ORIGINAL ARTICLE

Data analysis of patients admitted to the emergency medicine clinic of Mersin City Training and Research Hospital after the Kahramanmaraş earthquake

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ABSTRACT

BACKGROUND: In earthquakes and other natural disasters, there is a significant number of injuries directly resulting from trauma. Additionally, due to the disaster's impact on overloaded health institutions, healthcare providers face significant challenges during earthquakes. In this context, nearby hospitals providing health services play a crucial role. Nonetheless, with proper planning, the health crisis can be managed in the best possible way.

METHODS: A single-center retrospective study was conducted on patients admitted to Mersin City Training and Research Hospital due to injuries attributed to the earthquake that occurred in the southern and mid-eastern regions of Türkiye on February 6, 2023. A total of 2,155 patients meeting the study criteria were included in the analysis.

RESULTS: Of the 2,155 patients enrolled in the study, 46.8% (n=1009) were male, with a mean age of 45.86±17.68 years. Falls (57.2%, n=1233) were the most common mechanism of injury, and 71.9% (n=1550) of cases presented to the hospital on their own. Among the head injuries, the most common types were soft tissue injury and lacerations, while soft tissue injury and rib fractures were most common in the thoracic region. Soft tissue injury and retroperitoneal bleeding were the most commonly recorded types among abdominal injuries, whereas soft tissue injury and fractures were most common in the upper and lower extremities. Fractures were identified in 11.1% (n=240) of cases in the upper extremities and 21.3% (n=458) in the lower extremities. Rhabdomyolysis was one of the most frequently observed injury types (n=443, 20.6%). Crush syndrome and acute kidney injury were recorded in 9.2% (n=198) of cases, leading to a total of 46 amputations in 40 (1.8%) patients and 164 fasciotomies in 132 (6.1%) patients. The orthopedics department performed the most frequent surgical interventions and hospitalizations. Mortality was noted in 2.87% (n=62) of cases.

CONCLUSION: This study demonstrated a significant increase in workload and patient volume following the earthquake. There is a need for a large number of healthcare professionals for expedient intervention in conditions such as fractures, crush syndrome, amputation, and fasciotomy in disasters with a high risk of serious trauma, such as earthquakes. Disaster planning and preparedness for possible consequences will mitigate the healthcare crisis involving the hospitals and lead to significant reductions in mortality and morbidity.

Keywords: Disaster planning; disaster preparedness; emergency department; earthquake; injury; trauma.

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INTRODUCTION

In Türkiye, two major earthquakes occurred, involving the city of Kahramanmaraş and 10 other cities (southern and mid-eastern regions) of Türkiye on February 6, 2023, with magnitudes of 7.7 mV and 7.6 mV on the Richter scale, just 9 hours apart. The first earthquake occurred during the night, catching many people in their sleep, leaving them with no chance to escape. The earthquake affected 10 cities and approximately 9.1 million people directly, leading to over 50,000 deaths and more than 100,000 injuries.[1,2] Beyond the injuries and other health issues directly inflicted by the earthquakes, many people were displaced from their homes, resulting in secondary damages. Survivors who managed to escape on their own and rescuers who arrived from other cities worked for days to rescue those trapped under rubble in challenging winter conditions.

Various types of trauma-related injuries are encountered in disasters related to earthquakes. The outcomes of these injuries are influenced by various factors such as the type of trauma, environmental factors including winter conditions, comorbid events, patient factors, and complications that ensued in the aftermath of the event. Additionally, epidemiological features that can alter the outcomes of disasters and related damage include sociodemographic characteristics of the region (mean age, development level of the region, etc.), the availability and number of reference healthcare facilities, the distance from the disaster area to these institutions, and the time taken for individuals to seek medical attention after the disaster. During the earthquake, four hospitals in the region were totally destroyed, and seven others had to be evacuated due to structural damage. Therefore, the hospital in Mersin, which is close to the area damaged by the earthquake, became one of the main reference hospitals to receive the affected patients.[3]

Examining the demographic and clinical characteristics of earthquake victims presenting with trauma will guide in determining preventive measures for subsequent disasters and will be instructive in planning for future events. In this context, this research aims to conduct an epidemiological assessment of earthquake victims presenting with trauma to the hospital in Mersin and incorporate the data in the literature.

MATERIALS AND METHODS

Study Setting

The present research was conducted retrospectively between November 1, 2023 and January 1, 2024. The data included registries of 2,155 patients who were admitted to the hospital's adult emergency department (ED) due to traumatic injuries attributed to the earthquake.

Patients

The trial was conducted retrospectively at a single center, in the ED of a tertiary care hospital. The hospital, with a daily average of 1,255 adult patient admissions to the ED and a bed capacity of 1,294, is one of the largest training and research hospitals in the region. The trial enrolled patients who presented with trauma-related injuries between February 6, 2023 and February 19, 2023. Patients without a direct relationship to the disaster, injuries caused by non-traumatic reasons, and those with incomplete data were excluded from the dataset. Additionally, only the first admission was considered for patients with repeated admissions. Patients who died without diagnostic investigations, whose outcomes could not be followed, and those for whom the injury mechanism could not be attributed to the earthquake were also not included in the dataset.

Data Collection

During the trial, patients were identified through the hospital automation system (PROHIMS Automation System) screening. The ICD-10 diagnostic code "X34" was used to select and recruit earthquake-related patients. As a result of the screening, 5,137 patients were identified. Entries from the 5,137 cases who did not have a connection to the earthquake, were injured by trauma mechanism not related to the earthquake, had missing data, and those with repeated admissions after the first one were not included in the dataset.

For the purposes of the research, demographic data (age, gender, and history), clinical data (vital signs, admission type, trauma mechanism, duration of being trapped under rubble, trauma-related injuries, consultations, treatments and surgical interventions performed, hospitalization status, length of stay in the hospital, outcome from the ED and the ward, referral status, and mortality status), and imaging data (numbers, types, and anatomic regions) of the patients were retrospectively screened. The obtained data were entered into a data sheet, forms were numbered, and archived.

The histories, examinations, and treatment information of the cases were obtained from the official electronic health records system. Mortality data were extracted from the death notification records of the Turkish Ministry of Health.

Statistical Analysis

The analysis was conducted using the statistical software SPSS 26.0 for Windows® (IBM Inc., Chicago, IL, USA). Descriptive statistics, including the number of observations, percentage, mean, standard deviation, median, and range (minimum and maximum) values, were used for the presentation of data in this descriptive trial.

Ethical Considerations

Ethical committee approval was obtained from the Clinical Research Ethics Committee of the University of Mersin (Ethics committee decision date: 15/03/2023, Decision No: 166). The trial was conducted in accordance with the Helsinki Declaration and Good Clinical Practice principles.

RESULTS

Of the 2,155 patients included in the research, 46.8% (n=1009) were male, and the average age was 45.86±17.68

Table 1. The distribution of imaging studies performed on the patients

Parameter	Not-Performed n (%)	Performed n (%)
CT Imaging		
Brain	1352 (62.7)	803 (37.3)
Thorax	1278 (59.3)	877 (40.7)
Abdomen	1428 (66.3)	727 (33.7)
Pelvis	1412 (65.5)	743 (34.5)
Cervical Spine	1653 (76.7)	502 (23.3)
Thoracic Spine	1834 (85.1)	321 (14.9)
Lumbar Spine	1730 (80.3)	425 (19.7)
Sacral Spine	2068 (96.0)	87 (4.0)
Hip	2151 (99.8)	4 (0.2)
Mandible/Maxilla	2148 (99.7)	7 (0.3)
Nasal	2154 (99.9)	1 (0.1)
Orbit	2147 (99.6)	8 (0.4)
Shoulder	2142 (99.4)	13 (0.6)
Elbow	2150 (99.8)	5 (0.2)
Hand/Wrist	2149 (99.7)	6 (0.3)
Knee	2150 (99.8)	5 (0.2)
Foot/Ankle	2150 (99.8)	5 (0.2)
CT Angiography Imaging		
Upper Extremity	2151 (99.8)	4 (0.2)
Lower Extremity	2144 (99.5)	11 (0.5)
Thorax (Pulmonary)	2154 (99.9)	1 (0.1)
USG Imaging		
Abdomen USG	2137 (99.2)	18 (0.8)
Doppler USG	2143 (99.4)	12 (0.6)
Pregnancy USG	2154 (99.9)	1 (0.1)
MR Imaging		
Brain Diffusion	2146 (99.6)	9 (0.4)
Cervical Spine	2150 (99.8)	5 (0.2)
Lumbar Spine	2154 (99.9)	1 (0.1)
X-Ray Imaging		
Hand	1785 (82.8)	370 (17.2)
Wrist	1810 (84.0)	345 (16.0)
Forearm	1842 (85.5)	313 (14.5)
Elbow	1866 (86.6)	289 (13.4)
Humerus	1841 (85.4)	314 (14.6)
Shoulder	1803 (83.7)	352 (16.3)
Foot	1439 (66.8)	723 (33.2)
Ankle	1432 (66.5)	716 (33.5)
Tibia-Fibula	1494 (69.3)	661 (30.7)
Knee	1537 (71.3)	618 (28.7)
Femur	1523 (70.7)	632 (29.7)
Hip	1702 (79.0)	453 (21.0)
Pelvis	1897 (88.0)	258 (12.0)
Lung	2022 (93.8)	133 (6.2)
Head	2147 (99.6)	8 (0.4)
Cervical Vertebra	2154 (99.9)	1 (0.1)
Lumbar Vertebra	2142 (99.4)	13 (0.6)
Coccyx	2154 (99.9)	1 (0.1)
Upright Abdominal X-Ray	2146 (99.6)	9 (0.4)
Nasal	2154 (99.9)	1 (0.1)

years. A total of 71.9% (1550) of the cases were admitted to the hospital by their own means, 27.7% by land ambulance, and 0.3% by air ambulance. The mean admission time of earthquake victims to the hospital following the earthquake was 102.40±83.08 hours (range: 4 and 540 hours). The number of patients trapped under the rubble was 522 (24.2%), and the mean duration of their stay under the rubble was 22.95±33.93 hours (range: 1 and 292 hours).

The average vital sign values at the time of admission were within the normal range (mean systolic blood pressure 127.64±21.04 mmHg; mean diastolic blood pressure 72.47±12.73 mmHg; pulse rate 90.59±16.80 beats/min; mean oxygen saturation 96.67%±2.84%; mean Glasgow Coma Scale (GCS) score 14.73±1.54). The most common trauma mechanisms were falls (n=1233, 57.2%), being trapped under rubble (n=522, 24.2%), and being injured by falling or being hit by an object (n=397, 18.4%).

The patients were assessed, and imaging studies such as X-ray, computed tomography (CT), CT angiography, magnetic resonance imaging (MRI), and ultrasonography (USG) were performed in line with clinical indications. Ankle X-ray was the most frequently ordered imaging modality. Table 1 demonstrates that the most commonly ordered CT was chest CT, while abdominal USG, lower extremity CT angiography, and diffusion-weighted MRI were the most commonly ordered modalities in their imaging categories.

After evaluating the patients and reviewing the injuries detected through examinations, it was found that soft tissue injury and lacerations were the most commonly observed lesions in the cranial region, soft tissue injury and rib fractures in the thoracic region, soft tissue injury and retroperitoneal bleeding in the abdominal region, and soft tissue injury and fractures in the upper and lower extremities, along with rhabdomyolysis. Fractures were identified in 11.1% (n=240) of cases in the upper extremities and 21.3% (n=458) in the lower extremities. When the localization of fractures was evaluated, it was observed that 123 patients had femoral fractures, 111 cases had tibial fractures, 83 cases had fibular fractures, 7 cases had patellar fractures, 13 cases had calcaneus/tarsal bone fractures, 25 cases had metatarsal bone fractures, and 10 cases had fractures in the toes. In the upper extremities, fractures involved the humerus in 78 cases, the radius in 44, the ulna in 17, carpal bones in 4, metacarpal bones in 4, and fingers in 25 cases. Additionally, head injuries were identified in 2.8% of the cases (n=60), chest injuries in 5.4% (n=117), abdominal injuries in 2.9% (n=62), spinal cord injuries in 10.5% (n=226), and extremity injuries in 72.3% (n=1558). While there were no trauma-related injuries in 16.2% of the patients, it was noted that 74.7% had a single traumatic lesion and 9.1% had multiple traumatic injuries (Table 2). Of note, rhabdomyolysis occurred in 20.6% (n=443) of cases; crush syndrome and acute kidney injury (AKI) developed in 9.2% (n=198), and hemodialysis was commenced in 6.6% (n=142) of cases.

Table 2. The distribution of pathologies detected in cases according to the regions of the body

Pathologies	n (%)
Cranial	
STI	169 (7.8)
Cut	39 (1.8)
Fracture	10 (0.5)
SAH	9 (0.4)
Epidural	4 (0.2)
Subdural	10 (0.5)
ICH	8 (0.4)
Contusion	4 (0.2)
Pneumocephalus	3 (0.1)
Upper Extremity	
Fracture	240 (11.1)
STI	314 (14.6)
Dislocation	4 (0.2)
Burn	10 (0.5)
Foreign Body	1 (0.1)
Lower Extremity	
Fracture	458 (21.3)
STI	709 (32.9)
Dislocation	8 (0.4)
Burn	15 (0.7)
Foreign Body	6 (0.3)
Other	
Rhabdomyolysis	443 (20.6)
Acute Kidney Injury	198 (9.2)
Compartment Syndrome	146 (6.8)
Thorax	
STI	115 (5.3)
Cut	1 (0.1)
Burn	1 (0.1)
Rib Fracture	86 (4.0)
Sternum Fracture	12 (0.6)
Pneumothorax	63 (2.9)
Hemothorax	70 (3.2)
Pneumomediastinum	16 (0.7)
Lung Contusion	22 (1.0)
Abdomen	
STI	26 (1.2)
Cut	1 (0.1)
Burn	3 (0.1)
Liver Injury	4 (0.2)
Spleen Injury	5 (0.2)
Kidney Injury	4 (0.2)
GIS Perforation	4 (0.2)
Abdominal Bleeding	5 (0.2)
Bladder Injury	2 (0.1)
Retroperitoneal Bleeding	18 (0.8)
Trauma	
No Pathology	350 (16.2)
Single Trauma	1609 (74.7)
Multi-trauma	196 (9.1)

SAH: Subarachnoid hemorrhage; ICH: Intracranial hemorrhage; STI: Soft tissue injuries.

Table 3. The distribution of interventions and treatments administered to the patients

Interventions	n (%)
Emergency Department Treatments	
Dressing	94 (4.36)
Burn Dressing	14 (0.6)
Tetanus Vaccine+Dressing	520 (24.1)
Wound Closure+Tetanus Vaccine+Dressing	72 (3.3)
CPR	12 (0.5)
Intubation	18 (0.8)
Eye Irrigation	2 (0.1)
Orthopedic Treatments	
Reduction	155 (7.2)
Debridement	167 (7.7)
Fasciotomy	132 (6.1)
Amputation	40 (1.8)
Graft	37 (1.7)
Splint	440 (20.4)
Velpeau Bandage	70 (3.2)
Pelvic Belt	15 (0.7)
Foreign Body Removal	6 (0.3)
Neurosurgery Interventions	
Vertebral Corset	112 (5.2)
Cervical Collar	9 (0.4)
Thoracic Surgery Interventions	
Tube Thoracostomy	32 (1.5)
Cardiovascular Surgery Interventions	
Embolectomy	6 (0.3)
Other	
Nasal Packing	2 (0.1)
Hemodialysis	142 (6.6)
Blood Replacement	213 (9.9)
Hyperbaric Treatment	51 (2.4)
Surgical Units	
Orthopedic Operation	228 (10.6)
Neurosurgery Operation	113 (5.2)
Plastic and Reconstructive Surgery	167 (7.7)
Ophthalmology Operation	5 (0.2)
Thoracic Surgery Operation	7 (0.3)
General Surgery Operation	12 (0.55)

CPR: Cardiopulmonary Resuscitation.

Consultations were requested from the relevant department(s) for the identified lesions in the patients. Considering the disciplines of consultations requested and their percentages in the whole sample: orthopedics (44.9%, n=967), internal medicine

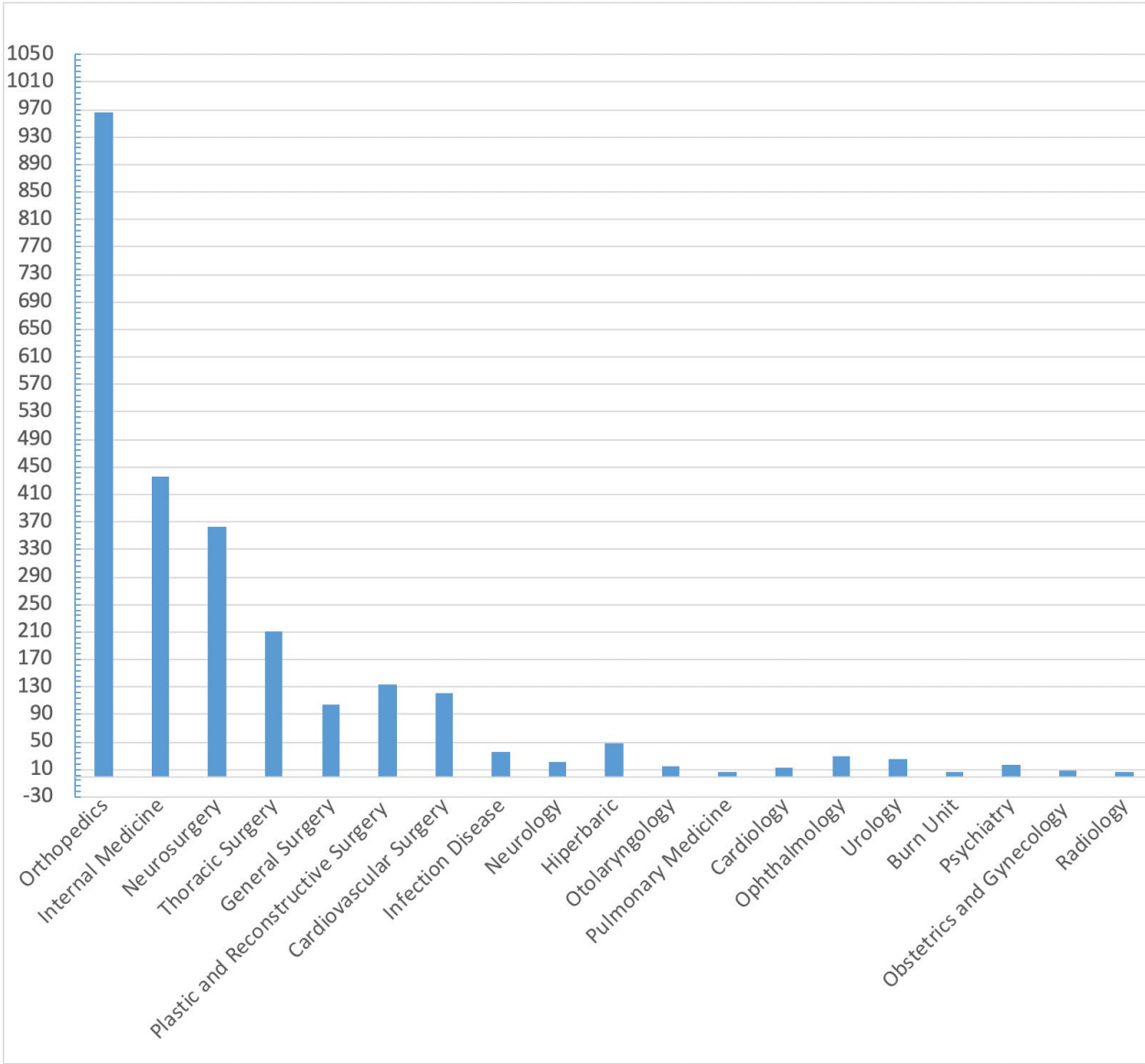

Figure 1. The distribution of requested consultations from relevant departments for cases.

(20.2%, n=436), and neurosurgery (16.8%, n=363) were the most commonly consulted disciplines (Fig. 1).

Treatments were administered for the injuries, including interventions performed by the ED clinician or those carried out following consultation with the relevant specialty. In the ED, medical dressing and tetanus vaccinations were most commonly performed on patients with compromised tissue integrity. Orthopedics conducted interventional procedures such as foreign body removal from soft tissues, debridement, amputation, fasciotomy, reduction, and grafting for relevant patients. Additionally, some patients received extremity stabilization with devices like splints, Velpeau bandages, and pelvic belts. Neurosurgery recommended cervical collars and vertebral corsets, while thoracic surgery performed tube thoracostomy. Cardiovascular surgery conducted embolectomy, and other specialties performed interventions such as nasal packing, hemodialysis, blood replacement, and hyperbaric oxygen therapy. Moreover, all surgical disciplines performed surgical interventions on patients with indications for surgery. Orthopedics performed the highest rate of surgical interventions (n=228, 10.6%) (Table 3). Regarding amputations performed on the cases, the number and localization were as follows: 10 above-knee amputations, 21 below-knee amputations, 2 foot amputations, 3 toe amputations, 4 above-elbow amputations, 5 below-elbow amputations, and 1 finger amputation, totaling 46 amputations for 40 (1.8%) patients. When localizations and numbers of fasciotomies were examined, it was found that 18 forearm fasciotomies, 3 arm fasciotomies, 31 thigh fasciotomies, and 112 leg fasciotomies, totaling 164 fasciotomies, were performed for 132 (6.1%) patients.

After the necessary interventions were performed, patients with the required indications were admitted to the hospital.

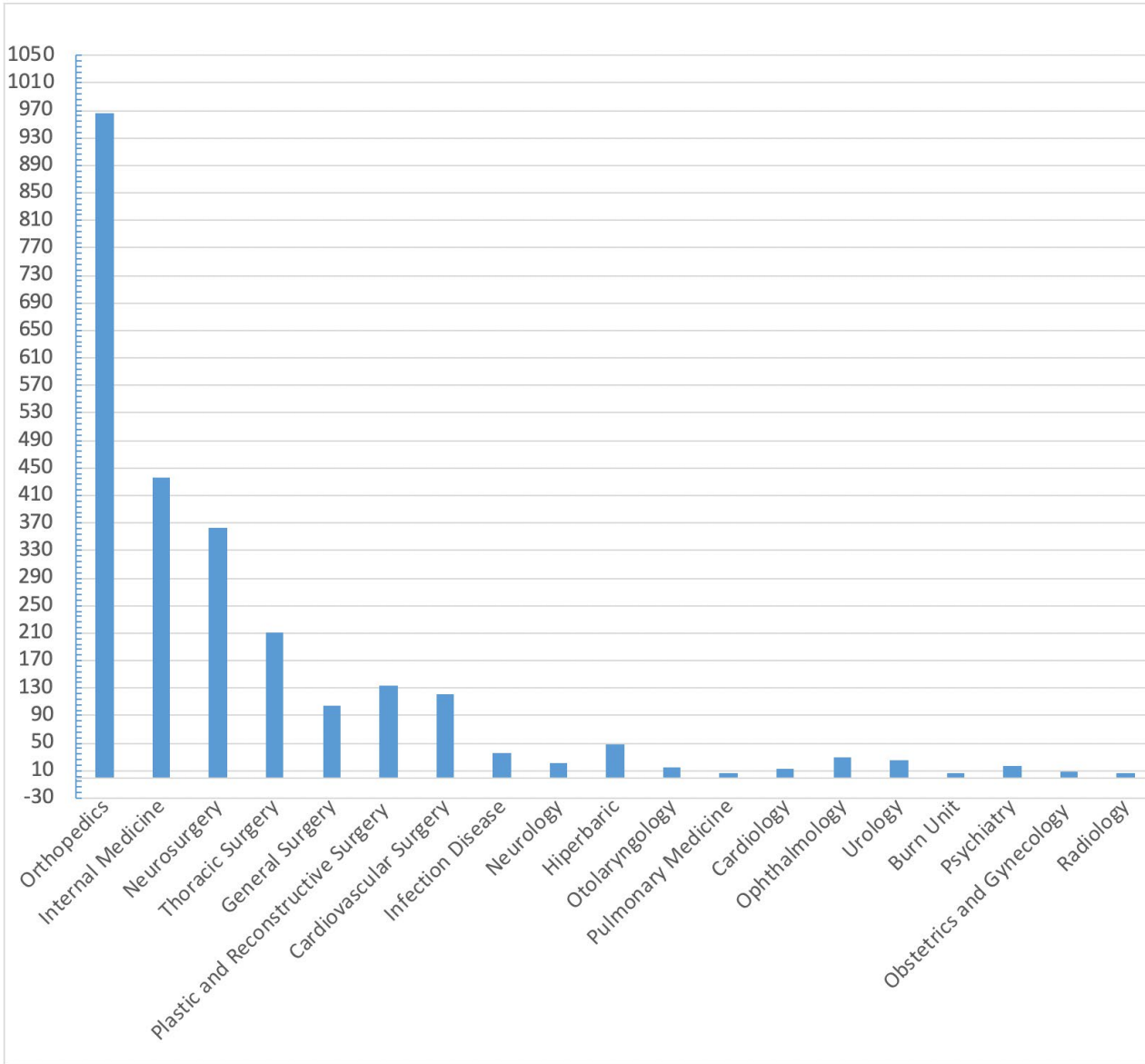

Figure 2. The distribution of amputations and fasciotomies in terms of quantity and localization.

The distribution of hospitalized patients is presented in Figure 2. Orthopedics (n=318, 14.8) had the highest number of patients admitted to the hospital, followed by internal medicine (n=225, 10.4%) and neurosurgery (n=93, 4.3%).

The outcomes of the cases in the ED and the ward are presented in Table 4. It was found that 48.2% (n=1038) of cases were discharged from the ED, 34.8% (n=751) were admitted to the ward, 10.9% (235) were admitted to the intensive care unit (ICU), and 0.55% (n=12) died in the ED. Additionally, 33.3% (n=718) of cases were discharged from the ward, 0.8% (n=18) still had ongoing hospitalization, and 2.32% (n=50) died. A total of 62 patients (2.87%) were deceased. When examining the length of hospital stay, the average length of stay in the ward was found to be 6.47±6.87 days, in the ICU 6.57±8.34 days, and the total length of stay 7.12±8.12 days.

DISCUSSION

On February 6, 2023, two consecutive devastating earthquakes struck the southeastern region of Türkiye. Official reports indicate over 50,000 deaths and more than 100,000 injuries. The earthquakes caused damage in 10 cities, leading to a serious disruption of health services. Numerous healthcare facilities collapsed, and many healthcare personnel experienced the destructive effects of the earthquakes as victims themselves. Starting from the second day of the earthquake, Adana, Mersin, and Diyarbakir emerged prominently as cities that experienced fewer devastating effects and began providing healthcare services not only to their own residents but also to patients arriving from the other seven affected provinces. The hospital is one of the main hospitals serving in Mersin province. The epidemiological examination results of

Table 4. The distribution of outcomes for the patients in the emergency department and the ward where they were hospitalized

Outcomes	n (%)
Emergency Department	
Discharged	1038 (48.2)
Admitted to the Ward	751 (34.8)
Admitted to ICU	235 (10.9)
Referred from ED to Another Institution	52 (2.4)
Refusal of Treatment in ED	67 (3.1)
Died in ED	12 (0.55)
The Wards	
Discharged from the Ward	718 (33.3)
Referred from the Ward to Another Institution	170 (7.88)
Refusal of Treatment in Ward	30 (1.4)
Ongoing Hospitalization	18 (0.8)
Died in Ward	50 (2.32)

ED: Emergency Department.

cases presented to the hospital will contribute to the literature, providing valuable insights for clinicians and healthcare administrators regarding the types of injuries, accompanying traumas, consultations performed, surgical and medical treatments administered to patients, and the outcomes of patients. The findings of this research are crucial for being better prepared for the disasters in the future.

This research included 2,155 patients, with 46.8% of them being male and a mean age of 45.86±17.68 years. In a trial conducted by Gürü et al. in a hospital outside the earthquake zone, they reported an average age of 46.5±17.4 years for 124 patients who presented after the February 6 earthquake, with 60.5% being female and 39.5% male.[4] In another research conducted by Uz et al. after the Aegean earthquake in 2020, they reported that the average age of 313 patients who were admitted to the ED with injuries due to the earthquake was 38.0 years old and 60.4% of these patients were female.[5] The prompt and accurate intervention and treatment of patients seeking hospital care after an earthquake become crucial, considering that these patients tend to be relatively young, with the expectation of a long lifespan.

The mean admission time of earthquake victims to the hospital following the earthquake was 102.40±83.08 hours (range: 4 and 540 hours). The distance between the earthquake center and the hospital is approximately 271 km, and transportation by road takes about 3 hours. Therefore, patients took a long time to reach our hospital. The impact of the damage sustained on the highways during the earthquake may have also caused a slowdown in patient transport. Additionally, the need to refer patients due to the inadequacy of nearby health facilities and the length of time patients remained under rubble may be other factors.

It is evident that the majority of patients sustained trauma in a single region, with lower extremity traumas being the most frequent among these injuries. Extremity traumas stand out as the most common reason for patient admissions. The most frequently fractured bones in extremity traumas were the femur, tibia, fibula, humerus, and radius, in decreasing order. In a report by Mackenzie et al., the researchers reported that 65% of hospital admissions were related to orthopedic traumas.[6] In another report by Sarı et al., extremity trauma was detected in 66.3% of earthquake survivors.[7] Many trials in the literature similarly indicate that extremity traumas are the most common injuries.[8-10] In the present research, 72.3% of hospital admissions were related to extremity trauma, and the rate of patients requiring surgical intervention was 10.8%. For the follow-up and treatment of patients presenting to the ED, consultations were most frequently requested from orthopedics, followed by internal medicine and neurosurgery. The admission rates to the hospital indicate that when earthquake disaster plans are made, support planning for both ED personnel, who receive all patients, and internal medicine departments for patient follow-ups should be considered primarily. Especially during the initial days of the earthquake, we observed that there was an overwhelming number of patient admissions, leading to a shortage of hospital capacity and a significant increase in the workload of all hospital personnel. These results also show that more than half of the patients who presented to the hospital were hospitalized. In a report published by Gökmen et al., a similar pattern was observed, with more than half of the patients being hospitalized.[11] Considering both the intensity of this workload and the fact that many hospital personnel could also be earthquake victims, we believe that rapid planning for assignments from non-earthquake centers should be made.

Of the earthquake survivors who presented to the institution, 34.8% were admitted to the ward, 10.9% to the intensive care unit, and 2.4% were referred to other institutions. A total of 12 (0.55%) of the earthquake survivors died in the ED. In a project conducted by Buyurgan et al. at a university hospital serving the same region, 29.2% of patients were hospitalized, with only 2.9% of them being treated in the ICU. The mortality rate in the ED was reported to be 0.3% in that report.[12] The difference in admission rates may be attributed to the fact that a high number of critical cases were transferred from hospitals in the earthquake zone to our hospital by ships under the coordination of the Ministry of Health. Both the present trial and the research by Buyurgan et al. showed low mortality rates. The main reason for this could be that trauma patients in critical condition were admitted to closer centers before the study hospital due to the distance between hospitals. In the present trial, the mortality rate in hospitalized patients was found to be 2.32%. Similarly, the mortality rate of patients hospitalized in the earthquake zone was reported to be 2.7% in the report by Gokmen et al.[11] There is no significant difference between the two studies.

Crush syndrome, together with traumatic rhabdomyolysis and acute kidney injury, is characterized by the ischemic necrosis

of muscle tissue due to prolonged compression of limbs or the torso.[13,14] Clinically, it can manifest as widespread edema, erythema, blisters, purpura, open fractures, ischemia, and tissue necrosis.[15] The incidence of Crush syndrome in earthquake survivors varies between 2% and 37%. This discrepancy can be attributed to factors such as compression duration, availability and efficiency of rescue teams and medical support, distance from the epicenter to referral hospitals, and post-disaster conditions.[16] In the present trial, rhabdomyolysis was identified in 20.6% of patients, and Crush syndrome developed in 9.2% (n=198) of them. A majority of patients with Crush syndrome received dialysis. Among the 198 patients diagnosed with Crush syndrome, 132 (6.1%) underwent fasciotomy for a total of 164 times. The majority of fasciotomy procedures were performed in the crural region. Additionally, mortality was observed in 19.8% of cases with Crush syndrome. In a trial conducted by He et al. after the Wenchuan earthquake in China, they found that 41.6% of patients diagnosed with Crush syndrome developed AKI.[17] Sever et al. reported that 12% of patients developed AKI attributed to earthquakes in Türkiye.[18] Reports by Safari et al., Li et al., and Gökmen et al. also indicate high rates of fasciotomy in different parts of the world.[11,19,20] The current findings suggest that there can be a considerable need for dialysis and fasciotomy among earthquake survivors. When planning for disasters, both the preparation of personnel capable of performing fasciotomies and the availability of dialysis devices and staff should be taken into account.

Amputation surgery was performed on 1.8% of patients who presented to the hospital, with lower extremity amputations being the most prevalent in the present trial. In research by Bingöl et al., 14% of patients underwent amputation, while the same variable was reported as 25% by Duman et al. and 4% by Kang et al. in their research conducted after earthquakes. Discrepancies in amputation rates are thought to be influenced by factors such as the distance of hospitals to the earthquake zone, variations in the length of time patients spent trapped under rubble, delays due to referrals from one institution to another, and differences in the number of patients included in the studies. Considering that patients undergoing amputation surgery may require prosthetic and orthotic devices in the postoperative process, including physical therapy and rehabilitation, it is crucial to consider these needs when planning for a disaster.

Limitations

The retrospective nature of the analysis and the high volume of patients referred simultaneously in the post-earthquake period may have led to gaps in the patients' medical reports. We acknowledge these limitations as the primary constraints of the present trial, and we do not believe they would significantly impact our data.

CONCLUSION

Major earthquakes are unavoidable catastrophes that can lead to a significant death toll. In this context, serious planning and disaster preparedness are needed to prevent health crises both in the areas directly affected by the earthquake and in the surrounding regions.

To provide effective healthcare in disaster situations, detailed and rational planning should be made before the disaster. Healthcare personnel should be assigned from the provinces neighboring the disaster area, and the staff should be provided with rapid transportation to the scene. For patients to access effective and rapid treatment, it would be appropriate to gradually transport patients to container and tent hospitals or health facilities in surrounding provinces, in line with triage plans prepared realistically and rationally. Additionally, amplification of ambulance helicopter crews and the use of military helicopters by converting them into ambulance helicopters may be a solution to reduce the negative effects of distance from the incident center on the injured.

As observed in this research, particular attention should be given to the need for healthcare personnel and medical supplies, especially in EDs and surgical disciplines. Additionally, as seen in the present trial, when there is a high number of earthquake victims in need of help, providing support in terms of shelter and food becomes crucial. Although upper and lower extremity injuries are the most commonly recorded types of injury, almost every kind of injury is encountered in the victims, creating a need for multidisciplinary action to mitigate the burden on the health system. We believe that the present study, along with other literature data, will serve as a guide in healthcare planning during disasters and will contribute to constructing effective disaster preparedness.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Kahramanmaraş depremi sonrası Mersin Şehir Eğitim ve Araştırma Hastanesi Acil Tıp kliniğine başvuran hastaların veri analizi

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AMAÇ: Deprem ve diğer doğal afetlerde doğrudan travmaya bağlı olarak ciddi sayıda yaralanma meydana gelmektedir. Ayrıca afetin aşırı iş yükü yüklenen sağlık kurumlarını da etkilemesi nedeniyle sağlık çalışanları deprem sırasında önemli zorluklarla karşı karşıya kalmaktadır. Bu bağlamda yakın çevrede sağlık hizmeti veren hastaneler önemli bir rol oynamaktadır. Ancak doğru planlamayla sağlık krizi en iyi şekilde yönetilebilir.

GEREÇ VE YÖNTEM: 6 Şubat 2023'te Türkiye'nin güney ve ortadoğu bölgelerinde meydana gelen depreme bağlı yaralanma nedeniyle Mersin Şehir Eğitim ve Araştırma Hastanesi'ne başvuran hastalar üzerinde tek merkezli retrospektif bir çalışma yapıldı. Çalışma kriterlerini karşılayan toplam 2155 hasta analize dahil edildi.

BULGULAR: Çalışmamıza dahil edilen 2155 hastanın %46.8'i (n=1009) erkek olup yaş ortalaması 45.86±17.68 yıl idi. Düşmeler (% 57.2, n=1233) en sık görülen yaralanma mekanizması olup, vakaların %71.9'u (n=1550) hastanemize kendi imkanları ile başvurmuştur. Kranial bölgede en sık görülen yaralanmalar yumuşak doku yaralanması ve cilt kesileri iken, torasik bölgede yumuşak doku yaralanması ve kaburga kırıkları en sık görülen yaralanmalardı. Abdominal yaralanmalar içindeen sık yumuşak doku yaralanması ve retroperitoneal kanama saptanırken, üst ve alt ekstremitede ise yumuşak doku yaralanması ve kırıkları en sık olarak saptandı. Olguların %11,1'inde (n=240) üst ekstremitede, %21.3'ünde (n=458) alt ekstremitede kırık tespit edildi.Rabdomiyoliz en sık görülen yaralanma türlerinden biriydi (n=443, %20,6). Vakaların %9.2'sinde (n=198)Crushsendromu ve akut böbrek hasarı saptandı; bu durum 40 (%1.8) hastada toplam 46 amputasyona ve 132 (%6.1) hastada 164 fasiyotomiye yol açtı. Ortopedi bölümü en sık cerrahi müdahale ve hastaneye yatışları gerçekleştirdi. Vakaların %3.0'ında (n=62) mortalite gözlendi.

SONUÇ: Bu çalışma deprem sonrasında iş yükünde ve hasta hacminde önemli bir artış olduğunu ortaya koymuştur. Deprem gibi ciddi travma riski yüksek olan afetlerde kırık, ezilme sendromu, amputasyon, fasiyotomi gibi durumlara hızlı müdahale için çok sayıda sağlık profesyoneline ihtiyaç vardır. Afet planlaması ve olası sonuçlara karşı hazırlıklı olmak, hastaneleri ilgilendiren sağlık krizini hafifletecek ve mortalite ve morbiditede önemli azalmalara yol açacaktır.

Anahtar sözcükler: Afet planlama; acil servis; deprem; travma; yaralanma.

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