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Adult Food Poisoning in a Tertiary University Hospital: Retrospective Evaluation of Emergency Department Visits and Outcomes

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Abstract

Background: The clinical diagnosis, which occurs with various symptoms resulting from consuming contaminated food, is defined as food poisoning (FP). A large number of people around the world experience FP each year. This report focuses on the clinical and descriptive characteristics of adult cases visiting the emergency department (ED) due to FP.

Methods: This study was planned as a retrospective examination of adult FP cases who visited a tertiary ED in a 4-year period. Complaints, vital signs, physical examination and laboratory data at the time of the visit were recorded. The treatment given for ED and the ways to recover from ED were also evaluated.

Results: 61 patients were included. 43 patients (70.5%) were male. Median age was 31 years (min: 18- max: 73). The most common symptom was nausea (n=27, 44.3%). No relationship was detected between length of hospital stay and descriptive data. Most of cases except two (96.7%), were discharged after the treatments administered in the ED.

Conclusions: FP cases are often young and male. They most often visit ED with complaints of nausea and are often discharged from ED after treatment. Descriptive data is not predictive of outcomes.

Key words: Poisoning; Emergency Departments; Nausea; Gastroenteritis; Abdominal Pain.

INTRODUCTION

Food poisoning (FP) is a diagnosis accompanied by a series of symptoms resulting from consumption of contaminated food (1). According to WHO (World Health Organization) data, 600 million people are affected every year due to FP after eating contaminated food, and 420,000 people die every year (2). The causes of FP include bacteria, viruses, and toxins (3). The most common source is bacterially contaminated foods (3). New pathogens are discovered

every year, causing acute gastroenteritis (AGE). However, in cases of AGE, the etiological cause is often unidentified because stool samples are rarely collected or because many laboratories can detect pathogens, especially viruses (2, 3). Symptoms may include fever, headache, nausea, vomiting, abdominal pain, and diarrhea similar to AGE (4). To suspect FP in patients presenting with these symptoms, 2 or more people must consume the same food and have similar symptoms (4).

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Depending on the causative agent, cases of FP often persist for a long time; It can occur within a few hours to a few days after food intake. Cases can result in severe and life-threatening liver and kidney-related complications, disability, or death. Mild FP is usually self-limiting, and patients can recover without specific treatment. However, severe FP may require antibiotics, hospitalization, and hydration (5). It can cause crowding in hospitals, especially emergency departments (EDs), and lead to events that will block the healthcare system. Although EDs are these patients' first point of visit, they are also a public health problem. Therefore, food security is important for every region and country (6).

In EDs, patients with suspected FP are usually examined and treated based on their clinical characteristics; some patients are treated on an outpatient basis, depending on their clinical condition, without testing (2). This study examined patients who visited the ED with suspicion of FP. Thus, it aimed to present descriptive data about these patients' ED visits to emergency physicians and contribute them to the literature.

MATERIALS AND METHODS

Study Design and Collecting Patients' Data

This study was approved by Tekirdağ Namık Kemal University Faculty of Medicine Ethics Committee (Dated: 28.09.2022; Approval Number: 201416). It was designed retrospectively and conducted in a university hospital's tertiary-level ED. To create a patient group, A05.X diagnosis codes were scanned from the hospital electronic archive using the International Classification of Diseases, 10th revision, Clinical Modification (ICD-10-CM) diagnosis codes among the patients who visited ED during four years between January 01, 2018, and January 01, 2022. Inclusion criteria include being over 18 years old and diagnosed with A05.X. Patients whose information could not be obtained were excluded. By examining the electronic files of the patients included in the study, Complaints at the time of admission, vital signs, physical examination, and laboratory findings were recorded in the previously created case report form. In addition, the methods used to treat these patients and the need for ward or intensive care admission were recorded in the case form. The patients' microbiology results for the agent were examined, and no positive results were observed.

Statistical Analysis

The data obtained were recorded and analyzed in the database prepared in the statistical program called Statistical Package for the Social Sciences (SPSS) 18. In our study, four patients who applied to the ED and were diagnosed with FP were compared (female, male, outpatient treatment, treatment in inpatient services). Descriptive statistics for categorical variables were expressed as number (n) and percentage (%). The chi-square test was used to compare data between groups. The compliance of continuous variables with normal distribution was evaluated using the Kolmogorov-Smirnov test. Comparison of categorical variables when they comply with normal distribution will also be achieved with the Chi-Square Test. Descriptive statistics were expressed as median values (25–75%) when none of the variables followed a normal distribution. Mann-Whitney U-test was used for group comparisons. Between-group differences were analyzed using Fisher's Test or Chi-Square Test, depending on the nature of the data. A value of $P < 0.05$ was considered statistically significant.

RESULTS

Descriptive Data

A total of 61 patients were included in the study. Of these, 18 (29.5%) were female and 43 (70.5%) were male. The median age of the patients included in the study was 31 (min:18—max:73). No significant relationship was found between the patient's age, gender, and other descriptive data and length of stay in the ED (Table 1).

Symptoms, Biochemical Data, and ED Treatments

The most common reason for ED visits was determined to be nausea in 27 (44.3%) patients. Abdominal pain was detected in 18 (29.5%) and diarrhea was detected in 16 (26.5%) (Table 1).

It was observed that some biochemical tests were also performed on the cases included in the study. Accordingly, their average urea value is 37.43 ± 40.6 mg/dl, average creatine value is 0.88 ± 0.27 mg/dl, average AST value is 24.6 ± 8.4 IU/L, average ALT value is 23.8 ± 14.17 IU/L, mean LDH value was 244 ± 122 IU/L, mean sodium was 137 ± 2 mmol/L, mean potassium was 4.3 mmol/L. The mean CRP value was 4.2 ± 0.4 mg/L, the mean WBC value was $10.1 \pm 2.7 \times 10^3$ /uL, and the mean hemoglobin value was 14.3 ± 1.7 g/dL. The average platelet value is 248 ± 70

10[^]3/uL. When the laboratory data of the patients were compared with their hospitalization/discharge status, no significant relationship was found (Table 2).

Symptomatic treatments of the patients hospitalized in ED were also examined. 12 (19.6%) patients received hydration with physiological saline only. Metoclopramide HCL was administered to 36 (59%) of the patients, hyoscine-N-butyl bromide was administered to 19 (31.1%), and 5HT₃ receptor antagonist was administered in addition to hydration to 4 (6.6%). No symptomatic treatment was applied to 21 (34.4%) patients (Table 1).

Outcome Data

According to the ED outcome, 59 cases were discharged from the ED after their symptomatic treatment was completed, and 2 cases were kept under observation in the ED. These two cases were hospitalized and discharged from the clinic after a full recovery (Table 1).

DISCUSSION

In this study, FP cases visiting a tertiary ED were examined. The median duration of the symptoms was 24 hours, the most common symptom was nausea, and the median duration in the ED was 30 minutes. Cases were largely discharged from the ED. The male gender was dominant. Metoclopramide HCL was the best ED treatment.

The low number of cases may be because we were exposed to a pandemic during most of the period between 2018 and 2022 when we collected data, and people paid more attention to food safety during the pandemic and avoided crowded places such as ED. In a study examining the incidence of AGE cases during the COVID-19 pandemic period, it was similarly observed that FP cases were lower in the pandemic years than in other years (6).

In the report of Elkhal et al., which examined 367 cases of patients visiting ED due to AGE, it was observed that the most affected patient group was women (7). In another study investigating food poisoning, Pardal et al. reported that men were most frequently affected (5). In our study, the male gender was dominant. However, when similar literature and the results of this study with a limited number of cases are evaluated, it does not seem possible yet to demonstrate a gender trend in FP cases.

It is noteworthy that in our study, the duration of stay of the patients in the ED was short. Additionally, no significant difference was found in treatments given, symptoms, age, and gender. The main reason for the short duration of these periods is the low need for symptomatic treatment after rapid evaluation in the ED and the fact that patients are treated with an outpatient prescription. In another study, 120 cases of FP were examined, and it was determined that the length of stay in the ED of 89.2% of the patients was 1-2 days (8).

We think hydration, antiemetics, analgesics, and spasmolytic agents are commonly used to relieve FP symptoms. Still, since each patient is different, the treatment plan should be shaped according to the patient's individual symptoms and clinical condition. For this reason, we think that there cannot be a standard treatment approach in FP. Studies suggest that antibiotics should not be given to patients unless necessary, even if bacterial etiology is detected (12). In our research, the most frequently used drug for treatment was metoclopramide HCL. Similarly, in the research conducted by Getie and Belayneh, which retrospectively examined food poisoning, one of the most frequently used drugs was metoclopramide HCL, followed by cimetidine (9).

The literature on food poisoning shows that the cases are caused mainly by bacterial contamination, and treatment and hospitalizations have been determined for this reason. A limitation of our study was that there was no growth in the microbiology results of the patients. Therefore, the pathogens are uncertain. However, only two patients required hospitalization, and the others were treated on an outpatient basis, suggesting that these cases may be in the mild poisoning category. In 2009, Bütün et al., in a retrospective study of food poisoning, microbiology examination was performed on 11% of the patients, and no growth was detected (10). A review published in 2021 emphasized that the pathogen generally cannot be detected in food-borne gastroenteritis (11). Researchers who are curious about the reason for this situation have turned to investigating whether bacterial or viral contamination or food allergy is the main cause in cases that we think of as FP (12). However, we believe that the clinical course of the patients should be prioritized since it is a problematic diagnostic group to distinguish.

The most important limitations were the small sample size and the lack of archive material for the current sample. No causative pathogen was found in the patients' microbiological examinations. Similarly, due to the lack of data, which foods cause symptoms is not known.

The young age of patients presenting to the ED with FP is noteworthy. The most common symptom in these cases is nausea. The cases are primarily relieved after the symptomatic treatment they receive in the ED and are discharged from there. The most common ED treatment is metoclopramide HCl. The descriptive data considered

in this study is not predictive of clinical outcomes of FP cases.

Declarations

The authors received no financial support for the research and/or authorship of this article. There is no conflict of interest

This study was approved by the Tekirdağ Namık Kemal University Faculty of Medicine Ethics Committee (Dated: 28.09.2022; Approval Number: 201416).

Table 1. Complaints of food poisoning cases visiting the Emergency Department, the number and percentage values of drugs used in treatment, and the comparison of these parameters with the duration of stay in the emergency department			
		Length of stay in ED	
		n %	
		p	
Median age, (min-max)		31 (18-73)	0.499
Median symptom duration in hours (min-max)		24 (1-48)	0.071
Length of stay in ED as hours (min-max)		30 (10-120)	
How to leave the ED	Discharge	59 (96.7%)	0.349
	Hospitalization to a clinic	2 (3.3%)	
Gender	Male	43 (70.5%)	0.182
	Female	18 (29.5%)	
Symptom			
Nausea/vomiting		27 (44.3%)	0.468
Abdominal pain		18 (29.5%)	
Diarrhea		16 (26.5%)	
Drugs Used in the Treatment of ED			
Metoclopramide HCl		36 (59%)	0.093
Hyoscine-N-butylbromide		19 (31.1%)	
Hydration with saline		12 (19.6%)	
None		21 (34.4%)	
5HT ₃ receptor antagonist		4 (6.6%)	
ED: Emergency department, n: Number, HCl: hydrochloric acid, 5HT ₃ : 5-hydroxytryptamine-3			

Table 2. Laboratory analysis data of food poisoning cases admitted to the Emergency Department

Parameter	Mean ± SD	p (Discharge / Hospitalization to a clinic)
Urea (mg / dl)	37.4±40.6	0.857
Creatine (mg / dl)	0.88±0.27	0.286
AST (IU / L)	24.6±8.4	0.400
ALT (IU / L)	23.8±14.1	0.952
LDH (IU / L)	244±122.6	0.072
Sodium (mmol / L)	137±2	0.316
Potassium (mmol / L)	4.2±0.4	0.758
CRP (mg / L)	15±14	0.343
WBC (10 ³ / uL)	10.150±2,788	0.947
Hb (g / dL)	14.3±1.7	0.442
Plt (10 ³ / uL)	248±70	0.771

SD: Standard deviation, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, LDH: Lactate dehydrogenase, CRP: C reactive protein, WBC: White blood cells, Hb: Hemoglobin, Plt: Platelet

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Comparison of the results of different surgical techniques in the treatment of chronic subdural hematoma in a training and research hospital

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Abstract

Background: Chronic subdural hematoma can cause compression of brain tissue followed by neurological deficits. There are several methods for the treatment of chronic subdural hematoma, but the most appropriate treatment is still controversial. We compared 5 different surgical methods applied by five different surgeons in a single center and we suggest the most appropriate treatment method in the literature.

Methods: Chronic subdural hematoma can cause compression of brain tissue followed by neurological deficits. There are several methods for the treatment of chronic subdural hematoma, but the most appropriate treatment is still controversial. We compared 5 different surgical methods applied by five different surgeons in a single center and we suggest the most appropriate treatment method in the literature.

Results: We collected data from 185 patients who underwent surgery due to chronic subdural hematoma. Different surgical techniques were used in the treatment of patients. Only one burr hole was opened in 22 of the patients, one burr hole was opened in 40 of them and 1 drain was placed in the subdural space, only two burr holes were opened in 41 of them, two burr holes were opened in 58 of them and 1 drain was placed in the subdural space, and mini craniotomy was performed in 24 patients.

Conclusions: Five different surgical methods used in the treatment of chronic subdural hematoma have advantages and disadvantages. We believe that a study conducted by increasing the number of patients, ensuring homogenization of groups, and increasing surgical techniques will shed light on the literature.

Key words: Subdural hematoma, burrhole, mini craniotomy, drainage

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INTRODUCTION

A subdural hematoma (SDH) is a congestion of blood between the dura and arachnoid meningeal layers surrounding the brain and chronic SDH develops over the course of 3 or more weeks (1). Chronic subdural hematoma can cause compression of brain tissue followed by neurological deficits. While chronic subdural hematoma may be asymptomatic, it may lead to a heterogeneous clinical picture ranging from headache, seizure, ataxia, focal neurological deficit, language disturbance, confusion and parkinsonism (2). The probability of recurrence varies between 12% and 20%, while the mortality rate is thought to be 5%. Risk factors include age, chronic alcoholism, therapeutic interventions such as ventricular shunting, long-term use of anticoagulants (3).

There are several methods for the treatment of chronic subdural hematoma, but the most appropriate treatment is still controversial. While there are patients who have been followed, there are also surgical techniques with or without subdural drainage such as twist drill, 1 burr hole, 2 burr hole, mini craniotomy (4).

In our study, we compared 5 different surgical methods applied by five different surgeons in a single center and we suggest the most appropriate treatment method in the literature.

MATERIALS AND METHODS

This retrospective study was conducted at a single center and at a tertiary hospital. After obtaining the approval of the the Bursa City Hospital Ethics Committee (Dated: 26.06.2024; Approval Number: 2024-11 /7), the files of the patients with a diagnosis of chronic subdural hematoma -who were operated on at the S.B.U Bursa City Hospital Neurosurgery Clinic between July 2019 and April 2024- were retrospectively reviewed. The patients were evaluated in terms of their complaints, neurological examinations, type of operations, use of subdural drains, and postoperative complications. 5 different surgical techniques were applied to the patients. The surgical method was determined by taking into account the surgeon's experience and the area where chronic subdural hematoma was found in the cranial CT examination.

Collection of data

Demographic data included age, gender, presenting symptoms, preprocedural GCS score , medical

comorbidities and anticoagulation/antiplatelet status. All radiographic data were collected from examination of the patients' brain computed tomography (CT). The thickest point of the subdural hematoma was defined in millimeters from the inner table to the cortex in the axial view. Hematoma density was classified as hyperdense, hypodense or isodense, and this classification was based on the density in which more than 50% of the hematoma predominated. Hematoma classification was divided into homogeneous, laminar, separated and trabecular types. Midline shift was determined by millimeter displacement of the septum pellucidum relative to the midline at the level of the foramen of Monro on axial CT. It was understood that it improved, worsened or remained unchanged during follow-up.

Surgical Techniques

One burr hole

The dura was opened after a burr hole was opened 1 cm above the squamous suture. After the bleeding that caused increased intracranial pressure was evacuated, the patient was not irrigated with saline solution and no drain was placed. The operation was completed by closing the skin and subcutaneous tissue (Figure-1).

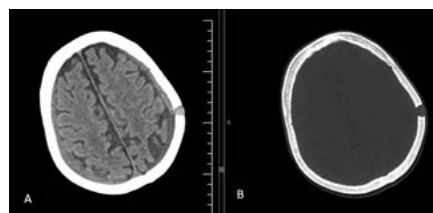


Figure 1:

A: Brain dose computed tomography image of the patient who

underwent surgery by opening a one burr hole and no drain,

B: Bone dose computed tomography image of the patient who

One burr hole + drainage

The dura was opened by making a burr hole 1 cm above the squamous suture. The bleeding causing intracranial pressure was drained and the subdural space was irrigated with saline. Since there was no blood coming from the subdural space, a drain was placed in the subdural space. The operation was completed by closing

the skin and subcutaneous tissue (Figure-2).

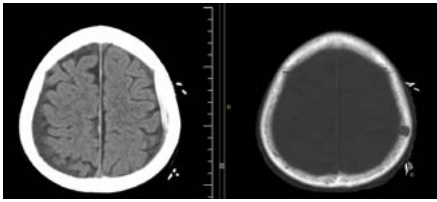


Figure 2:

A: Brain dose computed tomography image of the patient who underwent surgery by opening a one burr hole and placing a drain in the subdural space,

B: Bone dose computed tomography image of the patient who underwent surgery by opening a one burr hole and placing a drain in the subdural space.

Two burr holes

Two burr holes were drilled in the temporal and parietal regions. After the dura was opened, the bleeding that caused increased intracranial pressure was drained. The subdural space was irrigated with saline and it was observed that there was no bleeding in the space. No drain was placed. The operation was completed by closing the skin and subcutaneous tissue (Figure-3).

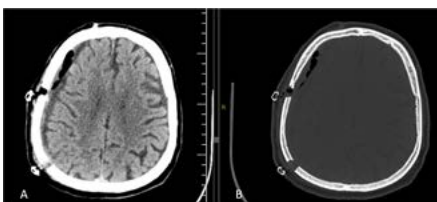


Figure 3:

A: Brain dose computed tomography image of the patient who underwent surgery by opening two burrhole and no drain,

B: Bone dose computed tomography image of the patient who underwent surgery by opening two burr hole and no

Two burr holes + drainage

After two burr holes were drilled in the temporal and parietal regions, the dura was opened. The bleeding that caused increased intracranial pressure was drained. The subdural space was washed with saline and a drain was placed in the subdural space from the burr hole opening to the parietal area. The operation was completed by closing the skin and subcutaneous tissue (Figure-4).

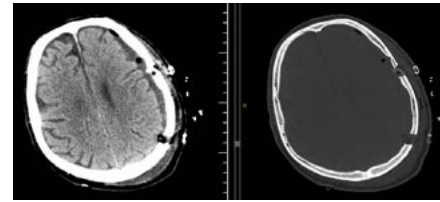


Figure 4:

A: Brain dose computed tomography image of the patient who underwent surgery by opening a two burr hole and placing a drain in the subdural space,

B: Bone dose computed tomography image of the patient who underwent surgery by opening a two burr hole and placing a drain in the subdural space.

Mini-Craniotomy

A craniotomy of approximately 3x3 cm was made in the temporal region with a drill. The dura was opened in a y-shape. After the bleeding in the subdural space was evacuated, irrigation with saline solution and membranectomy were performed. The arachnoid membrane was opened in several regions. A drain was placed in the subdural space. Dura was closed. The operation was completed by closing the skin and subcutaneous tissue (Figure-5).

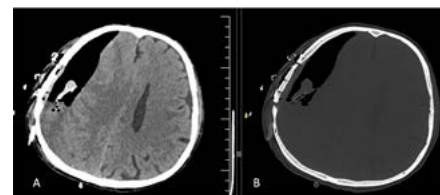


Figure 5:

A: Brain dose computed tomography image of the patient who was operated by opening a mini craniotomy,

B: Bone dose computed tomography image of the patient who was operated by opening a mini craniotomy.

RESULTS

Of the 185 patients participating in the study, 45 were female and 140 were male, and the age range was 70 ± 13.2 years. The mean GCS of the patients at admission was 13.6 ± 1.4 . while 132 patients were admitted to the postop intensive care unit, the duration of hospital stay of the patients was 6.2 ± 2.1 days. While the patients who were operated by one burr hole method with the least duration of stay in the hospital was 3.8 ± 0.6 days, the longest remaining patient group was those who were operated with mini craniotomy. In the postoperative

period, 8 patients had seizures, and 6 of these patients consisted of patients who were operated with two burr hole + drainage method. The patient group with the highest pneumocephaly rate of 94.8% (55%) in postoperative control CT examinations was the patient group operated with two burr hole + drainage method.

We collected data from 185 patients who underwent surgery due to chronic subdural hematoma. Different surgical techniques were used in the treatment of patients. Only one burr hole was opened in 22 of the patients, one burr hole was opened in 40 of them and 1 drain was placed in the subdural space, only two burr holes were opened in 41 of them, two burr holes were opened in 58 of them and 1 drain was placed in the subdural space, and mini craniotomy was performed in 24 patients (Table-1). 8 patients were re-operated due to recurrent chronic subdural hematoma. 8 Patients were re-operated due to recurrent chronic subdural hematoma. none of these patients had a history of re-trauma. anticoagulant medication was not started in any of the patients. 4 out of 8 patients were operated again after chronic subdural hematoma, which caused a shift effect, was seen again on control cranial ct imaging., 2 of them were re-operated upon the occurrence of chronic subdural hematoma causing shift effect in cranial ct examination performed due to persistent headache, 1 of them was re-operated upon the occurrence of chronic subdural hematoma causing shift effect in cranial ct thinning per formed upon the development of deficit, 1 of them was re-operated upon the occurrence of chronic subdural hematoma causing shift effect in cranial ct examination performed after seizure.

All of these patients had two burr holes opened and no drain inserted during their first surgery. In two surgeries, chronic subdural hematoma was drained from the same two burrholes and 1 drain was placed at the subdural distance. 6 patients died due to age and comorbidities.

DISCUSSION

Chronic subdural hematoma treatment was first described as twist drill craniotomy (TDC) in the 1930s, and since then, many different treatment methods such as one or two burr hole craniotomy and craniotomy have been applied (5,6). Although there are many studies on the advantages and disadvantages, reoperation and complications of surgical techniques, most of them are in the form of meta-analysis (4,7,8). Single-center studies

are mostly comparisons of two different techniques (9,10).

When deciding on the most appropriate surgical method, the surgeon first considers the technique that has the lowest probability of complications, shorter hospital stay, and less re-operation (11,12). Meta-analysis studies are very valuable in finding the most accurate surgical technique to be applied. However, it is not fully informative since two different techniques are compared in the meta-analyses published in the literature (7,8,13). In our study, we compared five different surgical techniques applied in a clinic that has not been published before in the literature in terms of seizure, hospital stay and reoperation rates in the treatment of chronic subdural hematoma.

Historically, reoperation rates following surgical treatment of cSDH have generally been reported as %10– %20 (15,16). Modifications of the burr hole procedure to increase subdural fluid drainage, specifically the use of postoperative drains, have been associated with reduced reoperation rates. For example, in a randomized trial comparing subdural drain placement with no drain placement after burr hole evacuation, the rate of reoperation within 6 months was 9% with drain placement and 24% without. According to Santarius et al.'s suggestions in the study that 2(%1,1) of the patients who underwent reoperation (two burr holes were opened) and a drain was placed in the subdural space, while 6 (%3,2) of them (2 of them were patients with a single burr hole opened and 4 of them were patients with two burr holes) were patients in whom no drain was placed in the subdural space (17,18).

There were many studies regarding the preferred number of burr holes during chronic subdural hematoma surgery, the usefulness of intraoperative irrigation, and the most appropriate location for drain placement (subdural, subgaleal, subperiosteal) (19). Some studies have shown that there is no significant difference in the recurrence rate and complication rate in CSDH patients treated with a two-burr hole strategy compared to a one-burr hole strategy (19,20). A recent meta-analysis also showed that the outcomes of chronic subdural hematoma patients treated with a one burr hole in the postoperative period were similar to those treated with two burr holes (4,20).

In the literature, wound discharge, parenchymal

bleeding, and acute subdural hematoma are mentioned as complications that occur after chronic subdural hematoma treatment (4,21,22). However, seizures occurring after chronic subdural hematoma surgery are rarely mentioned in the literature (3,9,23). In our study, we considered patients' seizures in the postoperative period as a complication. Because it is a finding that is not present before surgery, it can be very difficult to treat. That's why we wanted to draw attention. In our study, 8 patients had seizures in the postoperative period and 2 patients were reintubated due to status epilepticus.

There are no studies in the literature showing a connection between pneumocephalus and seizures. In our study, we found that the rate of postoperative seizures in patients with pneumocephalus was proportional. However, we could not explain the connection between them because we did not have enough number of patients and data to establish the connection between them.

Fomchenko et al. In his study, as in our study, it was observed that the risk of pneumocephaly, recurrent and seizures was higher in patients with two burr holes compared to those with a single burr hole. Fomenchenko et al. thought that the reason for this is related to more irrigation, longer surgery time, and more incisions and burr holes, and our study also supports this theory (24).

A short hospital stay is an important criterion for reducing complications and hospital costs. One of the

important criteria that reduces the hospital stay is the small incision and burr hole/craniotomy of the chosen surgical method (24,25). In our study, the patients with the shortest hospital stay were the patients operated with a single burr hole, 3.8 ± 0.6 days, while the longest duration was the patient group operated with a mini craniotomy, 7.7 ± 2.2 days.

Patients who underwent surgery with mini craniotomy are also the group of patients who are most frequently admitted to intensive care and whose stay in intensive care is the longest. Although mini craniotomy is not a preferred method, membranectomy is a method applied when necessary (26).

Our study has limitations due to the small number of patients, lack of homogeneous distribution, and not mentioning all the techniques used for chronic subdural hematoma surgery.

In conclusion; Five different surgical methods used in the treatment of chronic subdural hematoma have advantages and disadvantages. When we evaluated both postoperative pneumocephalus, seizure and patient length of stay according to the criteria we used in our study, we concluded that the most appropriate treatment method was to make a single hole in the subdural space without placing a drain. We believe that a study conducted by increasing the number of patients, ensuring homogenization of groups, and increasing surgical techniques will shed light on the literature.

Tablo1. Summary of patient groups

Technique	Sex	Age	First GCS	Hospitalization	Postop ICU	Postop Seizure	Postop Pneumocephaly	Recurrence
One burr hole	6F 16M	55.9±10.6	13.9±0.6	3.8±0.6	0.4±0.4	0	14(64%)	2
One burr hole + drainage	10F 30M	77.1±6.6	13.9±1	5.6±1.3	1.8±1.2	0	33(82.5%)	0
Two burr hole	9F 32M	67±13.5	13.6±1.4	6.3±2.6	1.9±1.8	1	31(71.6%)	4
Two burr hole + drainage	14F 44M	68.1±13.9	13.5±1.8	7.2±1.5	1.7±1.4	6	55(94.8%)	2
Mini Craniotomy	6F 18M	71.9±10.8	13.7±0.8	7.7±2.2	3.1±1.7	1	21(87.5%)	0

Declarations

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The effect of staying at home or in a container city on early postoperative findings after cataract Surgery

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Abstract

Background: Chronic exposure to toxic pollutants present in air, water, and soil can cause various damages to the external tissues of the eye. During an earthquake, hazardous materials such as asbestos, lead, and other toxic substances can be released into the environment. Staying in a house or a container city after cataract surgery can lead to different levels of exposure to these substances.

Methods: Patients who underwent cataract surgery between May 2023 and May 2024 were retrospectively analyzed. The patients were divided into two groups based on whether they stayed at home or in a container city. The best-corrected visual acuity (BCVA), corneal edema, central corneal thickness (CCT) assessed by pachymetry, and intraocular pressure (IOP) were recorded and preoperatively, early findings at the 1st week and 1st month postoperatively compared between the two groups.

Results: When comparing the groups that stayed at home and those that stayed in a container city after cataract surgery, no significant differences were observed in BCVA, corneal edema, CCT, and IOP at the 1st week and 1st month. When evaluating other postoperative complications, no cases of endophthalmitis, cystoid macular edema, retinal detachment, or corneal decompensation were reported in either group.

Conclusions: We observed that staying at home or in a container city had no significant impact on surgical and visual early outcomes after cataract surgery. The limitations of the study included its retrospective nature and small sample size.

Key words: Cataract, Phacoemulsification, Postoperative Care, Earthquake.

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INTRODUCTION

According to a review of population-based studies on the prevalence of blindness and low vision from 55 countries by the World Health Organization, cataract is among the leading causes of visual impairment worldwide (1).

Cataract surgery is one of the most frequently performed surgeries in the developed world, with approximately 20-25 million cataract surgeries conducted each year (1). This surgery has a very high success rate, with some studies reporting up to a 90% improvement in visual function and visual acuity following the procedure (2,3).

Chronic exposure to toxic pollutants in air, water, and soil can cause various damages to the external tissues of the eye, such as the cornea and conjunctiva. Environmental pollutants, airborne toxins, and poorly ventilated buildings have been shown to cause various toxic effects on the surface of the human eye (4-6).

Due to the recent earthquakes centered in Kahramanmaraş, Turkey, many people in these regions affected by the earthquake are residing in tent or container cities. Compared to houses, living in these structures may increase exposure to various toxic factors.

The impact of the living environment on postoperative outcomes after cataract surgery has not been adequately discussed in the literature. In our study, we aimed to investigate whether the living environment during the postoperative period has an effect on postoperative outcomes in patients residing in the earthquake region after cataract surgery.

MATERIALS AND METHODS

Study Design and Patients

Patients who underwent cataract surgery at the Ophthalmology Clinic of XXXX State Hospital were retrospectively evaluated. The study was conducted in accordance with the Declaration of Helsinki. Approval for this study was obtained from the Local Ethics Committee of Hatay Mustafa Kemal University Faculty of Medicine University (Dated: 21.05.2024; Approval Number: 27).

To identify suitable patients for the sample, electronic patient records at XXXX State Hospital were retrospectively reviewed, and patients who had undergone cataract surgery between May 2023 and May 2024 were identified. We included patients over the age of 50 who had complete examination findings recorded

before the surgery and at postoperative week 1 and month 1. Patients with conditions that could hinder the improvement of visual acuity after cataract surgery, such as corneal disorders, diabetic retinopathy, glaucoma, macular degeneration, and uveitis, were excluded. Patients who developed complications before, during, or after the surgery were excluded.

Patients were divided into two groups based on whether they were staying in a home or a container city. The best-corrected visual acuity (BCVA), corneal edema, central corneal thickness (CCT) assessed by pachymetry, and intraocular pressure (IOP) were recorded for both preoperative and postoperative results. Corneal edema was subjectively evaluated based on its severity as none, mild, moderate, or severe (Grade 0, 1, 2, 3). In this study, the preoperative and early postoperative (week 1 and month 1) findings of both groups were compared.

Statistical Analysis

The correlation analysis of the data was performed using the IBM SPSS 25.0 package program. Mixed design ANOVA and Independent Sample T Test were used for the comparison of repeated measurements between the two groups. Results were considered statistically significant for $p < 0.05$.

RESULTS

Thirty patients who stayed at home and thirty patients who stayed in container cities after cataract surgery were examined. In the group that stayed at home (Group 1), 50% were female and 50% were male. In the group that stayed in container cities (Group 2), 56.6% were female and 43.4% were male. The average age was 67.03 ± 4.76 years in Group 1 and 67.67 ± 4.99 years in Group 2 ($p > 0.05$). No significant differences in age or gender were found between the patient groups living in container cities and those living at home.

The preoperative best-corrected visual acuity (BCVA) for patients staying at home was 0.71 LogMar, 0.2 at postoperative week 1, and 0.09 at postoperative month 1. Postoperative BCVA values at week 1 and month 1 were significantly improved compared to preoperative values ($p < 0.05$). Corneal edema values at week 1 (1.1) were significantly higher compared to preoperative values, while at month 1 (0.03), there was no significant difference compared to preoperative and postoperative week 1 values. The preoperative pachymetry value was 543 ± 24.5

μm , $577\pm34 \mu\text{m}$ at postoperative week 1, and $545\pm24 \mu\text{m}$ at postoperative month 1. The pachymetry value at week 1 was significantly higher compared to the preoperative value. Intraocular pressure (IOP) was $14.67\pm2.74 \text{ mmHg}$ preoperatively, $13.13\pm2.52 \text{ mmHg}$ at postoperative week 1, and $11.93\pm2.46 \text{ mmHg}$ at postoperative month 1. The IOP values at week 1 and month 1 were significantly lower than the preoperative values ($p<0.05$) (Table 1).

The preoperative BCVA for patients staying in container cities was 0.68 LogMar, 0.22 at postoperative week 1, and 0.08 at postoperative month 1. Postoperative BCVA values at week 1 and month 1 were significantly improved compared to preoperative values ($p<0.05$). Corneal edema values at week 1 (0.97) were significantly higher compared to preoperative values, while at month 1 (0.03), there was no significant difference compared

Table 1. The values of the Home Group at preoperative, postoperative week 1, and postoperative month 1

	Preoperative	Postoperative 1 st Week	Postoperative 1 st Month
BCVA	0.71±0.19	0.2±0.13	0.09±0.07
Corneal Edema	0	1.1±0.66	0.03±0.17
CCT	543±24.5	577±34	545±24
IOP	14.67±2.74	13.13±2.52	11.93±2.46

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

to preoperative and postoperative week 1 values. The preoperative pachymetry value was $544\pm24.09 \mu\text{m}$, $580\pm35 \mu\text{m}$ at postoperative week 1, and $545\pm23 \mu\text{m}$ at postoperative month 1. The pachymetry value at week 1 was significantly higher compared to the preoperative value ($p<0.05$). IOP was $15.07\pm2.76 \text{ mmHg}$ preoperatively, $13.30\pm2.57 \text{ mmHg}$ at postoperative week 1, and $12.33\pm2.27 \text{ mmHg}$ at postoperative month 1. The IOP values at week 1 and month 1 were significantly lower than the preoperative values ($p<0.05$) (Table 2).

Table 2. The values of the Container City Group at preoperative, postoperative week 1, and postoperative month 1

	Preoperative	Postoperative 1 st Week	Postoperative 1 st Month
BCVA	0.68±0.18	0.22±0.13	0.08±0.06
Corneal Edema	0	0.97±0.61	0.03±0.18
CCT	544±24.09	580±35	545±23
IOP	15.07±2.76	13.30±2.57	12.33±2.27

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

When comparing the home and container city groups at week 1 and month 1 after cataract surgery, no significant differences were found in terms of BCVA, corneal edema, CCT, and IOP ($p>0.05$) (Table 3, Table 4).

Table 3. Comparison of the values at postoperative week 1 between patients staying in a home and those staying in a container city

	Home	Container City	P Value
BCVA	0.2±0,13	0.22±0,13	0.496
Corneal Edema	1.1±0,66	0.97±0,61	0.618
CCT	577±34	580±35	0.966
IOP	13.13±2,52	13.30±2,57	0.985

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

Table 4. Comparison of the values at postoperative week 1 between patients staying in a home and those staying in a container city

	Home	Container City	P Value
BCVA	0.09±0.07	0.08±0.06	0.575
Corneal Edema	0.03±0.17	0.03±0.18	0.998
CCT	545±24	545±23	0.815
IOP	11.93±2.46	12.33±2.27	0.712

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

Regarding other postoperative complications, no cases of endophthalmitis, cystoid macular edema, retinal detachment or corneal decompensation were reported in either group.

DISCUSSION

In this study, which retrospectively examined the postoperative outcomes of patients who underwent cataract surgery, the effect of the postoperative care environment on these outcomes was investigated.

It is well known that significant improvements in visual acuity are achieved after cataract surgery (3). In our study, the increase in visual acuity was similar between the two groups.

In a study by Ramya et al., it was observed that intraocular pressure decreased after cataract surgery (7). Similarly, other studies have also reported a decrease in intraocular pressure after cataract surgery in both glaucomatous and

non-glaucomatous eyes(8,9,10). In our study, a similar decrease in postoperative intraocular pressure was observed in both the container city group and the home group. However, no significant difference was found between the two groups when compared.

Corneal edema is a common complication after cataract surgery (11). Corneal edema can develop due to damage to the corneal endothelium secondary to the ultrasonic power used during cataract surgery (12). In our study, an increase in corneal edema and pachymetry was observed in both groups at postoperative week 1, while no difference was observed compared to preoperative values at month 1. There was no significant difference between the two groups.

While the most common complications in the postoperative period after cataract surgery include increased intraocular pressure and corneal edema, less frequently, complications such as cystoid macular edema,

posterior capsule opacification, retinal detachment, and endophthalmitis can occur (13). Various intraoperative and postoperative complications have been shown to lead to worse surgical and visual outcomes (14,15,16). Comorbidities such as glaucoma, uveitis, diabetic retinopathy, and previous vitrectomy surgery can also affect surgical and visual outcomes (17,18). In our study, the complications observed were similar in both groups.

Environmental factors such as pollutants, temperature changes, ultraviolet rays, toxic gases, chemicals, bacteria, smoking, various medications, variable humidity, and cosmetics can affect various parts of the eye, such as the cornea and conjunctiva, leading to numerous eye conditions such as cataracts, conjunctivitis, glaucoma, and dry eye (19). Okawada et al. epidemiologically investigated the effects of photochemical air pollution on the human eye, and the results showed changes in human tear lysozyme (HTL) and tear pH due to eye irritation and corneal epithelialopathy (20).

Heilenbach et al. (21) demonstrated that environmental factors are associated with various ophthalmic conditions, including endophthalmitis. A recently published study suggested that environmental factors might contribute to the development of endophthalmitis and that proper hygiene and preventive measures could help prevent endophthalmitis (22). In our study, no cases of endophthalmitis were observed in either group.

Recent studies conducted in the earthquake region of Turkey have shown that hazardous materials such as asbestos, lead, and other toxic substances were released into the environment during the earthquake (23). Exposure to toxic pollutants in air, water, and soil may vary between staying in a home or a container city. In our study, this situation did not have an effect on the outcomes after cataract surgery.

Our country is rich in active fault lines and is therefore constantly at risk of earthquakes. The process of returning to routine after a natural disaster involves long and challenging phases. During this period, surgeons may face difficulties in deciding to accept elective cases due to potential complications. In our study, we found that there were no disadvantages to postoperative recovery in an environment recovering from an earthquake. Although the sample size and duration were limited, we believe this study will be informative.

We observed that the postoperative care environment,

whether at home or in a container city, did not have a significant impact on surgical and visual outcomes after cataract surgery. Limitations of the study included its retrospective nature and the small sample size. There is a need for prospective studies with larger samples.

Declarations

The authors received no financial support for the research and/or authorship of this article. There is no conflict of interest.

This study was approved by the Hatay Mustafa Kemal University Faculty of Medicine Ethics Committee (Dated: 21.05.2024; Approval Number: 27).

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Rare complication of RIB fracture and fixation with non-classical method

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Abstract

The vast majority of all chest traumas are blunt traumas. In blunt traumas, serious intrathoracic intrapleural complications such as pneumothorax, hemothorax, hemopneumothorax may be observed whether or not accompanied by rib fractures, and in some cases, thoracic wall hemorrhages may be observed rarely at a level that severely impairs vital signs. In our case, we presented a patient who developed secondary to multiple rib fractures, no intrapleural complications were observed, vital signs were severely impaired due to diffuse bleeding in the serratus anterior muscle, which was a very rare complication, and we performed rib fixation with an intrathoracic extrapleural approach as a non-classical method.

Key words: Cataract, Non-classical, Rib fixation, Rib fracture.

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INTRODUCTION

Blunt traumas constitute 70% of all chest traumas and require a multidisciplinary approach because they involve many organs including ribs, lung, pleura, heart, great vessels, diaphragm and mediastinal structures (1). Serious complications such as pneumothorax, hemothorax, lung contusion or other organ injuries may develop and mortality is relatively high (2). Multiple rib fractures that develop after a relatively low-energy trauma should not be ignored and it should be kept in mind that intensive care follow-up and surgical planning may be required. In terms of surgical technique, rib fixation can be performed with the intrathoracic extrapleural approach and non-classical method in appropriate cases (in cases where complications such as pneumothorax, hemothorax, etc. are not observed), giving priority to the area where complications develop.

CASE REPORT

A 53-year-old male patient was admitted to the emergency department with pain and progressive swelling in the right posterolateral region that started about 1 hour ago after lifting the refrigerator at home. He stated that he had no known comorbidities and his symptoms were gradually increasing. Initial vital signs were TA: 100/60 mmHg, pulse rate: 100/min, respiratory rate: 16/min, oxygen saturation: 96%. The patient's blood results showed that hemoglobin:13.3, serum biochemistry and coagulation parameters were within normal limits. Physical examination of the patient revealed a cystic lesion approximately 20 cm diameter under the scapula on the right posterior-lateral side with ecchymosis areas and increased tenderness with palpation. Posterior-Anterior Chest X-Ray (PA CXR) was performed as a first imaging modality. PA CXR showed multiple rib fractures on the right posterior-lateral side and increased opacity in the same area. Thorax Computed Tomography, one of the advanced imaging modalities, was ordered. Thorax Computed Tomography showed displaced fractures in the posterior-lateral aspect of the 5th-6th-7th-8th ribs on the right and diffuse hematoma areas in the serratus anterior muscle (figure-1). The patient was admitted to the 3rd level intensive care unit for follow-up and closely monitored vitally. An operation was planned for rib fixation and hematoma evacuation under elective conditions, but deterioration in vital signs in the 1st hour of hospitalization (TA: 70/50 mmHg, pulse rate: 140/min, respiratory rate: 22/min, oxygen saturation: 94%)

and Hemoglobin: 8.1, he was operated under emergency conditions. After intubation in the operating room, the patient was placed in the prone position and the rib fractures in the posterior-lateral area were detected by palpation, marked on the skin, and a skin incision of approximately 10 cm in the vertical axis was opened and the skin, subcutaneous tissue, muscle tissue were passed respectively and the hematoma area was reached. 2500 ml of hematoma was drained and bleeding areas were controlled with cautery and 2/0 vicryl. Leaking bleeding areas were observed from the fracture areas of the 5th-6th-7th ribs and controlled with cautery. When it was observed that the existing fractures were not exposed to the thorax, the parietal pleura was removed from ribs 5-6-7 with a retractor and rib fixation was performed extrapleurally with titanium hook fixators. Air leakage was checked by flushing with saline, and when it was observed that there was no air leakage, a hemovac drain was placed in the muscle and the layers were closed in the anatomical plan without any chest drain in the intrathoracic area. The patient was given 3 units of erythrocyte suspension intraoperatively. The patient was transferred to the postoperative intensive care unit. Postoperative PA CXR was observed (figure-2). The patient's vital signs improved markedly. On postoperative day 1, 400 ml/day, on postoperative day 2, 200 ml/day, and on postoperative day 3, 50 ml/day, a total of 650 ml was drained from the hemovac drain and the hemovac drain was terminated on postoperative day 4. The patient was discharged on postoperative day 5. No complication was observed in the patient who came to the 1st week follow-up after discharge.

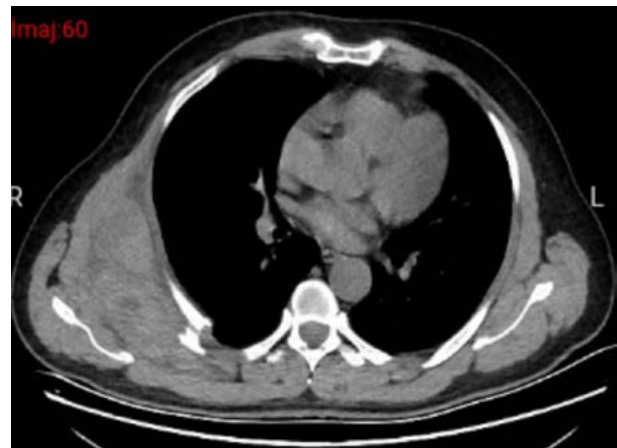


Figure 1: Rib fracture and hematoma on the right serratus anterior muscle.



Figure 2: PA CXR on postoperative day 0 (3 ribs were fixed and only a Hemovac drain was placed without a chest tube).

DISCUSSION

The clinical picture of complications of blunt trauma to the chest ranges from simple soft tissue injury to life-threatening injuries. Thoracic trauma is more common in males. In a study conducted in our country, the mean age of patients with thoracic trauma was 41 ± 16 years (3). Our patient was a 53-year-old male patient with a life-threatening injury.

In patients with thoracic trauma, PA CXR is the first imaging method to be used in determining the severity of trauma, providing early triage, deciding on surgical operation and determining the need for further imaging (4). In the first presentation of our patient, PA CXR was ordered and Thorax Computed Tomography was ordered as a further investigation as a result of radiologic imaging and clinical evaluation.

Common complications in thoracic traumas include pneumothorax, hemothorax, hemopneumothorax, lung contusion and rib fractures. Rib fractures are observed with a rate of 29-75% (3). In our case, multiple rib fractures developing after thoracic trauma and bleeding in the serratus anterior muscle, which is a very rare complication, were observed.

Landino et al. defined 4 indications for surgical stabilization (4): Respiratory failure despite aggressive medical treatment, flail chest with a large surface covering the anterior and lateral parts of the thoracic wall, inability to wean from mechanical ventilation, and thoracotomy performed for another indication. Our case was operated for hematoma evacuation, bleeding control

and rib fixation.

Early rib fixation is indicated in selected elderly patients without severe pulmonary contusion and respiratory failure. With fixation, many complications are prevented and treatment costs are significantly reduced (5). Our patient was operated 2 hours after the first admission to the hospital and more mortal complications were prevented.

Bille et al. reported that rib fixation with titanium plates was effective, safe and had good long-term results (6). In our patient, rib fixation was performed with titanium hook fixators, which are safe and effective.

In conclusion, we presented that rib fixation is a safe and effective procedure not only for flail chest, pulmonary and pleural pathologies, displaced multiple rib fractures causing excruciating pain, but also for the repair of rib fractures causing intramuscular hemorrhage, that bleeding in the serratus anterior muscle can be added to the rare complications of rib fractures, and that rib fixation can be technically applied intrathoracic extrapleural in selected patients.

Declarations

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There is no conflict of interest. Ethical committee approval is not required because of this article is a case report. Informed consent was obtained from patient.

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