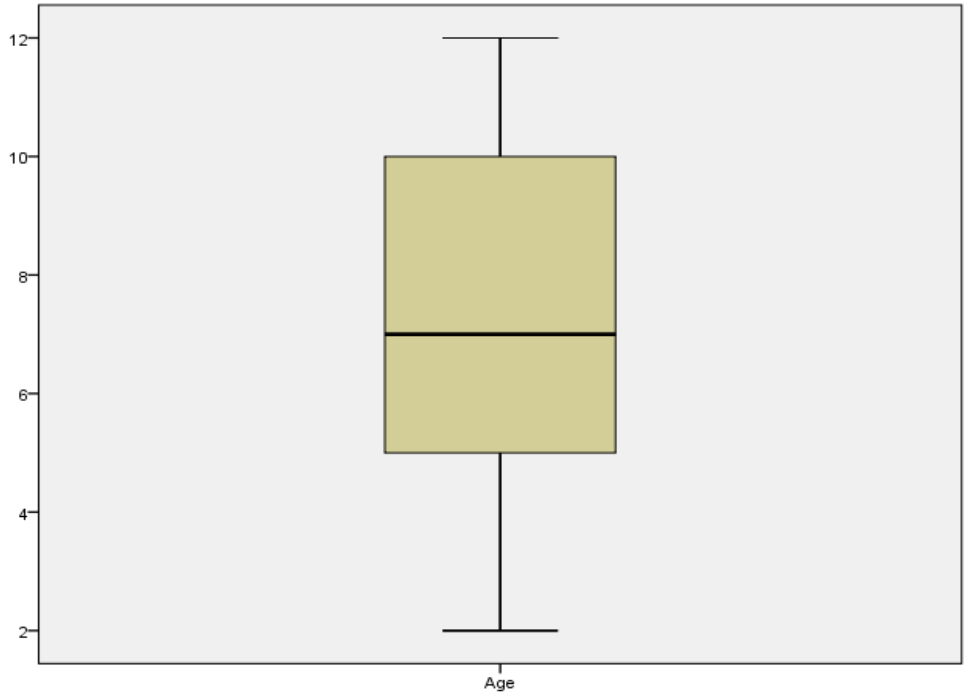
Frequencies (absolute numbers) and corresponding percentages were calculated for all categorical variables, while the central trend and dispersion values (mean, median and standard deviation) were calculated for numerical one.The Mann-Whitney U test was used to assess differences in median age values between male and female patients with SHF.

A p-value of <0.05 was considered statistically significant. Statistical analysis was conducted usingStatistical Package for Social Sciences, statistical software, version 25.0.In terms of ethical considerations, this study was conducted according to the Helsinki Declaration protocol, ensuring anonymous use of patient's data for research purposes.

RESULTS

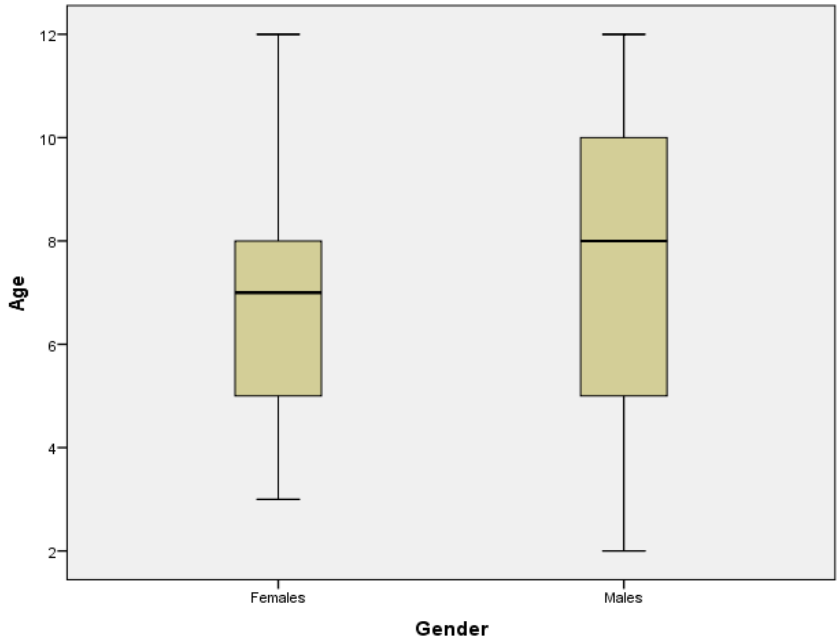
Overall, the mean age of patients with SHF who were included in this study was 7.5±2.8 years. The median age was 7.0 years, while the interquartile range was: 5-10 years. The age range of the patients included in this study was: 1-12 years. (Figure 1)

Figure 1: Distribution of age of patients in form of boxplot graphic



63.3% of the patients were males, while, 36.7% were females.The mean age of male patients with SHF was 7.9±2.8 years. The median age was 8 years, while the interquartile range was: 5-10 years. The age range of male patients included in this study was: 2-12 years. Thus, the average age of female patients with SHF was 6.8±2.7 years. The median age was 7 years, while the interquartile range was: 5-8.5 years. The age range of female patients included in this study was: 3-12 years. These differences were not singnificant, p=0.09 (Figure 2)

Figure 2: Distribution of age of patients, according respective gender



The results of the annual distribution of patients with SHF showed that the highest prevalence of this trauma was in the months of April and May, respectively with 11.1% and 13.3%, while the lowest prevalence was in the February with 2.2% of the patients. Also, the results showed that SHF occurred in 100% of children during the holidays in July and August and in 100% of children during school in November. (Table 1)

Table 1: Distributions of monthly frequencies of supracondylar humeral fractures during term time and holiday time

Months	January	February	March	April	May	June	July	August	September	October	November	December
Term time	5 (83.3) *	1 (50.0)	5 (83.3)	7 (70.0)	10 (83.3)	3 (37.5)	0 (0.0)	0 (0.0)	4 (50.0)	6 (75.0)	3 (100.0)	4 (50.0)
Holidays	1 (16.6)	1 (50.0)	1 (16.6)	3 (30.0)	2 (16.6)	5 (62.5)	9 (100.0)	8 (100.0)	4 (50.)	2 (25.0)	0 (0.0)	4 (50.0)
Overall	6 (6.7)	2 (2.2)	6 (6.7)	10 (11.1)	12 (13.3)	8 (8.9)	10 (11.1)	9 (10.0)	8 (8.9)	8 (8.9)	3 (3.3)	8 (8.9)

*Absolute numbers and respective percentages

DISCUSSION

Our study included 90 patients with SHF, with a mean age of 7.5±2.8 years. The majority of patients (63.3%) were males, with a mean age of 7.9±2.8 years. The remaining 36.7% were females, with a mean age of 6.8±2.7 years.

The age and gender distribution of SHF in this study is consistent with previous reports in the literature. Several studies have shown that SHF typically occurs in children between 5 and 10 years of age, with a male

predominance (7,8). The higher incidence of SHF in boys may be related to their increased participation in high-risk activities and sports (9).

Although the mean age of male patients with SHF was slightly higher than that of females in this study, the difference was not statistically significant (p=0.09). This finding is consistent with previous reports that have not found a significant difference in the age distribution of SHF between males and females (10,11).

Our results showed that the highest prevalence of SHF occurred in April and May, with 11.1% and 13.3%, respectively, while the lowest prevalence was in February with only 2.2% of patients. The study also found that SHF occurred in 100% of children during the holidays in July and August and in 100% of children during school in November.

The higher prevalence of SHF in April and May may be related to the increased participation of children in outdoor activities during spring and summer months, which may involve more physical activity and risk-taking behaviors. A previous study also found that the incidence of fractures in children increased during the summer months due to increased outdoor activities and participation in sports (12).

During school holidays, children may have more free time to engage in physical activities, and during the school year, they may participate in more physical activities during physical education classes or after-school sports.

However, it is important to note that the study has some limitations, such as the small sample size and the lack of information on the specific activities and circumstances leading to the SHF. Future studies with larger sample sizes and detailed information on the activities leading to SHF may provide more insight into the seasonal and temporal patterns of SHF in children.

CONCLUSION

In conclusion, SHF is a common type of elbow fracture in children, with a male predominance and a typical age range of 5-10 years.The study's findings suggest that SHF in children has a seasonal and temporal pattern, with higher prevalence in the spring and summer (during holidays). Parents and caregivers should be aware of these patterns and take appropriate precautions to prevent SHF during high-risk periods.

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