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Evaluation of pediatric cases presenting to the emergency department of our hospital because of trauma

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Summary

Aim: Trauma is the leading cause of mortality in developed countries. The objective of this study was to evaluate the pediatric cases presenting to the emergency department because of trauma in our region in company with the literature and present the results.

Material and Method: Study data were obtained by retrospective screening of the files of pediatric cases presenting to our emergency department because of trauma between January 2006 and December 2007. The subjects were evaluated in terms of age, gender, time of presentation, type of trauma, type of injury, radiologic findings and hospitalization rates.

Results: Files of 1293 children between 0 and 16 years of age could be accessed. 69% of these children were male and 31% were female. Most of the presentations occured in August. Falling down/crashing onto the flat surface was the leading cause among the causes of injury. In terms of time of presentation in the emergency department, non-vehicle traffic accidents were the fastest group. “Head region” was in the first line with a rate of 42% among regions exposed to injury. The rate of exposure to trauma was found to be the highest (43.8%) in the 2-6 years old age group.

Conclusions: Injuries most frequently occur in the summer. Frequently seen causes of injury include falling down/crush onto the flat surface and non-vehicle traffic accidents. In this study, we aimed to draw attention to the problem of trauma in our country by emphasizing some properties of pediatric trauma cases who presented to an emergency department. *(Turk Arch Ped 2011; 46: 156-60)*

Key words: Children, trauma, traffic accident, head trauma, emergency service

Introduction

Trauma is the leading cause of mortality in the childhood in developed countries (1,2). Although the causes of trauma in children varies according to age groups, the most common causes include falling, in-vehicle or non-vehicle traffic accidents, bicycle accidents, drowning in water, burns and child abuse (3). In this study, trauma types and injuries in children presenting to our emergency service were discussed in company with the literature.

Material and Method

The study is a retrospective study examining the files of trauma cases in the 0-16 year-old group presenting to our emergency service between January 2006 and December 2007. 1293 subjects whose file data could be reached were included in the study. The subjects who had burns and whose data could not be reached were excluded from the study. Age, gender, seasonal distribution of traumas, mechanism of trauma, body region exposed to trauma and type of injury

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were examined. For statistical analysis data were entered into SPSS (version:13.0) and defined as number of individuals and percent in the tables. Approval was obtained from the ethics committee (date: 05.13.2008, number 2008/39, decision number 2008-4/5).

Results

Among the subjects in the 0-16 year-old group presenting to the emergency department during the study period, 1293 subjects whose data could be reached were included in the study. 896 of the subjects (69%) were male and 397 (31%) were female (Table 1). 43.8% of the subjects (n=566. 8 of 10 subjects who died were included in these subjects) were in the 2-6 year-old group. 372 (28.8%) subjects in the 7-11 year-old group were in the second line.

The most common type of trauma was found to be falling down/crushing onto the flat surface with 572 subjects (44.3%). This was followed by falling down from a high level with 211 subjects (16.4%) and non-vehicle traffic accidents with 202 subjects (15.7%). The least common type of trauma was assault (Table 2). Traumas were found to occur most frequently between May and October and reached the highest level in August (Figure 1).

415 of the subjects (32.1%) were found to present to the emergency department in the first hour. When presentation times were compared by trauma type, mean presentation time found to be 112 minutes (the fastest) for non-vehicle traffic accidents was and 264 minutes for falling down/crashing onto the flat surface (the latest). Although cases of falling down/crashing onto the flat surface were the latest to present to the emergency department compared to the average, they were in the first order to present to the emergency department in the first hour after trauma with 191 subjects (46%). Non-vehicle traffic accidents were in the second order with 81 subjects (19.5%) and falling down from a high level was in the third order with 60 subjects (14.4%).

166 (38.3%) of 433 (33.5%) patients who were hospitalized were hospitalized in the department of neurosurgery and 106 (24.5%) were hospitalized in the department of pediatric surgery. 541 (41.8%) of the subjects were discharged by the physicians of the emergency department and 319 (24.7%) were discharged following consultations and treatment adjustments. Cases of falling down/crushing onto the flat surface constituted the group for whom ambulatory treatment was adjusted with the highest rate (491 subjects; 57.5%). The highest hospitalization rates were found in cases of falling down from a high level (131 subjects; 30.3%) and in cases of non-vehicle traffic accidents (118 subjects; 27.3%).

5 of 10 exitus cases were dead on presentation to the hospital. 7 of these cases were non-vehicle accidents, one was in-vehicle accident, one was contusion-compression type of injury and the last case was falling from a high level. 9 of these cases had significant head trauma.

The most common region affected by trauma was the head (543 subjects; 42%) and the second most common region was extremities (432 subjects; 33.4%). Among multiple traumas, head-extremity trauma was in the first line (50 subjects; 32.5%) (Figure 2).

Table 1: Gender distribution of the subjects

	n	%
Male	896	69.3
Female	397	30.7
Total	1293	100.0

Table 2: Distribution of the subjects according to the type of trauma

	n	%
Falling from a high level	211	16.4
In-vehicle traffic accident	97	7.5
Non-vehicle traffic accident	203	15.7
Sharp object injuries	84	6.5
Assault	59	4.6
Crashing-falling	572	44.3
Contusion-compression	65	5.0
Total	1293	100.0

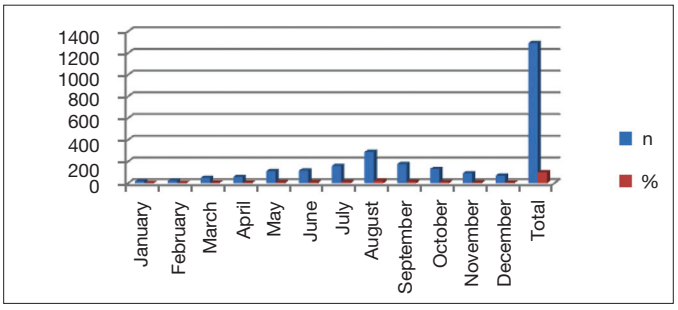

Figure 1: Distribution of the subjects according to months

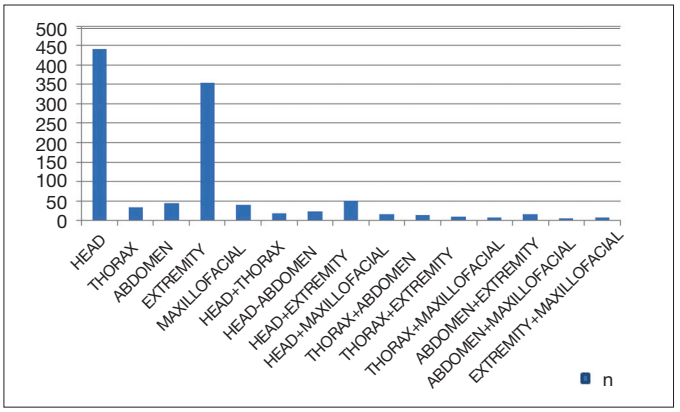

Figure 2: Distribution of the regions exposed to trauma

Head trauma was the leading trauma among all traumas (543 subjects; 41.9%) and was related to the highest rate of hospitalization in the department of neurosurgery (166 subjects; 38.5%). Isolated head trauma was found in 440 subjects (34%) and accompanying non-head trauma was observed with a rate of 19%.

The rate of trauma related to brain parenchyma was found to be 8.6% among all head traumas. In the 7-11 year-old age group, non-vehicle traffic accidents and falling from a high level with a rate of 80.9% were the most common traumas leading to head trauma. In the 0-1 year-old age group, subarachnoid hemorhhage was observed in two subjects (3.2%) and the rate of linear fracture was found to be 31.5%.

Among 353 subjects who had extremity fracture, upper extremity fracture was observed in 264 subjects (74.8%). 86 subjects (24.4%) had hand fracture and 71 subjects (20.1%) had forearm fracture. Subjects who had forearm fractures constituted the group for whom ambulatory treatment was adjusted with the highest rate (56 subjects; 12.8%) and subjects with hand fracture were in the second line (47 subjects; 10.8%). In 56 subjects (15.9%), amputation was observed.

In our study, chest trauma was found in 76 subjects (5,9%) and 75% of these cases were traffic accidents. Isolated chest trauma was found in 32 subjects (2.5%) and 19 of these subjects (59.4%) had developed lung contusion and 10 (31.3%) had developed pneumothorax.

Isolated abdominal trauma was found in 42 subjects (3.2%).

For radiographic imaging computarized tomography (CT) was ordered in 538 subjects (41.6%), ultrasonography was ordered in 282 subjects (21.8%) and both were ordered in 222 subjects (17.1%) in addition to direct graphy. Among all subjects, linear fracture was diagnosed by radiology in 7 subjects (0,5) who had normal physical examination findings.

7 subjects had vertebral column trauma. 2 of these subjects were in the 2-6 year-old group, 2 were in the 7-11 year-old group and 3 were in the 12-16 year-old group. In one case of exitus, fracture was found in C1.

Bone pathology was found in 38 (14.1%) of 270 subjects (20.9%) who had external lesion with maxillofacial trauma which is evaluated seperately from head traumas. The most common bone pathologies were mandibula fracture (11 subjects; 28.9%) and nasal bone fracture (10 subjects; 26.3%). Among all subjects with maxillofacial traumas, skin laceration was observed in 98 subjects (36.4) and periorbital edema was observed in 85 subjects (31.6%) as external lesions.

Discussion

Trauma is the most important cause of morbidity and mortality in the young age group (4,5). In pediatric trauma cases, type of accident and consequent pathologies vary according to anatomical structure by age, activity areas and physical activity levels. The frequency of trauma in children is affected by factors including climate, culture, level of development, season, time of the day and age (6). For each exitus case 34 hospitalizations and 1000 presentations to the emergency department are registered (7).

The higher number of male subjects in our series is compatible with the data indicating that male individuals tend to be exposed to trauma with a higher rate (8,9). Among presentations to the emergency departments as a result of trauma, falling is generally in the first line (8). In USA, this rate is between 25% and 34% (9). The most common two causes of pediatric injuries include falling from a high level and traffic accidents (10). In our study, falling down/crushing onto the flat surface was found to be in the first line with 572 subjects (44.3%) and motor vehicle accidents was found to be in the second line with 300 subjects (23.2%). In this study, falling down/crushing onto the flat surface was the most commonly seen type of trauma with 255 subjects (19.7%) in the 2-6 year-old age group.

32.1% of the patients presented to the emergency service in the first hour after trauma. Mean presentation time to the emergency service after sharp object injuries was in the second line with 143 minutes. This can be interpreted as active external bleeding shortens the presentation time of the patient and relatives to the hospital. The rate of presenting to the emergency service in the first hour after trauma was found to be 46% in cases of falling down/crushing onto the flat surface, 19.5% in cases of non-vehicle traffic accidents and 14.4% in cases of falling from a high level.

In USA, 14 million cases of trauma occur each year in children below 15 years of age. 9 million of these present to the hospital and 250000 are hospitalized (11). In a series, 4.2% of 35946 cases of trauma in the 0-16 year-old age group presented to the emergency service were hospitalized (12). In the series of Özkan et al.(13) who evaluated traumas in pre-school children, the rate of hospitalization was found to be 23%. In our series, the rate of hospitalization was found to be 33.5%. The reasons for the difference in the rates of hospitalization may include presentation of the patients from external regions, referral of more serious cases of trauma from peripheral hospitals to our center, transportation possibilities and type of trauma.

In cases of multi-trauma, the most common reason for mortality is severe head trauma (16). Head trauma is in the third line among mortality and morbidity causes in children (200/100000 years) and occurs 2 times more frequently in males (17). Non-head trauma accompany head trauma in 30-70% of the patients with head trauma (14). 10-32% of the patients with severe head trauma have a well general status on presentation at the emergency service and worsen later (15). Head traumas were in the first line among all traumas with 543

subjects (41.9%) and constituted the group with the highest rate of hospitalization in the department of neurosurgery (166 subjects; 38.5%). In our series, isolated head trauma was found in 440 subjects (34%) and accompanying extracranial trauma was found with a rate of 19%. The low level of this rate may be explained by the fact that 46% of the cases were falling down/crushing onto the flat surface. While the rate of linear fracture was 0.6% by physical examination, following CT this rate increased to 12%. In insignificant head trauma, plain graphy can demonstrate simple fractures, but can not exclude intracranial injury. We think that if fracture is seen on cranial graphy in patients with subcutaneous hematoma below one year of age, CT should be performed and pathology related to brain parenchyma should be investigated.

Cervical vertebrae injuries accompanying head traumas in emergency services are observed with a rate of 2-6% (18). In our study, six subjects with vertabral trauma were hospitalized and treated. Neck fracture was found in two of these subjects, chest fracture was found in one and vertebral corpus fracture was found in three.

More than 50% of maxillofacial fractures are the result of traffic accidents. The incidence in the childhood is less than 10% (19). Apart from soft tissue traumas, the most common bone fracture is observed in the nasal bone as a result of maxillofacial trauma. This is followed by mandibular, zygomatic and maxillar fractures (20,21).

Bone fracture was found in 38 (14.1%) of 270 subjects (20.8%) who had external lesions due to maxillofacial trauma. 41.6% of maxillofacial external lesions were the result of falling down/crushing onto the flat surface and 44.7% of bone fractures were the result of traffic accidents.

Blunt chest traumas are infrequently seen in children compared to adults, but the morbidity and mortality rates are high. While the general mortality rate in trauma is 2-3%, it is 20-30% in children with chest trauma and chest trauma is the second leading cause of mortality after head trauma (22-25). In children, chest graphy is unvaluable for the initial evaluation because of limited assitance.

If head trauma is present in patients with blunt abdominal trauma, the mortality rate is 4 times higher (26). In more than half of the fatal cases, the cause is abdominal injury masked by accompanying head trauma.

Injuries which may occur in extremity traumas are observed in a wide range from soft tissue contusions to amputation. In our series, extremity traumas were in the second line with 432 subjects (33.4%) after head traumas and upper extremities were found to be the most commonly affected region (75.1%). This may be explained by the fact that extremities are exposed to sharp object injury and contusion-compression injuries with a higher rate.

As observed in this study, trauma is a serious problem in our country. We aimed to draw attention to the problem of trauma in our country by emphasizing some properties of pediatric trauma cases who presented to an emergency service.

Conflict of interest: None declared

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