

PARTICULARITIES OF LETHAL HEAD INJURIES IN CHILDREN

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Abstract: Cranio-cerebral trauma is one of the most serious and frequently encountered causes of death, ranking first in the structure of violent death, among children and adolescents. The present work aimed to study the frequency, dynamics, structure and lesional peculiarities of lethal craniocerebral trauma in children. In order to achieve the proposed goal, 86 cases of lethal head trauma in children examined in the Chisinau thanatology department of the Center of Forensic Medicine for the period 2015-2021 were analyzed. Our study showed that 61.6% of male children died, more frequently aged 13-15; death mainly occurred in spring and summer. Head traumas were noticed mostly in urban areas (78.5%), due to transport and falls from height. Meningo-cerebral traumas (35.8%), scalp wounds (31.6%) and skull bone fractures (24.7%) were predominantly established during autopsies. A less prevalence of cranial fractures can be explained by peculiarities and high elasticity of bone tissue in children.

Keywords: lethal craniocerebral trauma, head trauma, traumatic objects, lesional particularities, children.

INTRODUCTION

Traumatic craniocerebral disorders are one of the most serious and frequent encountered causes of death, placed on the first positions in the structure of violent death at pediatric age [1].

Cranio-cerebral trauma is one of the most life-threatening important medico-social problems, due to the continuous increase in incidence year to year. Thus, some authors consider that craniocerebral trauma in children increases annually by 1-2% and affects most frequently children aged 0 – 2 and 15 and 18 years old.

Cranio-cerebral injuries have a leading place in the structure of mechanical lethal trauma and essentially predominate in comparison with the trauma of other regions [5]. This kind of trauma has an obvious lesional polymorphism due to the variability of mechanisms and location of traumatic actions, and structural and mechanical peculiarities of injured tissues: pericranial soft tissue, bone tissue, meninges, vessels and brain tissue [2].

Cranio-cerebral trauma in children involves a general reaction of the entire organism and produces a great adaptation through a complex of physiopathological, biochemical and morpho-

functional changes, not only in the immediate region subjected to impact but also at the level of the nervous, endocrine, cardiovascular and other systems. Trauma in children has some particularities generated by age-specific physiological aspects, different reactivity to aggressive external stimuli, as well as the continued growth of the child. All these factors also influence the morphological characteristics of trauma at this age [4].

The significant incidence of lethal craniocerebral traumas in children dictates the necessity to study this medico-social problem more detailed.

OBJECTIVES

The present work aims to study the frequency, dynamics, structure and the lesional particularities of lethal craniocerebral trauma in children.

MATERIALS AND METHOD

The present research is a selective retrospective analytical study. In order to achieve the aim, 86 cases of lethal head trauma in children examined in the Chisinau thanatological department of the Center of Forensic

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Medicine for the period 2015-2021 were analyzed. The selected data were analyzed by using the comparative analytical method and statistically calculated.

RESULTS AND DISCUSSIONS

Based on the carried out research, during the nominated period an oscillatory evolution of the lethal cranio-cerebral trauma cases was observed (Fig. 1).

The results of our study reveal that in 61.6% of cases, male children died as a result of cranial-cerebral trauma, and much less often, namely in 38.4% of cases female children became victims.

In the same context, analyzing the incidence of cases according to the sex of the victims, during the nominated period, the following ratio of cases between boys/girls was established, thus, in 2015 - 1.25:1, in 2016 - 2.2 :1, 1.5:1 in 2017, 1.66:1 in 2018, 1.4:1 in 2019, 2:1 for 2020 and 1.6:1 during 2021 (Fig. 2).

Depending on the age of the traumatized children, our research allowed us to identify the following structure: thus, most cases of lethal head trauma were represented by children aged 13-15 years - 28%. In an insignificantly smaller number, children aged 4-6 years were subjected to the trauma, constituting 24%, followed by children aged 10-12 years, who account for 16%. The other age categories

follow with a smaller weight: 7-9 years and 1-4 years, each with 10%, 16-18 years - 6.0%, and children under 1 year - 6.0% (Fig. 3).

For a more complex image of the cases of lethal cranio-cerebral trauma in children, an analysis of the seasonal distribution of the given phenomenon was undertaken. So as it results from our research and shown in figure no. 4, the most “dangerous” months turned out to be the months of the spring season (40.6%) and summer (31.39%), followed by the months of the autumn season (18.6%), and later with a significant difference, deaths being found in the cold season of the year, being 9.5%.

This fact, namely, the highest rate in the case of traumas produced during spring and summer, can be explained by the increase in children’s mobility and types of activities during the warm period of the year.

Our study revealed that, in depending on the place of residence, cranio-cerebral trauma occurred more frequently in urban areas (78.5%) than in rural areas (21.5%). It should be noted that the high frequency of fatal head injuries in urban areas can be explained by the presence of high-rise residential buildings in these areas, by the comparative intensity of road traffic, etc.

The analysis of the circumstances of the occurrence of cranio-cerebral traumas allowed us to state some particularities, thus, in the overwhelming

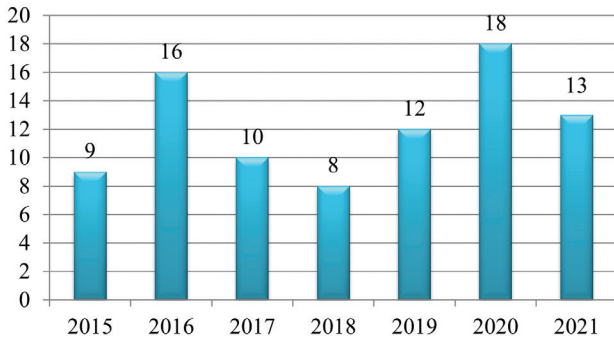


Figure 1. Dynamics of head trauma cases in children (2015-2021), (%).

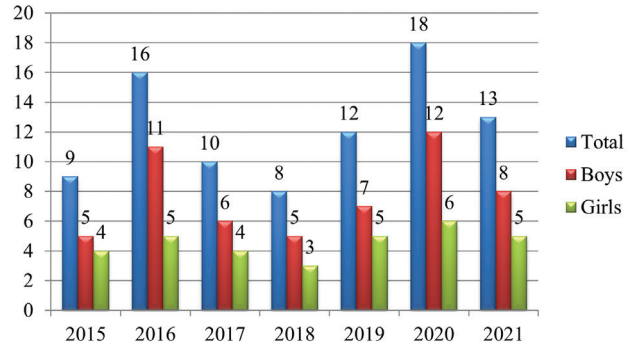


Figure 2. Incidence of lethal head injuries in children according to sex.

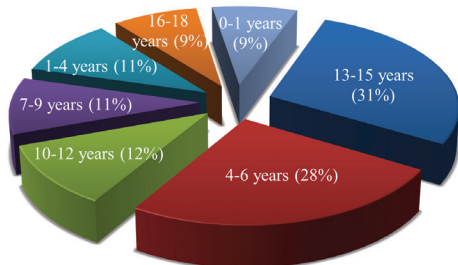


Figure 3. The frequency of head injuries according to age.

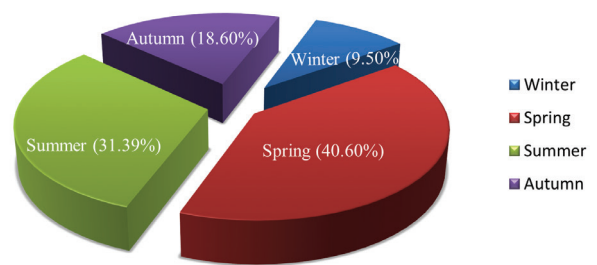


Figure 4. Distribution of head trauma cases according to seasons.

majority of head trauma cases produced by the action of blunt objects, traumas mainly being the consequences accidents by various means of transport (45.6%). In 33.7% of observations, children have died outside the home as a result of the trauma caused by the fall. The falls on the same plan and the subsequent hitting of the head by hard blunt objects, were recorded in 12.5% of cases, and in an insignificant number (8.2%) as a means of producing injuries they served the action of other traumatic factors (firearms, sharp objects).

It should be noted that the type of trauma (open/closed) is in direct correlation with the character of the traumatic object, thus, in all cases (100%) open cranio-cerebral traumas occurred when firearms were used. In 73.5% of observations as a result of road accidents, head injuries were open, and in 26.5% closed cranio-cerebral traumas were found. As a result of the precipitations, open cranio-cerebral traumas were established in 54.5% of cases.

The results of our research have shown that lethal head trauma in children has an essential lesional polymorphism, a fact conditioned by various factors: the type of injury causing objects, their kinetic energy of action, the place and angle of force application, the structural particularities of the tissues of the affected region, such as and other factors able to influence the lesion character.

Analyzing the structure of head injuries according to their type, a predominance of meningo-cerebral traumatic disorders was established (35.8%), followed by lacerations, wounds by firearms and sharp objects (31.6%), and fractures of skull bones (24.7%). Much less often, the soft tissues of the head were traumatized, being manifested by abrasions and bruises.

However, we can affirm that the relatively small presence of cranial bone fractures in children, in the ratio of meningo-cerebral injuries, can be explained by the structural particularities of the brain, as well as the increased elasticity of the bone tissue at this age.

Our facts show that, depending on the place of death, in 51.2% of the victims subjected to cranio-cerebral trauma died in medical institutions, in 39.8% - the death occurred in the street and only in 9.0% the death occurred installed at home. The increased mortality of children in medical institutions can be conditioned by the aggressiveness and severity of the traumatic agent, the volume of the lesion caused at the level of the head, which, in some cases, determines the impossibility of saving the patient, even on the background of the administration of adequate treatment.

CONCLUSIONS

1. The results of our study reveal that in 61.6% of cases, male children died as a result of brain trauma, and much less often, in 38.4% of cases, female children became victims, the death mostly occurring in medical institutions.

2. More frequently, as a result of cranio-cerebral trauma, died children with aged between 13-15 years, being followed by those aged 4-6 years, death settling mainly in the spring and summer months - a fact that can be explained by growth children's mobility during the warm period of the year.

3. It was established that fatal head injuries were more frequently produced in the urban localities, through the action of blunt objects - various means of transport and falls from height, which can be argued by the intensity of road traffic, as well as the presence high-rise housing constructions in the given localities.

4. Analyzing the structure of head injuries according to their type, it was established a predominance of meningo-cerebral traumatic disorders (35.8%), and scalp wounds (31.6%), followed by skull bone fractures (24.7%), and the relatively lower presence of skull fractures can be explained by the structural peculiarities and increased elasticity of the bone tissue at this age.

Conflict of interest

The authors declare that they have no conflict of interest.

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