

## Evaluation of Pre-School (0-6) Age Group Trauma Patients Etiology

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### Abstract

**Objective:** Trauma is one of the most important reasons of death in the pediatric age group. The aim of this study is to analyze the relation between the trauma type, trauma time, and the way of arrival to the hospital and to examine the causes of traumatic etiology and outcomes in the 0-6 age group (pre-primary) of trauma cases in our state.

**Material and Methods:** Trauma cases in the 0-6 age group (pre-primary) who were admitted to the Cumhuriyet University Medical School Emergency Department between May 2009-May 2011 were evaluated.

**Results:** In our study period, 799 children aged 0-6 were admitted to our emergency service; 55.8% of these patients were male. Most patients were mainly referred to the ER in July, August, and September, and the highest value was detected in July. Falls were first and motor vehicle accidents were second in frequency among the causes of injury.

**Conclusion:** Consequently, traumas are showing an increase, especially in summer time, and it is observed that children are disregarded during farm works, and because of this, trauma numbers are being increased between the ages of 0-6 years. (*JAEM 2014; 13: 172-5*)

**Key words:** Hospital emergency service, trauma, children

### Introduction

Trauma is the most common reason of mortality in the pediatric age group in developed countries. It was reported that inadequate assessment and inappropriate treatment methods are responsible for 30% of mortalities in children with polytrauma (1). The trauma causes in the childhood period differ from each other, while the most common cause is falling, followed by passenger- and pedestrian-type traffic accidents and bicycle accidents, respectively (2). Head traumas constitute an important portion of these traumas. These patients should be assessed carefully in terms of the primary causes of head traumas, intracranial lesions following a head trauma, and a treatment algorithm, since it can cause mortality and morbidity (3, 4).

### Material and Methods

Pediatric patients aged between 0-6 years who were admitted with a trauma complaint to the Cumhuriyet University Hospital Emergency Department between May 2009 and May 2011 were analyzed retrospectively. Trauma type, age, gender, and data of the patients were recorded. Vital values and pathologic findings in the

physical examination were assessed with the test results. Test results of referred patients that were obtained in other healthcare centers were used in this study. Patients with burn trauma, electric trauma, and drowning complaints were not included in this study. SPSS 14.0 was used for the statistical tests, and the data were defined as number and rate. Local ethical committee approval number 2009/06-09 and informed consent of patients were obtained for this study.

### Statistical Analysis

All data were inserted in Statistical Package for Social Sciences 14.0 (SPSS Inc., Chicago, IL, USA), and variance analysis, Tukey test, chi-square test, and difference between means tests were used.

### Results

Trauma patients belonging to the 0-6 age group who were admitted to the Cumhuriyet University Medical Faculty Emergency Department were analyzed retrospectively; 446 (55.8%) of the patients were male, and 353 (44.2%) were female.

The 2 years old children were the most (152 (10.9%) patients) who were faced with trauma. The most common reason of the



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trauma was falling (292, 36.5%) (Table 1). The other reasons were as follows: crush injuries, minor extremity traumas, penetrating traumas, isolated eye, and ear or nose traumas.

The most common period of the traumas was the summer season, and most of the patients (134, 16.8%) were admitted in July (Table 2).

Patients were classified according to Glasgow coma scale at the first admission, and patients who scored between 13 and 15 were accepted as good, 9-12 was moderate, and below 9 was accepted as bad in terms of general condition. Of the 8 patients with bad general conditions, 4 patients were hospitalized in the neurosurgery department, 1 patient was hospitalized in the pediatric surgery department, and 3 patients died during the initial approach and tests (Table 3). The hospitalization and discharge data of the patients and their departments are shown in Figure 1.

The most common trauma type was head-neck trauma (306, 38.3%), while the least common trauma type was isolated thorax trauma (3, 0.4%) (Table 4).

A total of 445 (55.7%) of the patients were referred to our hospital with an ambulance from another healthcare center, while 94 patients were referred without an ambulance. The remaining 260 patients were admitted to our emergency department directly (Table 5). The hospitalization and discharge distribution of patients and their relationship with administration type are shown in Figure 2.

### Discussion

Trauma is the most important reasons of both mortality and morbidity in the pediatric patient population. In undeveloped and developing countries, trauma is the second most common reason of mortality in the 1-4 age group after infections. It is the most common mortality in these countries among pediatric patients over 4 years and in the 1-14 age group in developed countries, with a rate of 52% (5). Our study consisted of 446 male (55.8%) and 353 (44.2%) female patients. The ratio of males was higher (6, 7), and this finding was compatible with the literature.

Falling is the most common reason of trauma in the pediatric patient population, and it is the second most common mortality reason after traffic accidents (8-10). Falling was also the most common trauma type in our study, with a rate of 36.5%. In a previous study, it was also reported that the most common injury reason was falling in the pre-school period (11). Falling was the dominant trauma type among the other causes in terms of etiology. Compatible with the literature, falling was the most common trauma type, with 292 (36.5%) in our study, while the rate varies between 25%-34 % in developed countries (12).

Navascues del Rio et al. (13) reported a hospitalization rate in 35,946 patients aged between 0-16 of 4.2%. In our study, the hospitalization rate was 16.3%, and this finding was not compatible with the literature. We assert that this difference is related with the observational hospitalization of patients who received only medical treatment. The factors that affect the hospitalization rates in favor of increasing are referral from out of the city center, transportation problems, physicians' concerns about legal liabilities, and the relatively cheap medical costs compared to the United States and European countries.

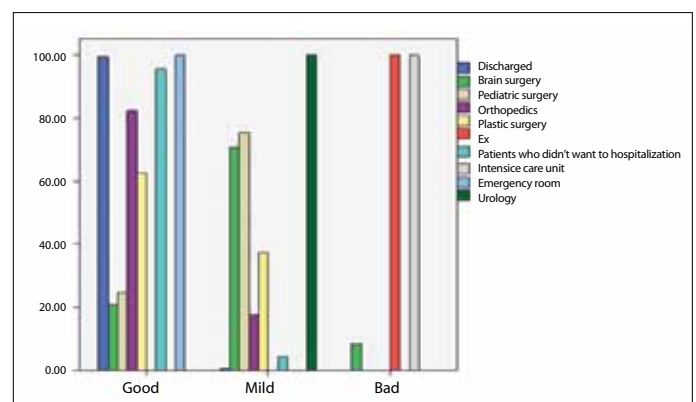
We determined that 642 (80.4%) patients were not hospitalized and discharged after their medical treatment in the emergency department. In a study of Akdur et al. (14), it was reported that 62.3% of patients were discharged without any hospitalization. The main reason of this difference is that our cases belonged mostly to falling

**Table 1.** Distribution of the trauma patients according to the injury mechanism

Injury mechanism	Number (n)	%
Motor vehicle accidents	174	21.8
Pedestrians	115	14.4
Falling down	292	36.5
Others	218	27.3
Total	799	100

**Table 2.** Distribution of the trauma patients according to month

Months	Number (n)	%
January	15	1.9
February	24	3.0
March	41	5.1
April	34	4.3
May	74	9.3
June	98	12.3
July	134	16.8
August	123	15.4
September	104	13.0
October	77	9.6
November	47	5.9
December	28	3.5
Total	799	100



**Figure 1.** Distribution of patients' services and discharge status according to their general condition

patients, and other cases requiring simple medical treatment were categorized under the title of other mechanisms.

Head trauma is a common type of trauma in trauma centers. A distinct extracranial injury is present in 39% of head trauma patients (15, 16). There are also other studies with similar rates (17, 18). Isolated head trauma was calculated as 38.3% in our study, and this result was compatible with the literature. Mortality and morbidity due to trauma are mainly related with head trauma (19, 20). Ott et al. (21) compared the prognostic values of different trauma scoring systems in 261 patients with multiple injuries and calculated the mor-

**Table 3.** Hospitalization wards of the patients

Result		General condition			Total
		Good	Mild	Bad	
Discharged	n	639	3	0	642
	%	90.5	3.5	0	80.4
Brain surgery	n	10	34	4	48
	%	1.4	40	50	6
Pediatric surgery	n	13	40	0	53
	%	1.8	47.1	0	6.6
Orthopedics	n	14	3	0	17
	%	2	3.5	0	2.1
Plastic surgery	n	5	3	0	8
	%	0.7	3.5	0	1
Exitus	n	0	0	3	3
	%	0	0	37.5	0.4
Discharged patients who did not want hospitalization	n	22	1	0	23
	%	3.1	1.2	0	2.9
Intensive Care Unit	n	0	0	1	1
	%	0	0	12.5	0.1
Emergency room	n	3	0	0	3
	%	0.4	0	0	0.4
Urology	n	0	1	0	1
	%	0	1.2	0	0.1
TOTAL	n	706	85	8	799
	%	100	100	100	100

**Table 4.** The distribution of cases according to physical examination

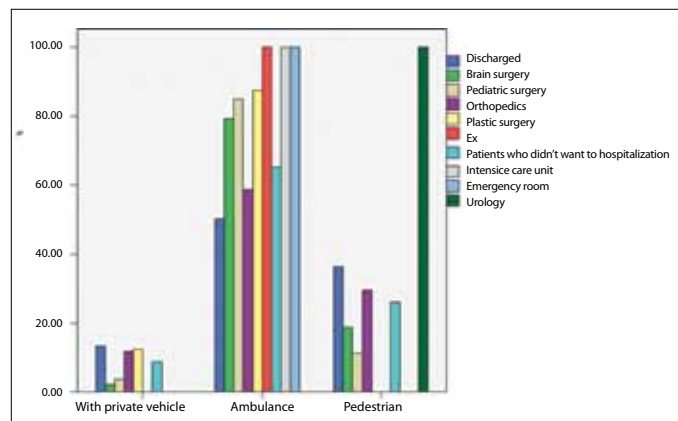
Physical examination	n	%
Normal	231	28.9
Head-neck trauma	306	38.3
Thoracic trauma	3	0.4
Abdominal trauma	17	2.1
Extremity trauma	134	16.8
Multiple trauma	108	13.5
Total	799	100

tality rate as 27%. The mortality causes were attributed to cerebral complications and multiorgan failure. The mortality rate was 0.4% in our study, and this finding was far below than in the literature. This difference may be related with the injury type and difference of the study population.

It was conceived that the pathologies related with the head traumas are more frequent than commonly believed with the use of computed tomography (CT) (22, 23). Linear fracture was present in 24 (3%) cases, subarachnoid hemorrhage was present in 3 (0.4%) cases, epidural hemorrhage was present in 4 (0.5%) cases, subdural

**Table 5.** Admission type to emergency department

Admission type	n	%
Private vehicle	94	11.8
Ambulance	445	55.7
Without any vehicle	260	32.5
Total	799	100

**Figure 2.** The service and discharge status of hospitalized patients according to their admission type

hemorrhage was present in 4 (0.5%) cases, contusion was present in 1 (0.1%) case, and multiple pathologies were present in 1 (0.1%) case in our study. These types of injuries are seen with pedestrian-type traffic accidents and falling injuries, in particular. Early diagnosis in posttraumatic intracranial hematomas is crucial, since the deteriorated cerebral perfusion and cerebral metabolism can be improved with early intervention (24). Thus, CT imaging consideration is very important.

Abdominal traumas presenting with head traumas are generally fatal. The mortality is reported to be 4 times higher in blunt abdominal traumas presenting with head traumas (25, 26). The main reason responsible for nearly half of the mortalities in these types of traumas is a late-diagnosed abdominal trauma concealed by concomitant head trauma. The abdominal CTs of 17 isolated abdominal trauma and 108 multiple trauma patients were normal without any trauma signs. Abdominal ultrasound imaging was performed first in these patients, and a total of 5 (4%) patients who were diagnosed with various types of abdominal pathology were consulted by pediatric surgeons. Contrast abdominal tomography was performed in these patients, and liver laceration was found in 2 (1.6%) patients, free abdominal fluid was found in 2 (1.6%) patients, and liver laceration together with spleen laceration was found in 1 (0.8%) patient.

Injury types following an extremity trauma can vary from soft tissue contusion to amputation. In our study, consisting of 134 isolated extremity trauma and 108 multiple trauma patients, we observed extremity fracture in 85 (35.2%) patients. The increase in trauma-related pathologies may be high, since our study group consisted of children without completed neurological system development and who were vulnerable to even simple traumas.

#### Study Limitations

More significant results can be obtained by increasing the patient population.

## Conclusion

We assert that trauma is an important problem, and precautions must be taken, since the trauma rates in our region in the 0-6 age group tend to increase in the summer period due to ignoring child-care during fieldworks, parents' lack of attention to their children in social places (e.g., playground, picnic area), and increased traffic activity.

**Ethics Committee Approval:** Ethics committee approval was obtained from the local ethics committee. (2009/06-09)

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

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