KLİNİK ÇALIŞMA / CLINICAL TRIAL
Ege Klin Tıp Derg 2023;61 (1): 73-78

Investigation of the Profile and Results of Intoxication Cases Admitted to the Tertiary Level Intensive Care Unit

Üçüncü Düzey Yoğun Bakım Ünitesine Kabul Edilen İntoksikasyon Olgularının Profili ve Sonuçlarının İncelenmesi

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Geliş Tarihi: 10/01/2023
Kabul Tarihi:15/03/2023

Abstract

Introduction : All over the world, many cases of accidental or suicidal poisoning apply to hospitals. Various factors affect the incidence of morbidity and mortality of acute poisoning.

Methods: We analyzed data from 126 patients admitted to ICU with acute poisoning. Data regarding demorgraphic data, type of poisoning, time of presentation, psychiatric disease history, reason for ICU admission, ICU course and outcome were obtained.

Results: 126 patients treated in the intensive care unit . Six (4.76%) of them died. 68 (54%) of the patients were female and 58 (46%) were male. The mean age of all cases was 34.32±15.25. SOFA score of all our patients was 2.33±1.079, APACHE II score was 10.03±5.28, Glasgow Coma Scale was 13.44±2.93. Acute poisoning was most common in the spring (27.8%) and summer (27.8%). 28 (22.2%) patients had a psychiatric disorder. Most common cause was antidepressants (13.49%), antipsychotics (11.9%) and benzodiazepines (10.31%). It was determined that 98 (77.8%) patients had suicidal intoxication.

Discussion and Conclusion : Analgesics and antidepressant-antipsychotic drugs are the most common causes of poisoning because they are easily accessible. A low Glascow Coma Scale at admission is associated with a poor prognosis.

Keywords: Poisoning, intoxication, organophosphate, toxicology, intensive care

Öz

Giriş : Tüm dünyada birçok kaza sonucu veya intihar amaçlı zehirlenme vakası hastanelere başvurmaktadır. Akut zehirlenmenin morbidite ve mortalite insidansını çeşitli faktörler etkilemektedir.

Yöntem ve gereç: Yoğun bakıma akut zehirlenme ile başvuran 126 hastanın verilerini analiz ettik. Demografik veriler, zehirlenme şekli, başvuru zamanı, psikiyatrik hastalık öyküsü, yoğun bakıma yatış nedeni, yoğun bakım seyri ve sonucuna ilişkin veriler elde edildi.

Bulgular: Yoğun bakımda 126 hasta zehirlenme nedeniyle tedavi yatırıldı. Bunlardan altısı (%4,76) öldü. Hastaların 68'i (%54) kadın, 58'i (%46) erkekti. Tüm olguların yaş ortalaması 34,32±15,25 idi. Tüm hastalarımızın SOFA skoru 2,33±1,079, APACHE II skoru 10,03±5,28, Glasgow Koma Skalası 13,44±2,93 idi. Akut zehirlenme en çok ilkbahar (%27,8) ve yaz aylarında (%27,8) görüldü. 28 (%22,2) hastada psikiyatrik bozukluk vardı. En sık zehirlenme nedeni antidepresanlar (%13,49), antipsikotikler (%11,9) ve benzodiazepinler (%10,31) idi. 98 (%77,8) hasta da suicid amaçlı intoksikasyon olduğu belirlendi.

Tartışma ve Sonuç : Analjezikler ve antidepresan-antipsikotik ilaçlar kolay ulaşılabilir oldukları için en sık zehirlenme nedenleridir. Başvuruda düşük bir Glaskow Koma Skalası, kötü prognoz ile ilişkilidir.

Anahtar Kelimeler: Zehirlenme, intoksikasyon, organofosfat, toksikoloji, yoğun bakım

Introduction

All over the world, many cases of accidental or suicidal poisoning apply to hospitals. Poisonings needs close follow-up treatment due to morbidity and mortality are admitted to intensive care units (ICU). Overall in-hospital mortality for poisoning patients is 0.2 – 1.1%. The death rate in poisonings, which represents approximately 3%-6% of all intensive care hospitalizations, is approximately four times that of cases treated in other in-hospital units.(1)

Poisoning can occur as a result of taking drugs or substances for suicidal purposes, using high doses of drugs, or adverse drug reactions. The general characteristics of patients with a diagnosis of poisoning do not depend only on socioeconomic, religious and cultural status. The clinical course is related to the agent exposed, dose, pre-existing comorbidities, time from exposure to a healthcare provider to presentation, and healthcare team experience. Mortality is lower in drug-induced poisonings. Mortality increases with pesticides taken for suicide. According to the World Health Organization, it is estimated that 300 thousand people die every year due to the intake of various poisonous substances. The most common cause of acute poisoning in developed countries is the abuse of commercially available drugs, the most common cause in developing countries is insecticides(2, 3).

Various factors affect the incidence of morbidity and mortality of acute poisoning. Timely recognition and appropriate management of critically poisoned patients is an important component. A systematic assessment allows early identification and hospitalization of high-risk and critically poisoned patients based on the clinical features of poisoning. While toxic substances and their health effects are numerous, specific, effective measures against the causative agent can be used to treat only a small minority of patients. The aim of this study is to reveal the reasons for admission to the intensive care unit of acute poisoning patients, the main factors affecting the course and outcomes of the patients, and the clinical approaches applied.

Materials and Method

The study includes patients who were treated in the 61-bed intensive care unit of our tertiary hospital between 01.06.2017- 31.10.2022. Data were collected retrospectively from medical records

Demographic data of the patients (gender, age), type of substance causing poisoning (medicinal drugs, pesticides, poisonous gas, methyl alcohol and others), psychiatric disease history, type of poisoning (accidental, suicide) and exposure to poisoning were collected. In addition, the patient's length of stay in the intensive care unit, mechanical ventilation requirements, neurological status at admission, Glasgow Coma Score (GCS) assessment, Sequential Organ Failure Assessment (SOFA) score, and Acute Physiology and Chronic Health Assessment II (APACHE II) score were recorded at admission to the ICU.

Data were collected by determining the clinical outcomes of the patients regarding discharge to their home, transfer to another service, need for renal replacement therapy, or death. Patients were admitted to the ICU according to the ICU admission policy for toxicology patients based on international recommendations. Patients were intubated to secure the airway or when otherwise indicated. Similarly, other medical practices and patterns of weaning from mechanical ventilation were according to standard ICU protocols.

Ethical approval was obtained for the study from the local ethics committee (16.11.2022 Decision no: 2022/129). This study was carried out in accordance with the Declaration of Helsinki Principles.

Statistical analysis was performed using Statistical Package for the social Sciences 20.0 (Statistical Package for the Social Sciences version 20, IBM Corp., Armonk, New York, IL, USA) software.Whether the variables fit the normal distribution or not was evaluated with the Kolmogorov - Smirnov test. Student -t test was used for the comparisons between groups of normally distributed continuous data. Parametric data with normal distribution were shown as mean ± standard deviation (SD). Values with $p < 0.05$ were considered statistically significant. categorical variables are presented as frequency and percentages

Results

A total of 5817 patients were admitted in intensive care units during the study period. 126 (2.16%) were hospitalized and treated in the intensive care unit due to acute intoxication. (4.76%) of 126 patients died. 68 (54%) of the patients were female and 58 (46%) were male. The mean age of all cases was 34.32±15.25 (min: 16 – max: 91), while the mean age of male patients was 35.81±15.9 years, and the mean age of female patients was 32.57±14.28 years. When we divided the ages according to the groups, it was determined that the patients under the age of 30 (n=55, 43.6%) years were admitted to the intensive care unit the most, followed by the 30-39 age group (n=35, 27.7%)(Table-1).

Table 1. Demographic and clinical characteristics of the patients

	Male n=68	Female n=58	Total n=126(%)	p	Non-survived n=6(%)
Age(mean)	35.81±15.9	32.57±14.28	34.32±15.25		48.0±10.01
• <29	26	29	55(43.7)		-
• 30-39	21	14	35(27.8)		2
• 40-49	8	5	13(10.3)		-
• 50-59	6	8	14(11.1)		4
• 60-69	4	1	5(4.0)		-
• 70>	4	-	4(3.2)		-
Intent					
• Suicide	47	51	98(77.7)		4
• Accident	21	7	28(22.3)		2
Psychiatric illness					
• Yes	14	14	28(22.2)		0
• No	54	44	98(77.8)		6
Route of exposure					
• Oral	62	53	105(83.3)		4
• İnhalation or dermal	6	5	11(16.7)		2
Season				0.591	
• Winter	22	11	33(26.2)		1
• Spring	11	12	23(18.3)		3
• Summer	17	18	35(27.8)		2
• Autumn	18	17	35(27.8)		1
Length of stay(days)	4.26±8.16	2.43±3.05	3,42±6,38	0.236	10.33±15.9
SOFA(mean)	2.57±1.25	2.04±0.73	2,33±1,079	<0.05	3.67±2.06
APACHE II(mean)	11.35±5.9	8.4±3.7	10,03±5,28	<0.05	18.33±9.13
GCS(mean)	13.02±3.24	13.94±2.4	13,44±2,93	0.07	9.83±4.2
Spesific treatment	9	3	12(9.52)		1
Invasive ventlilation	8	4	12(9.52)		6
Renal replacement therapy	6	4	10(7.93)		-

Abbreviations: SOFA, Sequential Organ Failure Assessment; APACHE II, Acute Physiology and Chronic Health Assessment II; GCS, Glasgow Coma Score

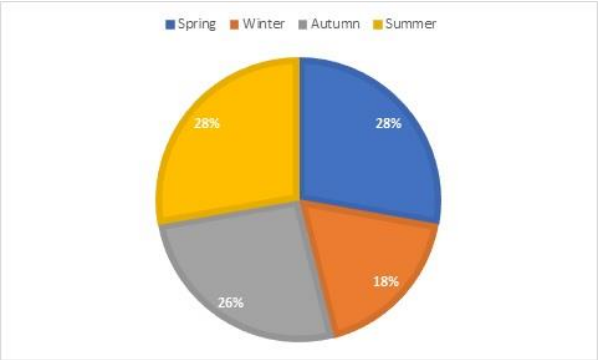

Figure 1 : Seasonal distribution of poisonings

When we look at the seasonal distribution of poisonings, it was seen that acute poisoning was most common in the spring (27.8%) and summer (27.8%) periods (Figure-1).

The mean length of hospital stay for all patients was 3.42±6.38 (min:1- max: 52), and the mean length of hospital stay for six patients who died was 10.33±15.9 (min:1 -max: 42)(p=0.31). The number of patients staying in intensive care for more than two days was 40. While the mean SOFA score of all our patients was 2.33±1.079 (min:1-max:7), the mean SOFA score of six patients who died was 3.67±2.06 (min:1-max:7) (p=0.15). The mean APACHE II score was calculated as 10.03±5.28(min:3-max:28) in the intensive care unit admission of the patients, the mean APACHE II score was 18.33±9.13(min:7-max:28) for the patients who died. Glasgow Coma Scale (GCS) of 126 patients was 13.44±2.93(min:3 – max:15) at the time of admission, GCS of patients who died was 9.83±4.26(min:5 – max:15)' and it was statistically significantly lower (p<0.05).

15(11.9%) of the patients needed intubation during hospitalization. While specific treatment was applied to the poisoned substance in 12 (9.52%) patients, symptomatic treatment was applied to the other 114 patients. Renal replacement therapy was applied to ten patients. 28 (22.2%) patients had a psychiatric disorder for which they had been treated before. Two of the patients who were admitted in the ICU due to intoxication were pregnant. It was determined that 98 (77.8%) of the acute poisoning cases were exposed to a toxic substance as a result of suicide and 28 (22.2%) of them were accidental.

89% of the patients were drug-induced poisoning. 34 (26.8%) patients were hospitalized due to multiple drug poisoning. When the toxic substances causing acute toxication were examined, it was seen that the most common antidepressants (13.49%), antipsychotics (11.9%) and benzodiazepines (10.31%) were respectively. Other commonly used drugs are shown in Table 2. Nine patients used pregabalin or drugs together with ethyl alcohol. Eight of our patients had organophosphate intoxication with a high mortality rate and two patients died.

Five of the patients who died were male and one was female. None of them had a previously diagnosed psychiatric condition and none of them needed renal replacement therapy. Only one patient received specific treatment for the poisoned substance. Two patients died due to organophosphate poisoning, two patients due to methyl alcohol poisoning, and one patient died due to carbon monoxide intoxication. The cause of poisoning in one patient was unknown. It was only known that he was addicted to drugs. All data of deceased patients are summarized in Table-2.

Table-2: The most common poisoning drugs and other substances

	n	**%**
Antidepressant	17	13,49206
Antipsychotic	15	11,90476
Benzodiazepine	13	10,31746
Paracetamol	12	9,52381
Nsaiid	12	9,52381
Antiepileptic	11	8,730159
Cardiac Drug	10	7,936508
Ethanol With Other Drugs	9	7,142857
Organophosphate	8	6,349206
Drugs	6	4,761905
Carbon Monoxide	5	3,968254
Pesticide	5	3,968254
Pregabalin	5	3,968254
Drug Name Unknown	5	3,968254
Methyl Alcohol	4	3,174603
Rat Poison	2	1,587302
Mushroom	2	1,587302

Discussion

The proportion of poisoning patients admitted to intensive care units shows significant local differences between regions(4). Acute poisoning may occur due to drug-related or non-drug-related causes. While drug-related poisonings are more common in Turkey, alcohol and drug use are the most common non-drug poisonings in Western countries(5).

Poisonings are most common in patients under 30 years of age in the literature (6, 7). In our study, poisoning cases were seen most frequently in the group below the age of 30 (43.6%). 68 (54%) of the patients were female. Tüfekçi et al(7). found the rate of female patients in posioning cases to be %73, Satar et al(8) % 65.4 and Göksu et al(9) %64.3. In a study, they had a similar number of female patients with our study (53%)(10). In our study, the rate of female patients was higher, albeit slightly.

77.8% of poisoning cases were for suicidal purposes. In studies conducted in different countries and cities of Turkey in the literature, cases of suicidal poisoning were found to be high at a rate of 78.3-94%, which is consistent with our study.(3, 6, 11-13). When we look at the seasonal distribution of poisoning cases, the first most common incidence varies, but it is most frequently seen in the spring and summer seasons. Mete at al(14). and Yaylacı et al.(13) found that it is most commonly seen in the summer months after the spring. On the other hand, Aydın et al(15) and Arıcı et al(16) found that it is most common in summer, then spring. In our study, it was observed that acute intoxication was most common in the spring (27.8%) and summer (27.8%) periods, as compared to the literature. The mean number of hospitalization days for all patients was 3.42±6.38 days. This period was found to be 1.55-4.6 days in studies conducted in different regions of our country. (5, 17). In a study conducted in India it was 3.9 days(11). In our study, drug-related poisoning occurred in 89% of the patients. 26.8% of the patients had taken more than one drug. In different studies conducted in Turkey, the rate of poisoning with more than one drug was found to be 28.6%-48.3%.(13, 18). The reason for the low percentage of those who used more than one drug compared to other studies in the literature may be due to the unreliability of the anamnesis obtained from the cases as well as regional and sociocultural differences.

In some studies on acute intoxication, antidepressants and psychoactive drugs are the most common causes of poisoning, while in some studies analgesics and benzodiazepines are the most common causes of poisoning(5, 17). When all our poisoning cases were evaluated, it was observed that the most common poisoning was with antidepressants, antipsychotics and benzodiazepines . These drugs were followed by paracetamol and NSAIDs . In studies conducted in different centers in Turkey, in accordance with our study, analgesic-anti-inflammatory and antidepressant-antipsychotic drugs were ranked first in drug poisoning in poisoning cases(19, 20). Analgesic-anti-inflammatory agents and antidepressants are more easily accessible as a result of over-the-counter and widespread use. Moreover; The fact that patients use antipsychotic or antidepressant drugs due to their psychiatric problems makes it possible to use these drugs for suicide attempt. In the studies, it was determined that 9.2-51% of the patients had a previous psychiatric diagnosis(13, 17, 19). In our data, 28 (22.2%) patients had psychiatric disorders for which they had been treated before.

While the Glasgow coma scale (GCS) was 13.44 on average in all our patients, the GCS of the patients who died was 9.83. In the study of Liisanantti et al(10), the mean GCS was 9.7. Forsberg et al(21). reported that approximately 30% of hospitalized poisonings had significant CNS depression at presentation. The death rate in poisoning cases presenting with deeper coma (GCS score 3 – 6) is approximately seven times higher than the general hospital mortality rate from acute poisoning(21).

In a study GCS <8 was found to be associated with morbidity and mortality(22) Another study argued that tracheal intubation criteria are available for trauma when GCS is ≤8, but it is not a criterion for patients receiving drug overdose (23).

Liisanantti et al(10) found the mean APACHE II score of the patients to be 14.4, APACHE II score of the non-survived patients to be 27.2, Mc Mahon et al(24) in all patients 14 and 34 in non-survived patients, Aydın et al(15) as 6 and 24, respectively. APACHE II score was 10.03 in all patients and 18.3 in patients who died. Our results were higher in patients who died, consistent with the literature.

Fifteen (11.9%) of the patients needed intubation during hospitalization. Intubation rate has been reported between 3.3-25.9% in different studies in Turkey (9, 13, 15). Nagashima et al (23) revealed that the use of anticonvulsants and antipsychotics was associated with an increased risk of tracheal intubation in patients taking drug overdose.

Koylu et al(6) found the need for renal replacement therapy as 2.1% in their study on 623 patients. This rate was found to differ between regions such as 15% in the study conducted in India, 14% in Ireland, and 2% in Finland.(3, 10, 24). Liisinantti et al (10). reported that kidney failure were associated with maintenance hospitalization and mortality. In our study, renal replacement therapy was applied to ten patients (7.93%) during their stay in the intensive care unit.

Different mortality rates have been reported for acute poisoning cases in our country and in the world. While the mortality rate is lower in developed countries, mortality in developing countries such as India varies between 15-30%.(11). Mortality was around 9%, while rates ranging from 0.92-4.9% were reported in Turkey. (17, 25). Our mortality rate was 4.76%. In the studies, the level of intensive care and the clinical condition of the patients are also effective on mortality. Our intensive care unit serves as the upper center following the patients in the most critical condition in the region as the 3rd level intensive care unit.

Conclusion

Intoxication cases are one of the important reasons for intensive care hospitalization. It shows some differences between regional and hospitals. Analgesics and antidepressant-antipsychotic drugs are the most common causes because they are easily accessible and patients with a history of psychiatric illness are more prone to intoxication. A low GCS at admission is associated with a poor prognosis.

The main limitations of the study were that it was a single-center, retrospective study, the drug doses were not clearly determined, and we could not reach the results of the psychiatric evaluation.

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