

Evaluation of Trauma Patients Admitted to Emergency Department According to Triage Categories

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Abstract

Aim: In our study, we aimed to evaluate the trauma patients who were admitted to Department of Emergency Medicine, Uludag University Hospital for demographic characteristics, triage categories, and necessity of a third-level emergency service.

Materials and Methods: Data of the trauma patients admitted between November 1, 2012 and November 1, 2013 were selected by a retrospective systematic sampling. The patient age, sex, admission date, trauma mechanism, body part affected by trauma, and triage categories have been recorded.

Results: In all, 3251 patients were included. Most cases were men (66%); the age of trauma exposure was 18-64 years age. Most patients were admitted between April and June, and the most frequent mechanism of trauma was sprain and crush. The hospital admission rate is higher in triages 1 and 2, and discharge rates were higher in triages 4 and 5.

Conclusion: To determine the severity of the trauma patients that comprised a special group in the emergency department, triage categories can be effectively used. Considering emergency admissions, 80.4% were not found to be emergent patients group, and these patients should be referred to outpatient clinics. (*JAEM 2015; 14: 60-4*)

Keywords: Emergency department, trauma, triage

Introduction

Trauma is one of the major leading causes of death in developing countries. The younger population is more commonly affected. Trauma is an important health issue and also causes a loss of work-power. However, trauma is the first cause of death in the 1-44 age group (1, 2). In the older population, trauma is the third cause of death following cardiovascular diseases and cancers.

The physical damage caused by mechanical energy is defined as trauma. Multiple trauma is the injury of at least 2 major systems (head and chest) or 1 major system and 2 major extremities (femur or humerus). The management of trauma patient definitely begins within the trauma scene (3).

In an emergency department, patients should be rapidly evaluated and treated. However, in most emergency departments, this cannot be obtained because of the crowd and lack of staff and sources. The use of triage categories is important in such situations (4, 5).

Nowadays, many triage scales are studied, but reliable and exact results could not be obtained. The Australian Triage Scale (ATS), which is the first triage scale with 5 steps, is used in our study and commonly in other countries (Table 1) (6).

In our study, we aimed to evaluate the demographic findings, triage categories, and necessity of third-degree emergency service requirement, according to the trauma mechanisms of the trauma patients in Uludag University Emergency Department.

Moreover, we aimed to determine the requirements of our emergency department, note the failures and draft regulations according to this study, and contribute to data in our country pertinent to this field.

Materials and Methods

The patients who were referred to our emergency department between November 1, 2012 and November 1, 2013 were included,



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Table 1. Classification of ATS according to trauma severity

Evaluation (ATS)	Trauma
Triage 1	
Life-threatening conditions	Major multiple trauma
Immediate evaluation and treatment	Severe head trauma
Triage 2	
Probable life-threatening conditions	Severe face, head, neck, spine, thoracic, and abdominal trauma
Evaluation and treatment in 10 min	Head trauma and confusion
	Severe local trauma (major fracture, amputation/ tissue defect, and ischemia)
	Severe burns
	Ascites and alkaline exposure to eyes
	Eye trauma with loss of vision
Triage 3	
Intervention in 30 min	Head trauma and short period of loss of consciousness
	Extremity injury (deformities, lacerations, crush, loss of senses)
	High-risk trauma without severe findings
	Trauma to outer genital organs
Triage 4	
Evaluated in 60 min	Foot sprain
	Uncomplicated fractures and incisions
	Thoracic traumas (normal respiratory findings and no rib fractures)
	Minor head traumas (without loss of consciousness)
	Electrical injury
	Minor surface burns 5%-10%
	Foreign bodies in eyes or inflammation
Triage 5	
Evaluated in 120 min	Minor injuries; abrasions, minor lacerations
	Patients called for controls (sutures, etc.)
	Subcutaneous foreign bodies
	Surface burns <5%

ATS: Australian Triage Scale

data were retrospectively collected, and patients were selected by the systematic example method.

The weekdays were screened as 1 day in a week and an average of 4–5 days, totally 52 days for homogenous distribution. The trauma patients were retrospectively selected from electronic patient records.

In our study forms, we recorded the patient age, sex, application date, trauma mechanism, body parts, and triage categories.

The discharge from emergency department, treatment rejection, exitus, and hospital admission situations were evaluated and recorded.

Trauma was categorized in groups as only to the head, neck, extremity, thoracic, abdominal trauma, and multiple trauma. In our hospital, ATS is used, and patient triage categories were obtained from the recorded data.

Statistical analysis

All data were analyzed using Statistical Package for the Social Sciences (SPSS Inc., Armonk, NY: IBM Corp, USA) for Windows 21.0 program. The descriptive statistics and frequency distributions were calculated according to the properties of the variables in the study. For comparison of categorical variables, Fisher's absolute chi-square tests were used. Statistical significance was set at $p < 0.05$.

Results

A total of 87.850 patients were evaluated in our emergency department between November 1, 2012 and November 1, 2013.

Through admissions, 3251 trauma cases were selected by the systematic example method; 2132 (66%) of them were males and 1119 (34%) were females.

The median age was 21 (0-90). In all, 1417 patients (43.6%) were aged 18 and below, 1728 patients (53.2%) were aged 18-64, and 106 patients (3.3%) were aged 65 and above.

The trauma cases were compared according to the days of the week. In all, 423 patients (13%) were evaluated on Monday, 446 (14%) on Tuesday, 439 (13%) on Wednesday, 483 (15%) on Thursday, 518 (16%) on Friday, 491 (15%) on Saturday, and 451 (14%) on Sunday. The number of patients increased on Friday and Saturday; however, on Monday, the number of patients decreased. There was no statistically significant difference ($p>0.05$).

The trauma cases were compared according to the months; most cases were observed in April ($n=338$, 10.4%) and June ($n=384$, 11.8%) (Figure 1). The seasonal distribution of the cases was 27.2% in spring, 28.9% in summer, 24.6% in autumn, and 19.4% in winter. The number of cases increased in spring and summer.

Trauma mechanisms were classified: sprain and strain were the most common causes ($n=1115$, 34.3%). Following this, falls, stabbing, motor vehicle injuries, and assault were reported (Table 2).

Totally, 2637 (81.1%) extremity traumas, 499 (15.3%) head and neck traumas, 31 (1%) thoracic traumas, 26 (0.8%) abdominal traumas, and 58 (1.8%) multitraumas were noted (Figure 2).

The most common applications of the trauma patients to the emergency department were found to be between the ages 18 and 64. Triage 4 category patients ($n=2311$, 71.08%) were the highest among all age groups (Table 3).

The number of triage 5 category patients was higher in age groups 18 and below; however, triage 1 category patients were higher in the 18-64 age group. There was statistically significant difference between the groups ($p<0.05$).

The distribution of the sex of the trauma patients, according to the triage categories, was studied. Sixteen (1.4%) of the 1119 female patients were triage category 1, 36 (3.2%) were triage category 2, 136 (12.2%) were triage category 3, 814 (72.7%) were triage category 4, and 117 (10.5%) were triage category 5. In all, 2132 male patients were included, and 44 (2.1%) of them were triage category 1, 55 (2.6%) were triage category 2, 350 (16.4%) were triage category 3, 1497 (70.2%) were triage category 4, and 186 (8.7%) were triage category 5. Triage category 4 patients were found to be higher in both sex. Comparing sex and triage categories, male patients were found to be higher in all triage categories. This distribution was found to be statistically significant ($p<0.05$).

The trauma mechanisms and triage categories were compared. The motor vehicle injuries $n: 26$ (10.3%) were found highest in triage category 1 patients.

All trauma mechanisms were evaluated, and the highest number of group was triage category 4 patients (Table 4).

Among 3251 trauma patients, 2914 (90%) were discharged from the hospital. Further, 2914 (90%) of the 3251 trauma patients were

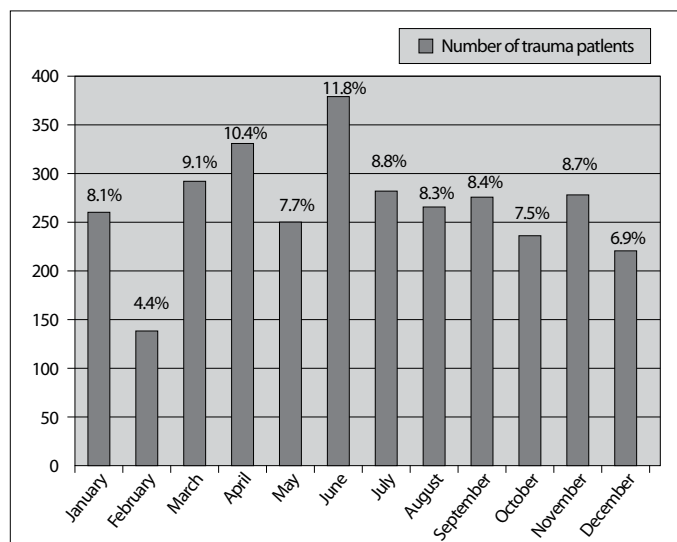


Figure 1. Distribution of trauma cases according to the months

Table 2. Numbers and percentages of trauma mechanisms

Trauma mechanisms	n	%
Sprain and strain	1115	34.3
Falls	919	28.3
Stabbing	733	22.5
Motor vehicle injury	252	7.8
Assault	113	3.5
Burns	98	3
Electrical injury	11	0.3
Gunshot injury	6	0.2
Animal bites	4	0.1
Total	3251	100

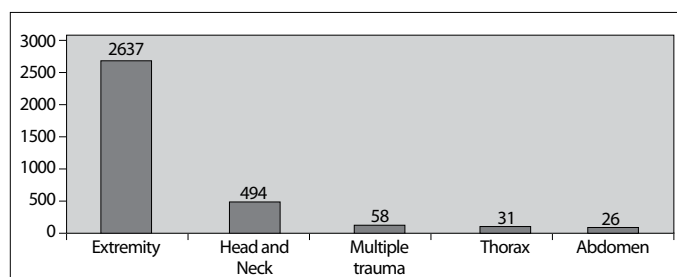


Figure 2. The distribution of the trauma patients according to the body regions

Table 3. Distribution of age groups according to the triage categories

	Triage 1	Triage 2	Triage 3	Triage 4	Triage 5	Total
<18 age	22	35	169	1023	168	1417
18-64 age	32	43	303	1220	130	1728
≥65 age	6	13	14	68	5	106
Total	60	91	486	2311	303	3251

Table 4. Distribution of triage categories according to trauma mechanisms

Trauma mechanism	Triage 1, n	Triage 2, n	Triage 3, n	Triage 4, n	Triage 5, n	Total n
Falls	10	59	352	372	126	919
Stabbing	1	12	79	625	16	733
Motor vehicle injury	26	14	43	166	3	252
Assault	0	3	2	79	29	113
Burns	19	0	3	67	9	98
Sprain and strain	0	0	0	995	120	1115
Animal bites	0	0	1	3	0	4
Electrical injury	3	0	5	3	0	11
Gunshot injury	1	3	1	1	0	6
Total	60	91	486	2311	303	3251

Table 5. Distribution of prognosis in trauma patients

Prognosis	n	%
Discharge	2914	89.6
Hospital admission	206	6.3
Transport to other hospitals	51	1.6
Exitus	2	0.1
Discharged without permission	7	0.2
Treatment rejection	71	2.2
Total	3251	100

discharged from the hospital. Thirty-nine (67.2%) of the 58 multiple trauma patients were admitted to the hospital, 17 (29.3%) of them were transported to another hospital, 2 (3.5%) were stated as exitus in the emergency department. The distribution of the prognosis of the patients are listed in Table 5. The number of hospital admissions was found to be higher in triage category 1 and 2 patients; however, discharge from hospitals were found to be higher in triage category 4 and 5 patients (Table 6).

Discussion

Male patients were found to be higher than female patients in our study, similar to the other studies conducted in this field. In another study conducted by Uludag University, 68.4% of the patients were male; however, in our study 65.6% of the patients were male (7).

The median age was 21 (0-90), and similar studies had the same median ages in the trauma patients (8, 9).

In our study, we compared patient admissions on weekends with those on weekdays to evaluate the efficacy of the staff plan. However, there was no significant difference between them and we concluded that there was no need for distinction between these days.

We evaluated the distribution of the trauma patients according to the months, and April and June were found to be much more crowded than other months. However, admissions decreased in winter. Akoğlu et al. (10) have revealed that May and October were more crowded than other months and that admissions decreased in summer. This difference could be related with our emergency depart-

ment's status and the number of transported patients, considering that it is the only center about pediatric traumas.

The trauma mechanisms differ between the clinics, countries, and among the years. In Major Trauma Outcome Study, motor vehicle injuries and falls are the most common; however, falls were evaluated to be the highest in a study conducted by Young et al. In our study, we revealed that sprains and strains were the highest, followed by stabbing (11, 12).

Ünlü et al. (13) have reported the head as the major part that is injured in traumas. Durdu et al. (14) have reported upper extremities, head, and neck region as the major parts that are injured in traumas. In our study, we evaluated the extremities and then the head and neck as the major parts of the body exposed to trauma.

There are many score systems in the trauma patients to evaluate the trauma severity and predict the mortality rate. These systems are drafted by physiological parameters, anatomical localizations, and a combination of both (15).

In our study, we surveyed the patient age, sex, trauma mechanisms, and prognosis to predict the trauma severity.

Exitus and hospital admission rates are higher in triage categories 1 and 2 patients; however, discharges are higher in triage categories 4 and 5 patients. Regarding this, it is proved that triage categories can be used to investigate trauma severities and mortalities.

Study limitations

The major limitations of our study were the retrospective design and the use of a single-center data. More significant results can be obtained by increasing the study population.

Conclusion

Triage categories can be used to evaluate the trauma severity in patients in the emergency department. In all, 80.4% patients were accepted as non-emergency patients in hospital admissions. These patients increase the consistency and cost of the emergency department. Moreover, they should be referred to first- or second-level health centers instead of third-level health centers. In our country, there are limited number of studies about this subject; therefore, more detailed studies should be conducted to evaluate the role of triage categories in trauma severities and mortality rates.

Table 6. Distribution of the patients according to the prognosis

Prognosis	Triage 1 (%)	Triage 2 (%)	Triage 3 (%)	Triage 4 (%)	Triage 5 (%)
Discharge	0	33	70.4	96.9	100
Hospital admission	68.3	50.5	17.1	1.6	0
Transport to other hospitals	28.3	11	4.5	0.1	0
Exitus	3.3	0	0	0	0
Gone without permission	0	0	0.4	0.2	0
Treatment rejection	0	5.5	7.6	1.3	0
Total	100	100	100	100	100

Ethics Committee Approval: Due to retrospective quality of the study ethics committee approval was waived.

Informed Consent: Informed consent was waived due to the retrospective nature of the study.

Peer-review: Externally peer-reviewed.

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