CCI JOURNAL CRITICAL CARE INNOVATIONS

ORIGINAL ARTICLE

Critical Care Innovations
2019; 2(2):1–8

www.criticalcareinnovations.eu

The paediatric trauma patient profile from the perspective of the emergency medical service.

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ABSTRACT

INTRODUCTION: Injuries are one of the main causes of mortality in the world. Emergency services should have appropriate knowledge and skills in the field of trauma research at the scene and proper therapeutic treatment. A special group of traumatic patients are children, which are often more difficult to assess and secure by medical personnel. The work aims to determine the profile of a paediatric patient after an injury secured by an ambulance.

MATERIAL AND METHODS: The research tool was medical documentation in the form of 68,441 medical charts of rescue operations from 2016-2017, out of which 464 interventions were selected for children with injuries. The factors taken into account were: age and sex of the injured, a combination of hours of travel and months per year, the place where the injury occurred, the type of injury and the type of ambulance.

RESULTS: At the scene, teams without a doctor were dispensed with 354 times, and teams with a doctor 110 times. The highest number of injuries in children occurred in educational institutions. The increase in the number of interventions was observed in the afternoon in the summer and autumn seasons. Trips to girls accounted for 39% (n=181), and 61% (n=283) were trips to boys. The average age of injured paediatric patients was 10.8 years (SD±4.84). The greatest number of injuries in children were head and neck injuries.

CONCLUSIONS: Children with injuries usually have a medical emergency team without a doctor. Interventions are usually carried out at schools, in June and October, around noon. Typically, injuries are experienced by several-year-old boys. The dominant regions of injuries are head and neck and limbs.

KEY WORDS: Injuries, children, accidents, emergency medical service, trauma patient

INTRODUCTION

Despite significant advances in emergency medicine over the past couple of decades, injuries continue to be the main cause of death among people under 45 years of age. Millions of people die every year as a result of injuries, and even more people suffer significant bodily harm or disability. Internal injuries are very dangerous, and during the first contact with the injured it is difficult to accurately determine the injuries. One of the most serious post-traumatic complications is haemorrhage, which in a very short time may cause hypovolaemia, which in turn leads to shock and multi-organ failure [1].While external haemorrhage is usually easy to control, the internal one still remains a challenge for emergency rescue personnel, due to the need to perform imaging diagnostics and surgery in most cases. It was established that the key factor affecting the survivability of the person who suffered the injury is the time to reach the operating room, which should not exceed one hour. The period was called the golden hour [2]. It should be remembered that every unnecessary activity reduces the chance of survival.

A special group of traumatic patients are children. Psychological and physiological differences of adults and children pose a challenge for medical personnel, who must establish the right diagnosis and implement the treatment in the shortest possible time. Securing the traumatic and painful child at the scene requires appropriate knowledge and skills of rescuers. In contact with a paediatric patient, simple and understandable words should be used [3].Establishing and maintaining eye contact not only with the child, but also with his parent, affects positively the sense of safety of the little patient. It should also be remembered that the anxiety felt by the parent / legal guardian can also be given to the child, thus enhancing his anxiety [4]. Small children can be very emotional and their reactions can change quickly [5]. Many difficulties in pre-hospital management also result from differences in the structure and arrangement of some organs and structures in the body of a small patient, which change with age. The following periods in the child's development are distinguished:

»Neonatal - from birth to 28 days of age;

»Infants - from 1 to 12 months of age;

»Toddlers - from 1 to 3 years of age;

»Pre-school - from 4 to 6 years of age;

»School - from 7 to 12 years old;

»Maturation - from 13 to 18 years [3].

Handling the child after the injury requires a lot of knowledge and high skills to make a proper assessment of the patient's condition. The mechanism of injury should be taken into account (e.g. the speed with which the vehicle moved, kinetics, the size of the injured person, the degree to which the vehicle has been damaged). If a child has been involved in an accident with high energy, it is assumed that it has suffered severe bodily injuries until they are ruled out. The mechanism of injury can be generalized or local. During a generalized injury, the injured requires a quick overall assessment, and may require a special assessment of the area where the injury occurred.

The aim of the study was to outline the trauma paediatric patient profile to which the ambulance service is called. The authors also attempted to determine the epidemiology of accidents involving children.

MATERIAL AND METHODS

The study was conducted in the period 2016-2017 at the Emergency Service Station in central Poland. The research tool consisted of medical documentation in the form of 68,441 medical cards, rescue operations, out of which 464 interventions were selected for children with injuries. The study took into account such factors as age and sex of the injured, a list of hours of trips and months per year, the place where the injury occurred, the type of injury and the type of ambulance. The study received a positive opinion of the Bioethics Committee (No. 6/2019). The test results were expressed in the form of arithmetic means and average standard errors.

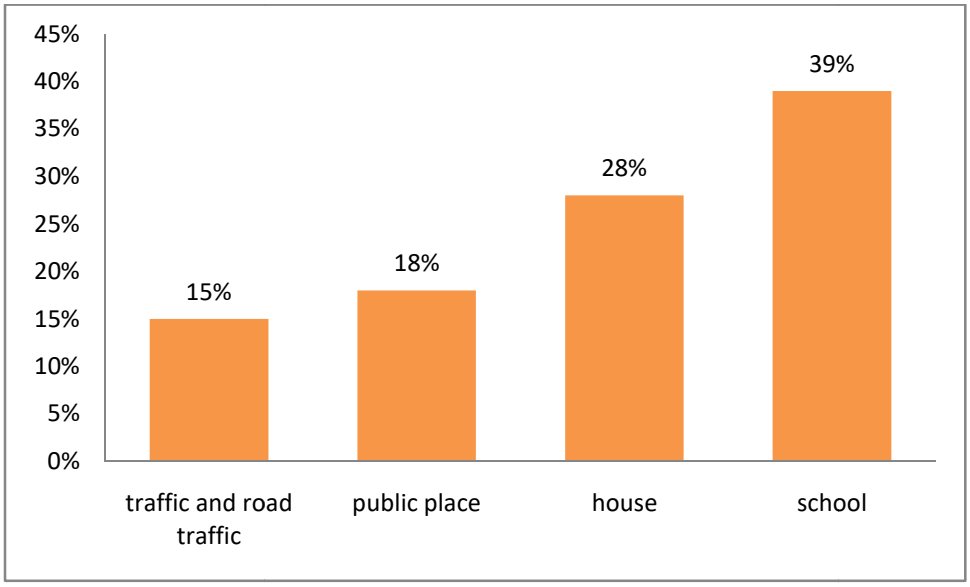
RESULTS

Intervention statistics

At the scene of the incident, teams without a doctor (BEMS - Basic Emergency Medical Service) were discharged 354 times, including 90 (25.4%) in the alarm code, and 110 times the teams with a doctor (SEMS - Specialist Emergency Medical Service) including 53 (48.2%) in the alarm code. In 2016, on-call

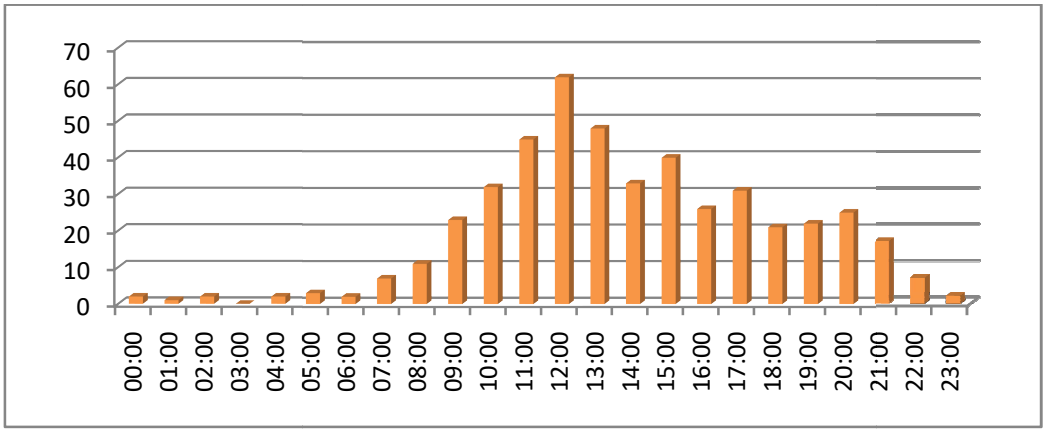
duty was performed by 13 BEMS teams and 8 SEMS teams, and in 2017 there were 14 BEMS and 7 SEMS teams. In total, 143 trips to paediatric patients were made in the first (emergency) code. During the analysis of the place of the incident, it was found that the highest number of injuries in children occurred at school, followed by home injuries. A detailed analysis of the specificity of the event site is shown in Figure 1.

Figure 1. The types of place of the event in which children have suffered an injury



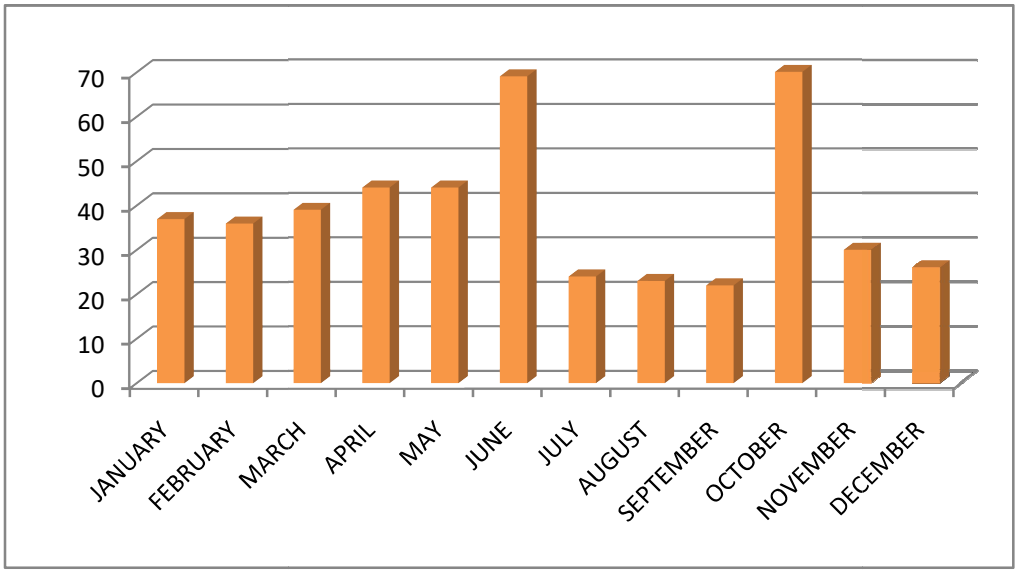
In most cases, injuries to children took place around midday. At 12:00 hours there were 62 interventions, at 13:00 - 48 calls, and at 11:00 - 45 interventions. The exact data is shown in Figure 2.

Figure 2. The number of interventions in terms of the daily schedule of hours



During the analysis of the dependence of the occurrence of the injury on the season, it was observed that the highest number of injuries in children in the examined period occurred in the summer season (June n = 69) and autumn (October n = 70).

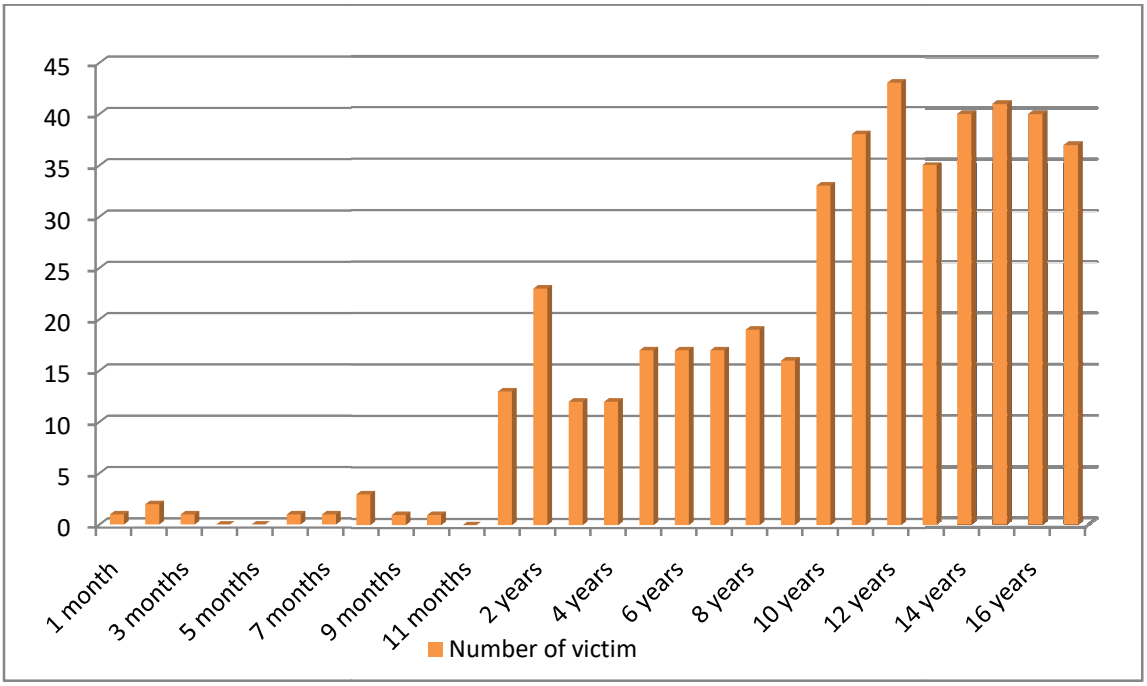
Figure 3. The number of interventions in terms of individual months of the year



Patient's characteristics

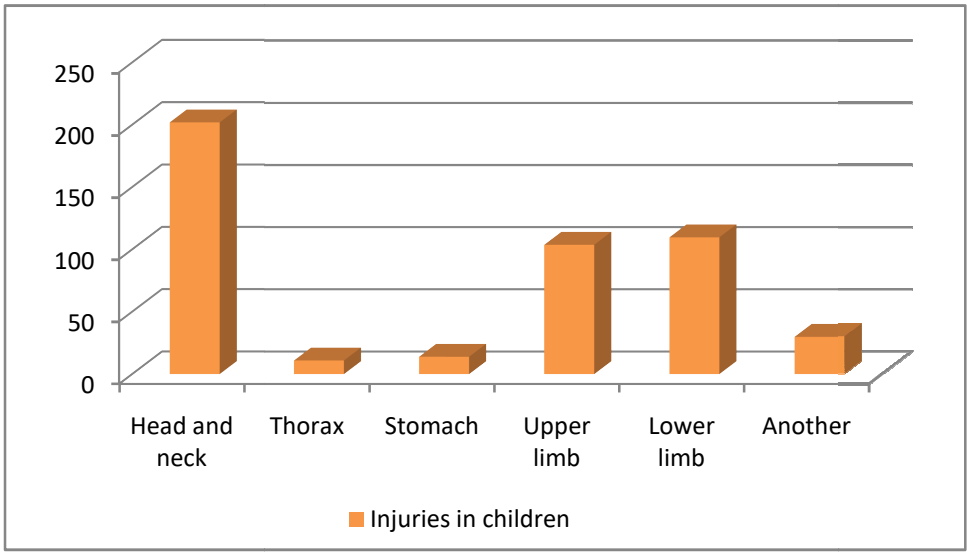
Trips to girls accounted for 39% (n=181), and 61% (n=283) were trips to boys. The average age of injured paediatric patients was 10.8 years (SD±4.84). The study found that the most common challenges were in patients aged 12 (n=43), 14 (n=40), 15 (n=41) and 16 (n=40). Detailed reports have been placed on Figure 4.

Figure 4. The age of paediatric trauma patients



Based on the International Classification of Diseases ICD-10, it can be concluded that in 2016-2017 the highest number of injuries in children were head and neck injuries (ICD: S00-S19), which were reported in 202 paediatric patients (42.89%). The second most common areas of injury were lower limbs (ICD: S70-S99), which accounted for 23.35% (n=110) of all injuries. Injuries to the upper limbs were ranked third, as they accounted for 22.4% of all injuries (n=104). The lowest number of injuries in children was found in the abdomen (ICD: S30-S39) constituting 2.97% (n=14) and chest (ICD: S20-S29), where eleven cases were recorded (2.34%).

Figure 5. The location of injuries sustained by children



DISCUSSION

Emergency calls for medical teams to paediatric trauma patients are relatively rare (0.68% of all interventions). The greatest number of injuries to children are sustained in educational institutions. School injuries accounted for as much as 39% (n=180) of all trips, when injuries sustained in street and road traffic only 15% (n=68). This may be due to the fact that children in school are very active and the injuries occurring are usually of a sports nature, associated with physical education classes or during breaks. The threat of an injury to school classes in these times is a big social problem. Although it is impossible to predict the accident itself, it is possible to predict the factors preceding this accident and strive to prevent them. In order to prevent such injuries, it is necessary to improve the safety conditions and to deepen the knowledge on the subject among teachers [6].

The dominant injuries among the children to whom the ambulance service was called were head and neck injuries. They constitute 43.5% (n=202) of all injuries. These injuries are very common in children and relatively quite dangerous. Mortality in children after craniocerebral injuries reaches even 70% [7]. The occurrence of a large number of head injuries in children may be due to anatomical differences that do not occur in an adult. The child's head is relatively larger and heavier than the rest of the body, and the bones of the skull are thin. At the scene of the incident, it is important to pay attention to worrying symptoms associated with head injuries, such as: nausea, vomiting, disturbance of consciousness, speech, hearing, over-stimulation, hematoma around the eyes and ears, widened / narrowed pupils, paresis [8]. Head injuries in children are global and unpredictable. Therefore, it is important to maintain constant vigilance at prehospital level and during hospitalization.

As many as 76.29% (n=354) of calls for injuries to children are carried out by emergency teams without a doctor. This requires high rescuers from the paramedics to investigate and deal with the paediatric patient with injuries. Medical staff most often encounter traumatic male children, from the age of 12 years. The highest risk of injuries in children occurs in the afternoon hours, in June and October.

CONCLUSIONS

Children with injuries usually have a medical emergency team without a doctor. Interventions are usually carried out at schools, in June and October, around noon. Typically, injuries are experienced by several-year-old boys. The dominant regions of injuries are head and neck and limbs.

Disclosure statement

No potential conflict of interest was reported by the author's.

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