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Examination of patients admitted to the emergency department with blunt chest trauma

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Abstract

Blunt chest trauma is an important and common cause of morbidity and mortality. It constitutes an important part of the admissions to the emergency department. For this purpose, we evaluated the demographic characteristics, type of trauma, accompanying traumas, trauma scoring systems and results, duration of stay in the emergency department, and hospital outcomes of patients with chest trauma admitted to the emergency department of our hospital. In our study, patients who admitted to the emergency department of our hospital within one year with blunt chest trauma were evaluated retrospectively. Of the 156 patients examined, 114 (73%) were male and the mean age was 52.83±17.9 years. Pneumothorax (35%) and rib fracture (55%) were the most common thoracic injuries. When the duration of hospitalization was examined, the presence of lower extremity and abdomen pathologies, pneumothorax, hemothorax, and (>3) rib fracture prolonged the hospitalization period ($p<0.05$). Revised Trauma Score (RTS) and Glasgow Coma Score (GCS) were found to be significantly lower in deceased patients ($p<0.001$). Pneumothorax, hemothorax, (>3) rib fracture and pneumomediastinum increased mortality ($p<0.05$). Patients with chest trauma can have life-threatening clinics. In the emergency department, it should be evaluated for possible life-threatening pathologies, especially in terms of multi-trauma, and thoracic pathologies and other organ injuries should be managed simultaneously in an efficient and rapid manner. The issues to be considered in the triage, stabilization and follow-up of the patients should be well known.

Keywords: Blunt chest trauma, mortality, glasgow coma score, revised trauma score

Introduction

Trauma is the most important and common cause of morbidity and mortality, especially in the patient group under 40 years of age. Deaths due to trauma are the third leading cause of death after cardiovascular diseases and cancer [1]. Among these cases, chest traumas are in the third rank after head-neck and extremity traumas. Chest traumas are common and life-threatening traumas caused by traffic accidents, occupational accidents and daily activities, and they constitute 25% of deaths [2].

Blunt traumas constitute 70% of chest traumas [3]. Physiopathological changes can be overlooked in blunt chest traumas [4]. In addition, clinical findings range from a simple soft tissue injury to life-threatening chest injuries [5]. The most common clinical condition we see is thoracic wall injury, followed by severe thoracic injuries such as parenchymal injury, hemothorax, pneumothorax, and flail chest [5]. While evaluating the cases admitting to the emergency department with blunt chest trauma, the use of computed tomography (CT) in addition to physical examination and direct radiography has gradually increased in recent years [6].

Nonoperative management is sufficient for most of the patients who admit for chest trauma. Besides, the important thing is to determine the factors affecting mortality and the approach to the patient should be done accordingly [7,8]. Therefore, multidisciplinary approach is important in cases of blunt chest trauma. Only the findings and results coming from the examination may sometimes give wrong results. The imaging method to be made and its selection are also important in this manner [8]. In this study, we evaluated the demographic characteristics, causes of trauma, their developing pathologies and treatments, prognosis and mortality rates of patients admitted to the emergency department of our hospital with blunt chest trauma.

Materials and Methods

In this study, patients with blunt chest trauma admitted to the emergency department of our hospital within one year were

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evaluated. Our study was carried out retrospectively after ethics committee (İzmir Bakırçay University Non-Invasive Clinical Research Ethics Committee, 269/249) approval was obtained.

Age, gender, etiology of trauma, time of admission to hospital, accompanying injuries, thoracic pathologies detected, duration of stay in the emergency department, treatment modalities, outcomes from the emergency department, duration of hospital stay, hospital outcomes, Glascow Coma Scale (GCS), Revised Trauma Score (RTS), Hemoglobin (Hb) and Hematocrit (Hct) values of our cases were examined.

Some of the cases had isolated chest trauma and thoracic computed tomography (CT) was used as imaging method for these cases. Thoracic CT, cervical CT, cranial CT and abdominal ultrasonography (USG) and extremity direct radiography were ordered in patients with multiple trauma. Echocardiography (ECHO) was done in necessary cases. Besides imaging results and blood values; GCS, respiratory rate, systolic and diastolic blood pressure of the patients were also recorded.

Conservative treatment was applied to the uncomplicated cases and then they were discharged from the emergency department. The length of stay for patients in the emergency department was examined. How the patients discharged from the emergency department and the length of stay and outcomes of the patients who were admitted to the hospital were examined.

Statistical analysis

IBM SPSS Statistics for Windows (Version 25.0) and Amos (Version 24.0) statistical package programs were used to evaluate the data. Descriptive statistics (mean, standard deviation, median, quartiles, number and percentile) were given for categorical and continuous variables in the study. One of the prerequisites of parametric tests, the homogeneity of variances was checked with the Levene test. The data were evaluated using Shapiro-Wilk test for normal distribution. For evaluating the differences between two groups Independent T Test was used when the parametric test meets the preconditions, if not, the Mann Whitney – U test was used. For comparison of three or more groups, one-way analysis of variance and Tukey HSD, Kruskal Wallis and Bonferroni-Dunn tests from multiple comparison tests were used. Relationships between categorical variables were analyzed using Fisher's Exact Test and Chi-Square test. In cases where the expected frequencies are less than 20%, an evaluation has been made with the "Monte Carlo Simulation Method" to include these frequencies in the analysis. Since the observations are performed month by month within the time interval of the hospitalization periods, the life table was analyzed using the Kaplan-Meier method, which is based on the times that occur in each event. A level of $p<0.05$ was considered statistically significant.

Results

A total of 156 patients, 114 (73%) male and 42 (27%) female, who admitted to the emergency department with blunt chest trauma, were evaluated. The average age of the patients was 52.83 ± 17.9 years. The mean time of admission to the emergency department was 6.04 ± 9.85 hours and the mean length of stay in the emergency department was 3.74 ± 1.26 hours. The length of stay in the hospital for inpatients was 3.56 ± 4.19 days. While 119 of the patients (76%) were followed up with analgesia treatment, 37 (24%) of them received tube thoracostomy. 55 (35%) of the patients received emergency treatment were discharged, 76 patients (49%) continued their inpatient treatment, 19 patients (12%) were admitted to the intensive care unit, and 6 patients (4%) died. Regarding to hospital outcomes, 138 patients (88%) were discharged, while 18 patients (12%) were died. When we examined the cases according to the etiology of trauma, falling on a flat surface (36%) was the most common cause of trauma (Table 1). Among the other accompanying traumas, the most common ones that we found were lower extremity and abdomen injuries (Table 1).

The RTS, GCS, Hg and Hct values and positive radiological findings of the patients are shown in Table 2.

In Table 3, we evaluated the effect of demographic characteristics of the patients on the length of stay in the hospital, according to the mortality status. It has been demonstrated that the time of admission to the hospital ($p=0,026$), the accompanying traumas to the lower extremity ($p=0,011$) and abdomen ($p=0,012$) traumas have different effects on the length of hospital stay in the categories of features according to the mortality status. When these effects are examined, the probability of patient survival decreases as the time of admission to the hospital increases. The discharge time was the longest in crush cases, while it was shorter in bump cases. Patients with lower extremity and abdominal trauma had longer length of stay in hospital.

The effects of clinical findings on the length of stay in hospital according to mortality status of patients are shown in Table 4. As RTS and GCS increase, the possibility of early discharge increases. Patients with low hematocrit values have a higher risk of death. Patients with positive radiological findings such as pneumothorax, hemothorax and (>3) rib fracture were discharged late from the hospital.

In terms of mortality, 33% of the patients who died were found to be falling from high and 38% of those who were discharged were found to be falling on a flat ground ($p=0.010$). Traumas to the lower extremity, abdomen and pelvis were found to be significant in terms of mortality ($p=0.001$) (Table 5).

When the clinical findings were evaluated according to the hospital outcome, the RTS, GCS, Hg and Hct values were significantly lower in patients who were exitus ($p=0.001$). Radiologically, pneumothorax, hemothorax, (>3) rib fracture and pneumomediastinum were significantly higher in patients who were exitus ($p<0.05$) (Table 6).

While the clinical findings were examined according to emergency department outcomes, it was found that RTS, GCS, Hg and Hct values were lower in patients who were hospitalized in intensive care and then died ($p<0.05$). Patients with pneumothorax and pneumomediastinum were significantly more likely to be admitted to the intensive care unit from the emergency department or to be died ($p<0.05$) (Table 7).

Table 1. Patient Characteristics (n=156)

Features		Categories	(Mean±SD | n (%))
Age			52.83±17.9
Time to admit to the hospital			6.04±9.85
Length of stay in the emergency room			3.74±1.26
Length of Hospitalization			3.56±4.19
Gender		Famale	42 (27%)
		Male	114 (73%)
Etiology of trauma		Falling on flat ground	56 (36%)
		Falling from high	32 (21%)
		Assault	8 (5%)
		Bump	6 (4%)
		Non-vehicle traffic accidents	18 (12%)
		In-vehicle traffic accidents	31 (20%)
		Crush	5 (3%)
Accompanying trauma	**Head and neck**	None	151 (97%)
		Available	5 (3%)
	Upper extremity	None	149 (96%)
		Available	7 (4%)
	Lower extremity	None	145 (93%)
		Available	11 (7%)
	Abdomen	None	145 (93%)
		Available	11 (7%)
	Spine	None	146 (94%)
		Available	10 (6%)
	Pelvis	None	151 (97%)
		Available	5 (3%)
	Myocardial contusion	None	155 (99%)
		Available	1 (1%)
Treatment		Analgesic	119 (76%)
		Tube thoracostomy	37 (24%)
Emergency room outcome		Being discharged	55 (35%)
		Hospitalization	76 (49%)
		Intensive care	19 (12%)
		Exitus	6 (4%)
Hospital outcome		Being discharged	138 (88%)
		Exitus	18 (12%)

Table 2. Information on Clinical Findings (n=156)

Features		Categories	(Mean±SD | n (%))
Revised Trauma Score			10.97±2.47
Glascow Coma Scale			13.69±3.31
Hemoglobin			13.12±2.74
Hematocrit			37.24±4.87
Positive Radiological Findings	**Contusion**	None	133 (85%)
		Available	23 (15%)
	Pneumothorax	None	101 (65%)
		Available	55 (35%)
	Hemorrhage	None	126 (81%)
		Available	30 (19%)
	Subcutaneous emphysema	None	149 (96%)
		Available	7 (4%)
	(>3) rib fracture	None	70 (45%)
		Available	86 (55%)
	(<3) rib fracture	None	110 (71%)
		Available	46 (29%)
	Sternum fracture	None	143 (92%)
		Available	13 (8%)
	Scapula fracture	None	152 (97%)
		Available	4 (3%)
	Clavicle fracture	None	152 (97%)
		Available	4 (3%)
	Pneumomediastinum	None	154 (99%)
			2 (1%)

Table 3. The Effect of Demographic Characteristics on the Length of Hospitalization of the Patients

Features		Categories	Time (Day)	SEM	Confidence Interval (95%)	Critical Value	Log-rank p
Length of Hospitalization			4.13	0.40	3.34-4.92	-	-
Age			-	-	-	83.428	0.052 [1]
Time to admit to the hospital		1	6.73	0.86	5.05-8.42	21.744	0.026 1*
		5	3.00	2.12	0.00-7.16		
		24	1.91	1.05	0.00-3.96		
		36	0.00	0.00	0.00-0.00		
Length of stay in the emergency room		2	5.58	1.54	2.57-8.60	5.156	0.524 [1]
		3	3.70	0.68	2.38-5.03		
		4	3.68	0.51	2.68-4.68		
		5	12.00	3.00	6.12-17.88		
		6	3.41	0.99	1.47-5.34		
Gender		Famale	3.28	0.75	1.80-4.76	1.901	0.168 [1]
		Male	4.44	0.47	3.53-5.35		
Etiology of trauma		Falling on flat ground	2.49	0.54	1.42-3.55	31.375	0.001 [1]**
		Falling from high	5.88	0.88	4.16-7.60		
		Assault	7.44	2.29	2.94-11.93		
		Bump	0.83	0.83	0.00-2.47		
		Non-vehicle traffic accidents	3.18	0.74	1.73-4.62		
		In-vehicle traffic accidents	4.42	0.77	2.91-5.93		
		Crush	15.75	5.21	5.55-25.95		
Accompanying trauma	**Head and neck**	None	3.99	0.41	3.20-4.79	2.918	0.088 [1]
		Available	9.25	2.53	4.29-14.21		
	Upper extremity	None	3.98	0.40	3.19-4.77	2.631	0.105[1]
		Available	7.59	2.63	2.43-12.74		
	Lower extremity	None	3.84	0.39	3.08-4.60	6.506	0.011 [1]*
		Available	8.96	2.58	3.90-14.02		
	Abdomen	None	3.81	0.40	3.02-4.59	6.277	0.012 [1]*
		Available	8.83	1.64	5.61-12.05		
	Spine	None	4.12	0.42	3.29-4.94	0.054	0.816 [1]
		Available	4.30	1.40	1.56-7.04		
	Pelvis	None	4.10	0.41	3.30-4.89	0.381	0.537 [1]
		Available	4.50	0.50	3.52-5.48		
	Myocardial contusion	None	-	-	-	0.582	0.446 [1]
		Available	-	-	-		
Treatment		Analgesic	2.72	0.32	2.08-3.35	39.718	0.001 [1]**
		Tube thoracostomy	9.74	1.05	7.68-11.80		
Emergency room outcome		Being discharged	0.22	0.16	0.00-0.53	132.938	0.001 [1]**
		Hospitalization	5.24	0.44	4.39-6.10		
		Intensive care	13.79	1.10	11.63-15.94		
		Exitus	0.00	0.00	0.00-0.00		

**p<0.05.*p<0.01. 1: Survival Analysis. SEM: standard error of mean

Table 4. The Effect of Clinical Findings on the Length of Hospitalization of the Patients

Features		Categories	Time (Day)	SEM	Confidence Interval (95%)		Critical Value	Log-rank p
GENERAL			4.13	0.40	3.34-4.92		-	-
Revised Trauma Score			-	-	-		68.921	0.001 [1]**
Glascow Coma Scale			-	-	-		41.055	0.001 [1]**
Hemoglobin			-	-	-		61.064	0.116 [1]
Hematocrit			-	-	-		87.307	0.023 [1]*
Positive Radiological Findings	**Contusion**	None	4.14	0.45	3.26	5.03		
		Available	4.01	0.76	2.52	5.49		
	Pneumothorax	None	2.55	0.40	1.77	3.33		
		Available	7.41	0.75	5.94	8.89		
	Hemorrhage	None	3.69	0.40	2.90	4.47		
		Available	6.15	1.26	3.68	8.63		
	Subcutaneous emphysema	None	3.98	0.40	3.19	4.76		
		Available	7.17	2.56	2.15	12.19		
	(>3) rib fracture	None	5.58	0.65	4.31	6.85		
		Available	3.06	0.49	2.10	4.03		
	(<3) rib fracture	None	3.27	0.41	2.46	4.08		
		Available	6.33	0.89	4.59	8.08		
	Sternum fracture	None	4.08	0.41	3.28	4.89		
		Available	4.54	1.39	1.81	7.26		
	Scapula fracture	None	4.08	0.40	3.30	4.87		
		Available	4.25	1.82	0.69	7.81		
	Clavicle fracture	None	3.99	0.40	3.21	4.78		
		Available	7.50	1.53	4.50	10.50		
	Pneumomediastinum	None	-	-	-			
		Available	-	-	-			

SEM: standard error of mean

Table 5. Evaluation of Demographic Characteristics According to Hospital Outcome

Features		Categories	Being discharged	Exitus	Critical Value	p
Age			54 (38.75-65.5)	49.5 (35.25-64.25)	-0.818	0.413 [3]
Time to admit to the hospital			3 (1.75-6)	1 (1-6.5)	-1.598	0.110 [3]
Length of stay in the emergency room			4 (3-4)	2 (2-4)	-2.581	0.010 [3]**
Gender		Famale	39 (28%)	3 (17%)	1.088	0.297 [1]
		Male	99 (72%)	15 (83%)		
Etiology of trauma		Falling on flat ground	53 (38%)	3 (17%)	18.17	0.006 [1]**
		Falling from high	26 (19%)	6 (33%)		
		Assault	6 (4%)	2 (11%)		
		Bump	6 (4%)	0 (0%)		
		Non-vehicle traffic accidents	17 (12%)	1 (6%)		
		In-vehicle traffic accidents	28 (20%)	3 (17%)		
		Crush	2 (1%)	3 (17%)		
Accompanying trauma	**Head and neck**	None	134 (97%)	17 (94%)	0.362	0.547 [1]
		Available	4 (3%)	1 (6%)		
	Upper extremity	None	133 (96%)	16 (89%)	2.083	0.149 [1]
		Available	5 (4%)	2 (11%)		
	Lower extremity	None	133 (96%)	12 (67%)	21.445	0.001 [1]**
		Available	5 (4%)	6 (33%)		
	Abdomen	None	131 (95%)	14 (78%)	7.145	0.008 [1]**
		Available	7 (5%)	4 (22%)		
	Spine	None	128 (93%)	18 (100%)	1.394	0.238 [1]
		Available	10 (7%)	0 (0%)		
	Pelvis	None	136 (99%)	15 (83%)	11.885	0.001 [1]**
		Available	2 (1%)	3 (17%)		
	Myocardial contusion	None	138 (100%)	17 (94%)	7.716	0.005 [1]**
		Available	0 (0%)	1 (6%)		
Treatment		Analgesic	116 (84%)	3 (17%)	39.970	0.001 [1]**
		Tube thoracostomy	22 (16%)	15 (83%)		
Emergency room outcome		Being discharged	55 (40%)	0 (0%)	59.404	0.001 [1]**
		Hospitalization	72 (52%)	4 (22%)		
		Intensive care	9 (7%)	10 (56%)		
		Exitus	2 (1%)	4 (22%)		

**p<0.05, *p<0.01,
[1]: Chi-Square Test [2]: Independent t-Test [3]: Mann Whitney U Test

Table 6. Evaluation of Clinical Findings According to Hospital Outcome Status of Patients

Features		Categories	Being discharged	Exitus	Critical Value	p
Revised Trauma Score			12 (12-12)	6 (3.75-9.25)	-8.254	0.001 3**
Glascow Coma Scale			15 (15-15)	5 (3.75-9.5)	-8.803	0.001 3**
Hemoglobin			13.4 (12.3-14.2)	11.45 (10.55-12.55)	-4.246	0.001 3**
Hematocrit			37.74±4.74	33.34±4.12	3.756	0.001 2**
Positive Radiological Findings	**Contusion**	None	118 (86%)	15 (83%)	0.060	0.807
		Available	20 (14%)	3 (17%)		
	Pneumothorax	None	98 (71%)	3 (17%)	20.604	0.001 ¹**
		Available	40 (29%)	15 (83%)		
	Hemorrhage	None	116 (84%)	10 (56%)	8.328	0.004 ¹**
		Available	22 (16%)	8 (44%)		
	Subcutaneous emphysema	None	133 (96%)	16 (89%)	2.083	0.149 ¹
		Available	5 (4%)	2 (11%)		
	(>3) rib fracture	None	58 (42%)	12 (67%)	3.907	0.048 ¹*
		Available	80 (58%)	6 (33%)		
	(<3) rib fracture	None	103 (75%)	7 (39%)	9.787	0.002 ¹**
		Available	35 (25%)	11 (61%)		
	Sternum fracture	None	125 (91%)	18 (100%)	1.85	0.174 ¹
		Available	13 (9%)	0 (0%)		
	Scapula fracture	None	135 (98%)	17 (94%)	0.729	0.393 ¹
		Available	3 (2%)	1 (6%)		
	Clavicle fracture	None	135 (98%)	17 (94%)	0.729	0.393 ¹
		Available	3 (2%)	1 (6%)		
	Pneumomediastinum	None	138 (100%)	16 (89%)	15.532	0.001 ¹**
		Available	0 (0%)	2 (11%)		

**p<0.05, *p<0.01,
¹: Chi-Square Test ²: Independent t-Test ³: Mann Whitney U Test

Table 7. Evaluation of Clinical Findings According to Hospital Outcome Status of Patients

Features		Categories	Being discharged	Hospitalization	Intensive care	Exitus	Critical Value	p
Revised Trauma Score			12 (12-12)	12 (12-12)	7 (6-9)	2 (0-3.25)	117.327	0.001 ³**
Glascow Coma Scale			15 (15-15)	15 (15-15)	8 (5-11)	3 (3-3.5)	144.429	0.001 ³**
Hemoglobin			13.4 (12.5-13.9)	13.3 (11.8-14.3)	12.4 (10.8-13)	11.5 (10.8-12.2)	14.169	0.003 ¹**
Hematocrit			37.43±4.51	38±4.92	34.84±5.15	33.42±2.57	3.581	0.015 ¹**
Positive Radiological Findings	**Contusion**	None	49 (89%)	65 (86%)	14 (74%)	5 (83%)	2.690	0.442 ¹
		Available	6 (11%)	11 (14%)	5 (26%)	1 (17%)		
	Pneumothorax	None	53 (96%)	46 (61%)	2 (11%)	0 (0%)	60.169	0.001 ¹**
		Available	2 (4%)	30 (39%)	17 (89%)	6 (100%)		
	Hemorrhage	None	51 (93%)	60 (79%)	12 (63%)	3 (50%)	12.677	0.005 ¹**
		Available	4 (7%)	16 (21%)	7 (37%)	3 (50%)		
	Subcutaneous emphysema	None	55 (100%)	72 (95%)	16 (84%)	⁶ (¹⁰⁰%)	8.636	0.035 ¹
		Available	0 (0%)	4 (5%)	3 (16%)	⁰ (⁰%)		
	(>3) rib fracture	None	11 (20%)	38 (50%)	16 (84%)	5 (83%)	30.036	0.001 ¹**
		Available	44 (80%)	38 (50%)	3 (16%)	1 (17%)		
	(<3) rib fracture	None	51 (93%)	51 (67%)	6 (32%)	2 (33%)	31.319	0.001 ¹**
		Available	4 (7%)	25 (33%)	13 (68%)	4 (67%)		
	Sternum fracture	None	52 (95%)	67 (88%)	18 (95%)	⁶ (¹⁰⁰%)	2.601	0.457 ¹
		Available	3 (5%)	9 (12%)	1 (5%)	⁰ (⁰%)		
	Scapula fracture	None	54 (98%)	74 (97%)	18 (95%)	6 (100%)	0.836	0.841 ¹
		Available	1 (2%)	2 (3%)	1 (5%)	0 (0%)		
	Clavicle fracture	None	55 (100%)	74 (97%)	17 (89%)	6 (100%)	6.428	0.093 ¹
		Available	0 (0%)	2 (3%)	2 (11%)	0 (0%)		
	Pneumomediastinum	None	55 (100%)	76 (100%)	18 (95%)	5 (83%)	15.301	0.002 ¹**
		Available	0 (0%)	0 (0%)	1 (5%)	1 (17%)		

**p<0.05, *p<0.01,
¹: Chi-Square Test ²: Independent t-Test ³: Mann Whitney U Test

Discussion

Blunt chest trauma is a common reason for trauma patients to be admitted to the emergency department. Chest trauma can result in a variety of clinical presentations ranging from minor soft tissue injuries to potentially fatal thoracic injuries [9]. Studies have shown that it is most common among young males between the ages of 20 and 44 [10,11]. Similarly, the majority of the patients in our study were men. However, in contrast to previous investigations, the average age was greater than they were.

The majority of blunt chest injuries (63-78%) are caused by motor vehicle accidents; the rest (10-17%) are caused by falls from a height, and a tiny percentage are caused by strikes from blunt objects or explosive devices [12,13]. However, in this study, we found that the most common cause was falling on flat ground, followed by traffic accidents and falling from a height. The patients started to be treated at the hospital 6.04 ± 9.85 hours after the incident. There are many factors that may affect this situation. It is influenced by factors such as the distance from the crime scene to the hospital, hospital transfers, and patient admission delays to the hospital by their own means. Those admitted late to the hospital, those who suffered a crush, and those who experienced other traumas all had prolonged hospital stays. Traffic accidents have the highest mortality rate, whereas patients who fall on flat ground have the lowest.

Thoracic injuries caused by trauma differ depending on the mechanism of trauma. The most common thoracic injury in our study was rib fractures. This was followed by pneumothorax and hemothorax. Contusion and pneumothorax have been shown to be the most prevalent in several research [14, 15]. In our study, patients with pneumothorax, hemothorax and (<3) rib fracture had longer hospital stays than other patients. Patients with pneumothorax, hemothorax, pneumomediastinum, and (>3) rib fracture had a higher mortality rate, which is consistent with previous studies [16-18]. Although some studies found that the number of fractured ribs was not significant in terms of mortality, this data was found to be statistically significant in our study [19]. Although scapula and sternum fractures were indicative of severe trauma [20,21], there was no significant difference in mortality and hospital stay in our study.

Chest traumas are not usually isolated organ injuries, but also occur in the form of multiple traumas accompanied by other organ injuries. Another controversial issue is the extent to which extrathoracic system injuries accompany thoracic traumas and whether they have an effect on mortality. Regarding to the literature, it has been reported that thoracic traumas are accompanied by extremity fractures, head traumas and intra-abdominal organ injuries, in order to their frequency [22,23]. We also discovered that the most prevalent injuries were extremity and abdominal traumas, which was consistent with the literature. Furthermore, patients with lower extremity and intra-abdominal pathologies had longer hospital stays. Patients with lower extremity, intra-abdominal, pelvic, and myocardial pathologies had also higher mortality rate.

Trauma scores play an important role in differentiating proper triage and higher-risk patients, and accordingly in determining treatment priorities and planning the treatment. Therefore trauma scoring systems are important in standardizing the trauma severity, predicting prognosis and mortality [24,25]. GCS and RTS are physiological scores. In this respect, it may be thought that the use of such a scoring systems will be beneficial in terms of evaluating trauma patients and planning the treatment according to the expected prognosis. In our study, we observed that patients with low GCS and RTS values had a longer hospital stay and a higher mortality rate.

One of the remarkable results that we observed in our study was that advanced age had no significant effect on mortality rate. According to the literature, mortality is more common in the 65 years and older patient group [16,25,26]. Low hemoglobin and hematocrit values were also associated with a high mortality rate. It is known that non-surgical approaches are mostly sufficient in the treatment of thoracic traumas. Especially, it is possible to effectively treat isolated thoracic traumas with non-surgical approaches and tube thoracostomy when necessary [27,28]. As supporting these studies, we found that non-surgical treatment was sufficient for a greater proportion of patients in our study.

By considering all of these variables, we may conclude that mortality rates are determined by scoring systems that take into account the severity of the trauma, the etiology of the case, the presence of accompanying trauma and what it is, and the type of chest pathology

Conclusion

Consequently, chest trauma can be classified as isolated thoracic trauma or as multiple trauma. Patients might have serious pathologies ranging from minor soft tissue trauma to fatal cases. Therefore, patients with blunt chest trauma should be evaluated by an expert team, and pathologies should be intervened effectively and quickly using a multidisciplinary approach.

Conflict of interests
The authors declare that they have no competing interests.

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Ethical approval
The study protocol was approved by the ethics committee of İzmir Bakırçay University Non-Invasive Clinical Research Ethics Committee.

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