



Epidemiological and Anatomopathological Aspects of Limb Trauma in Children Under 15 Years of Age at Kati University Hospital

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Abstract

Original Research Article

Aim: The aim of this study was to describe the epidemiological-clinical and anatomopathological characteristics of limb trauma in children aged 0-15 years at Kati University Hospital. **Patients and Methods:** This was a prospective cross-sectional analytical study. It ran from January 2022 to June 2022. The study population consisted of all children aged 0-15 years admitted for limb trauma during the study period. **Results:** Mean age was 11 ± 3.8 years. Children aged 11-15 years were the most represented (63%). Males predominated (71%), with a sex ratio of 3.4. Road traffic accidents were the main etiology (55%). Injuries were more prevalent in the forearm (31.1%), and the lower limb was most affected (57%). Complete fracture was the most common injury (65.5%), followed by epiphyseal detachment fractures (26.7%). **Conclusion:** Trauma to the limbs in children is a frequent reason for consultation at our facility. These injuries are of varied etiology, with road traffic accidents predominating. They preferentially affect boys over 10 years of age. Complete fracture is the most frequent injury, most of which occurs in the lower limb. However, the forearm is the limb segment most frequently affected.

Keywords: Fracture, Epiphyseal detachment, Child, Lower limb.

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INTRODUCTION

Compared to adult trauma, pediatric trauma accounts for only 14% of all trauma, but its mortality rate is high [1]. Accidental trauma is the leading cause of death in children over one year of age in industrialized countries, making it a real public health issue [2]. For children living in sub-Saharan Africa, there are few data available. Nevertheless, in a study carried out in Gambia in 2000, trauma accounted for 46.9% of patients admitted for surgical treatment [3]. A study in the emergency department of the Centre Hospitalier Universitaire d'Owendo found a frequency of 25% [4]. Traumatic injuries caused by accidents can sometimes have serious consequences [5-7] in children, these traumatic injuries have their own specific characteristics, linked to anatomical and physiological particularities, as well as to lesion mechanisms that are often different from those of adults [8]. Thus, the

majority of traumas are due to falls in the home or on playgrounds. Injuries are generally single, with fractures predominating in 28.6% of cases, according to a study carried out in Gabon [4]. According to the WHO, 30.2% of all traumas involve the musculoskeletal system. Some 12.1% of these injuries involve the lower limb in children under 18, and more than half occur in children aged 10 to 14 [8]. The majority of these injuries are due to falls in the home or on playgrounds. In Mali, studies have been carried out on the subject [9, 10], but very few have focused on limb injuries. The aim of this study is to describe the epidemiological-clinical and anatomopathological characteristics of limb trauma in children aged 0 to 15 years at Kati University Hospital.

PATIENTS AND METHODS

This was an analytical cross-sectional study with prospective data collection. It ran from January 2022 to June 2022. The study population consisted of all children aged 0-15 admitted for limb trauma during the study period. Patients with limb trauma whose parents or guardians gave their consent for participation in the study were included in the study. The parameters studied were socio-demographic characteristics; origin and reason for consultation; medical and surgical history, clinical aspects; radiological aspects; anatomopathological aspects of lesions. These lesions were classified as: wound; fracture; sprain; dislocation; contusion; traumatic amputation. Immediate complications were specified. Fractures were individualized according to the different forms of fracture in children. Epiphyseal detachments were classified according to Salter and Harris, and complete long-bone fractures according to A O. Data were collected using a pre-established survey form based on the department's emergency registers and patient records. The data were entered on an Excel mask and analyzed with SPSS version 20.0. We performed a univariate analysis, expressing the mean and standard deviation for quantitative variables and the percentage for qualitative ones. A bi-variate analysis was also carried out for different crosses, for which we used the Chi 2 test for comparison of proportions, and the results

were deemed significant for a p less than or equal to 0.05. The consent of the children's parents or guardians was obtained prior to inclusion. The agreement of the hospital's administrative authorities was also obtained prior to the start of the study. Data were collected and analyzed anonymously, using identification numbers. They were used strictly for research purposes and may under no circumstances be used for personal purposes.

RESULTS

Of the 1140 patients admitted for trauma at Kati University Hospital, limb trauma was diagnosed in 100 children aged 0-15 years, i.e. 8.7% (Figure 1). The month of March was the most represented, at 24% (Figure 2). The 10-15 age group was in the majority with 63%. The average age was 11 ± 3.8 years. The extremes were 3 and 15 years (Table 1). Road traffic accidents were the most common, accounting for 55%. There was no significant statistical relationship between gender and etiology ($p=...$) (Table 3). Direct mechanism was the most represented with 83% (figure 4). Pain was constant in all patients. Functional impotence of the affected limb was total in 78% of cases, against 20% of partial impotence. Fractures were the most common lesions, accounting for 78.4% (Table 4). Vascular-nervous lesions were observed in 3% of cases. Open fractures were found in 5% of patients. Type II was the most frequent in our study, accounting for 75%.

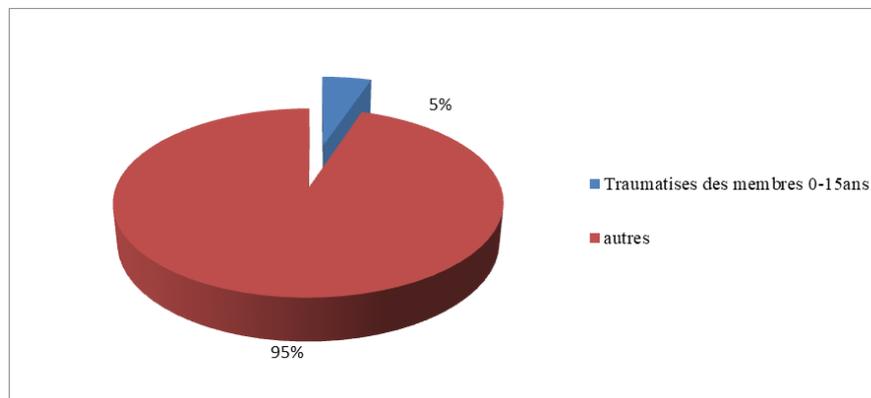


Figure 1: Frequency of limb trauma in children aged 0-15 years in relation to 1140 trauma admissions at CHU Pr Bocar Sidi Sall from January to June 2022

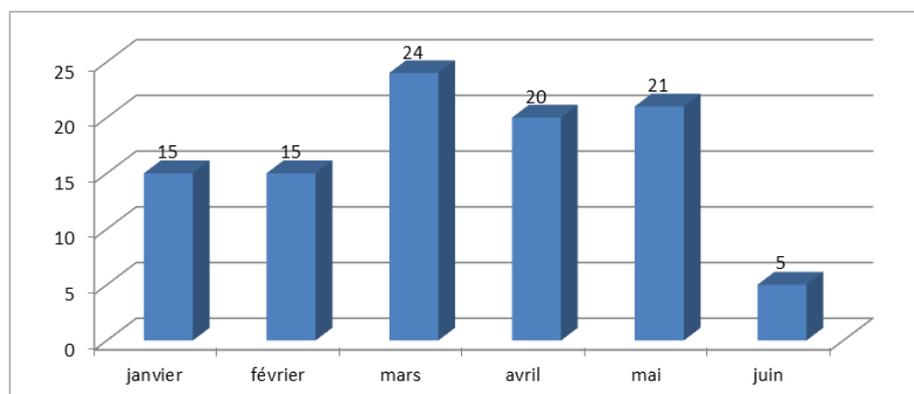


Figure 2: Distribution of patients by month

Table I: Distribution of patients by age group

Age group	Numbers	Percentages
[0 à 5] ans	11	11
] 5 à 10] ans	26	26
] 10 à15] ans	63	63
Total	100	100

Table II: Distribution of patients according by education.

Education	Numbers	Percentages
No education	17	17
Preschool	2	2
Primary	43	43
Second cycle	38	38
Total	100	100

Table III: Distribution of etiologies by gender

Etiologie		Play accidents	Road traffic accidents	Domestic accidents	Assault and battery	Total
Gender	numbers	11	36	23	1	71
	%	100	65,5	74,2	50	71
Female	numbers	1	19	8	1	29
	%	100	34,5	25,8	50	29
Total	numbers	12	55	31	2	100
	%	100	100	100	100	100

Chi II=8,6 ; p=0,08

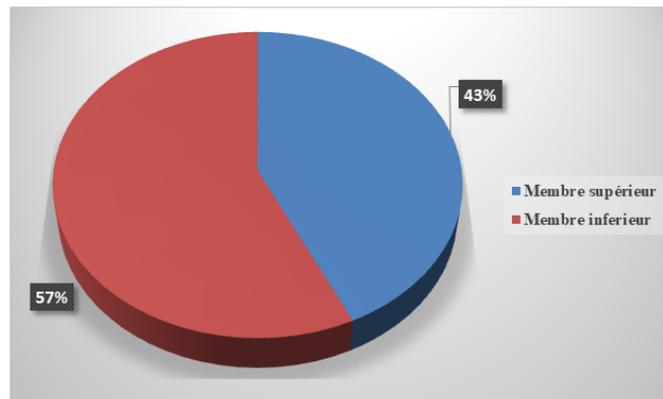


Figure 3: Distribution of patients by affected limb

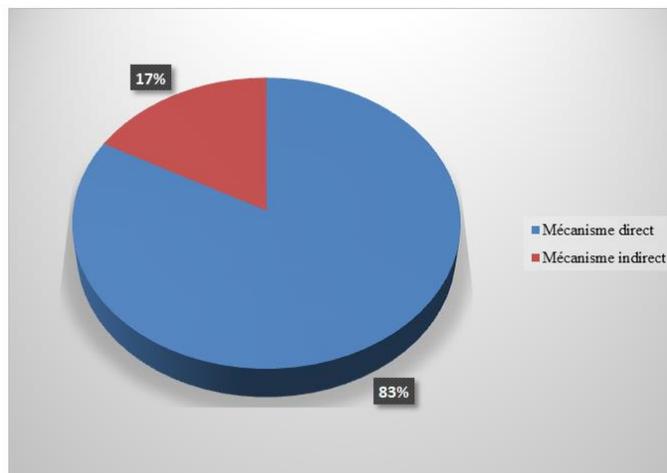


Figure 4: Patient distribution by mechanism

Table IV: Patient distribution by fracture type

Type	Numbers	Percentages
complete fracture	59	65,5
Epiphyseal detachment fracture	24	26,7
Butterball fracture	2	2,2
Fracture in green wood	1	1,1
Plastic fracture	1	1,1

DISCUSSION

This study has its limitations. The six-month duration of the study makes it impossible to determine the incidence of limb trauma. The incidence of limb trauma was 8.7% in our study. This result is close to that of Nga OP *et al.*, who reported 9.8% in their study [6]. Analysis by month shows that the highest number of patients was admitted in March, with 24%. This is probably related to the Easter vacation period, with its increased risk of traffic accidents. This result is comparable to that of Mateh, who found a peak in hospitalization in March with 110 cases in the Traumatology department of the CHU MOHAMMED VI in Marrakech [11]. On the other hand, Bénié Adoubs Célestin *et al.*, found a peak in December with 14% in Bouaké [12]. The 11-15 age group was the most represented, with 47% of cases. The average age was 11±3.8 years, with extremes of 3 and 15 years. This may be due to the fact that children are very active at this age, and are less monitored and supervised than in early childhood. These results corroborate those of Nga O P [6] and Diakité S *et al.*, [7] who found respectively 31.98% for the 11-15 age group and 47.0% for the 11-15 age group. The male sex was the most affected with 71.0% of patients with a sex ratio of 3.4. This male predominance was also reported by Diakité [7] in Mali, who found 63.9% boys. It could be explained by the fact that boys are more boisterous and tend to take more risks than girls. According to Molinié *et al.*, [13], this predominance is linked to physical and temperamental differences, predisposing boys to more accidents and fractures. Boys engage in play activities at a very early age (soccer, wrestling, running, jumping, etc.). Primary school pupils were the most represented in our study with 43%, followed by secondary school pupils with 38.0% of cases. This result is in line with the literature [14-16]. Road traffic accidents were the most frequent cause of injury in our study with 55% of cases, followed by domestic accidents with 31%. This could be explained by the ever-increasing number of rolling machines and children's ignorance of the highway code and their passion for games without regard for the danger involved. This result is comparable to that of Nga O P [6], who found public road accidents to be the cause of 65% of injuries. In contrast, KA hindo Saasita Apollinaire in the DRC found road traffic accidents and falls to be the most frequent causes, accounting for 35.7% [17]. Analysis of etiologies by sex shows that 65.5% of traffic accidents occurred in males, compared with 25.8% of domestic accidents in females. Statistically, we found no relationship between gender

and etiology (Chi 2=8.6; p=0.08). These results are similar to those of Kaboro *et al.*, [18], in their study in Chad. Play accidents occurred in 75% of the 11-15 age group, compared with 25.8% of domestic accidents in the 0-5 age group. In Gabon, play and domestic accidents were reported in the same age groups, with 44% and 34% respectively [4]. Similar results have been described in Africa by certain authors, notably Kaboro M *et al.*, [18] in Chad and Gaudeville *et al.*, [5] in the Central African Republic. The predominance of these accidents in these age groups may be linked not only to a lack of supervision by parents and educators, but also to the carelessness and hyperactivity of children in this period of childhood. The lower limb was the most affected, with 57% in our study. This contrasts with the study by Obame *et al.*, [4] in Gabon, who reported a predominance of the upper limb. The same finding was reported by Cissoko F [19] in Mali, with 64%. In our study, the mechanism of fracture was direct in 83% of cases. The study by Kahindo *et al.*, [17] found an indirect mechanism in 55.4% of cases, the difference being that it concerned only fractures of the upper limbs. Fractures were the most common lesion, accounting for 78.4% of cases, wounds for 5.4% and sprains for 1.8%. The rarity of the latter could be explained by the importance of the resistance of capsulo-ligamentary structures protecting the joints. Vasculo-nerve lesions were also observed in 2.7% of cases. The proportion of fracture cases in our series (65.5%) is higher than that of Kaboro *et al.*, in N'Djamena [18], who found 14.86% fractures. Complete fractures were the most common at 65.5%, followed by fractures with apophyseal detachment at 26.7%. Open fractures were found in 5% of our patients. Bénié Adoubs Célestin *et al.*, [12] found a higher rate of 15.1%. Contrary to the Indian study, which found a lower rate than ours, i.e. 2.8% [20]. In our study, forearm bone fractures were the most common, with 31.1% of cases, followed by femur fractures with 25.6%. The predominance of forearm fractures is also reported by Barry in Mali [9], but his study focused only on trauma to the upper limb. Injuries to the arm and elbow were the most common, at 33.3% each. Gaudeville *et al.*, [5] found that the majority of wounds were on the arm (58%).

CONCLUSION

Trauma to the limbs in children is a frequent reason for consultation at our clinic. These traumas are of various aetiologies, with a predominance of road traffic accidents. They preferentially affect boys over 10 years of age. Complete fracture is the most frequent

injury, most of which occurs in the lower limb. However, the forearm is the limb segment most frequently affected.

Conflict of Interest: None

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