


Retrospective analysis of acute intoxication cases in the intensive care unit: a 5-year single-center study

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ABSTRACT

Aims: Our study aimed to retrospectively analyze the demographic and clinical characteristics of patients with acute drug intoxication admitted to the intensive care unit for follow-up and treatment.

Methods: The records of the patients who were admitted to the intensive care unit of Muş State Hospital with the diagnosis of acute intoxication between 01/01/2020 and 01/06/2024 were scanned from the hospital data system.

Results: Of the 177 patients, 53% were 18-34 years old, and 109 (61.5%) were female. The mean length of stay in the ICU was 2.18 ± 0.51 days. Suicide cases were 71.7%, accidental intoxication was 22.1%, and intentional/recreational use was 6.2%. Single drug ingestion was 29.1%, two drug ingestion 20.1%, more than two drug ingestion 14.0%, alcohol 3.4%, mushrooms 5.0%, rat poison 2.2%, pesticides 4.5%, carbon monoxide (CO) 9.5%, street drugs 2.8%, scorpion/snake bites 3.4%, food intoxication 6.1%. The most commonly used medications were antidepressants (27.2%), acetaminophen/NSAIDs/analgesics (20.2%), and antipsychotics (18.5%). While 89.3% of the patients were discharged, 4.5% were referred to an external center, 5.6% refused treatment, and 0.6% were discharged. Acute intoxication cases were most common in summer (32.9%).

Conclusion: Acute intoxications occurred mostly in young female patients with suicidal intent and during the summer months. We found that antidepressants were the most commonly used drugs in intoxication cases. Most intoxications were caused by the ingestion of two or more than two drugs.

Keywords: Intensive care unit, acute intoxication, intoxication, prognosis

INTRODUCTION

Any substance that has a harmful effect on a living system is defined as a toxin, and the disruption of the living being's physiology by these substances is called intoxication.^{1,2} Intoxication can result from the intentional or accidental ingestion of drugs or substances. Additionally, intoxication can occur after taking a high dose of a drug or due to an unintentional drug interaction.³

In our country, 0.46-1.57% of patients admitted to hospital emergency departments are intoxicated cases.⁴ Of these, 37% are admitted to the intensive care unit (ICU).⁵ This rate is 5.5-12.8% in Western societies.^{6,7}

In our study, we aimed to evaluate the reasons for ICU admission and the prognosis of patients with acute intoxication in our ICU.

METHODS

This study was retrospective, and permission was obtained from the University of Health Sciences Diyarbakir Gazi Yasargil Training and Research Hospital Clinical Researches Ethics Committee (Date: 10.05.2024, Decision No: 52). The study was conducted according to the Declaration of Helsinki. Our study included patients who were admitted to the intensive care unit of Muş State Hospital due to acute intoxication between 01.01.2020 and 01.06.2024. Patients under the age of 18 years and those who could not be contacted were excluded from the study. Age, sex, drug/substance ingested, reason for ingestion (accident-suicide), date of ICU admission, length of ICU stays, and patient prognosis were obtained from medical records and the hospital information system.

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Patients admitted to the ICU with acute intoxication were followed and treated according to standard ICU protocols and treatment guidelines of the Turkish National Poison Center.

Statistical Analysis

In statistical analyses, measurable variables were presented as mean±standard deviation (SD), and qualitative variables were presented as number (n) and percentage (%). The SPSS program (version 22, SPSS Inc., Chicago, IL, USA) was used for calculations.

RESULTS

A total of 177 patients admitted to the intensive care unit for acute intoxication were retrospectively analyzed. While 53% of the patients were aged 18-34 years, 61.5% were female. Suicide cases were 71.7%, accidental intoxication 22.1%, and voluntary/recreational intoxication 6.2%. The mean length of stay in the ICU was 2.18±0.51 days (Table 1).

Age (year)	n	%	mean±SD
18-34	94	53	24.8±5.8
35-44	45	25	38.1±2.9
45-64	26	15	55.5±6.4
65 and over	12	7	67.5±2.0
Gender			
Female	109	61.5	
Male	68	38.5	
Material intake type			
Suicide	127	71.7	
Accident	39	22.1	
Voluntarily/for pleasure	11	6.2	
Days of stay in intensive care unit			2.18±0.51

n: Number of patients, %: Percentage, SD: Standard deviation

Single drug ingestion was 29.1%, two drug ingestion 20.1%, more than two drug ingestion 14.0%, alcohol 3.4%, mushrooms 5.0%, rat poison 2.2%, pesticides 4.5%, carbon monoxide (CO) 9.5%, street drugs 2.8%, scorpion/snake bite 3.4%, food intoxication 6.1% (Table 2). The most commonly used medications were antidepressants (27.2%), paracetamol/NSAIDs/analgesics (20.2%), and antipsychotics (18.5%) (Table 3).

While 89.3% of the patients were discharged, 4.5% were referred to an external center, 5.6% refused treatment, and 0.6% were exited (Table 4). Acute intoxication cases were most frequently seen in summer (32.9%) and spring (26.9%) (Figure).

DISCUSSION

Acute intoxications account for a significant proportion of emergency department and intensive care unit admissions. Morbidity and mortality rates decrease in patients with timely evaluation and treatment. The gender distribution of patients admitted to the ICU with acute intoxication is variable. In the study by Akgün et al.,⁸ 74.3% of patients were female. This rate was 77.7% in the study of Kaydu et al.⁹ In other studies conducted in our country, the rates of female patients were 69%, 56.5%, and 65.6%.^{2,5,10} In our study, the number of female patients was higher than that of male patients.

	Total n (%)	Female n (%)	Male n (%)
Taking a single drug	52 (29.1)	35 (32.4)	17 (23.9)
Taking two drugs	36 (20.1)	22 (20.4)	14 (19.7)
Taking more than two drugs	25 (14.0)	14 (13.0)	11 (15.5)
Alcohol	6 (3.4)	1 (0.9)	5 (7.0)
Mushroom	9 (5.0)	7 (6.5)	2 (2.8)
Rat poison intoxication	4 (2.2)	3 (2.8)	1 (1.4)
Pesticides	8 (4.5)	6 (5.6)	2 (2.8)
Carbon monoxide	17 (9.5)	9 (8.3)	8 (11.3)
Street drugs (cannabis/extasy/methamphetamine)	5 (2.8)	0 (0.0)	5 (7.0)
Scorpion/snake sting	6 (3.4)	3 (2.8)	3 (4.2)
Food poison intoxication/canned/expired food	11 (6.1)	8 (7.4)	3 (4.2)

n: Number of patients, %: Percentage

	n	%
Antidepressant	47	27.2
Antipsychotic	32	18.5
Antiepileptic	8	4.6
Paracetamol/NSAID/analgesic	35	20.2
Antigribral	12	6.9
Muscle relaxant	11	6.4
Oral antidiabetic	6	3.5
Antihistamine	8	4.6
Anticoagulant	4	2.3
Antiarrhythmic	6	3.5
Antihypertensive	4	2.3

n: Number of patients, %: Percentage, NSAID: Nonsteroidal anti-inflammatory drugs

	n	%
Discharge (service/home)	158	89.3
External center dispatch	8	4.5
Treatment refusal	10	5.6
Exitus	1	0.6

n: Number of patients, %: Percentage

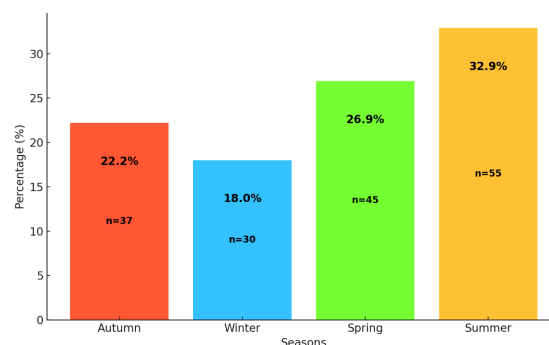


Figure. Distribution of acute intoxications based on seasons

When analyzing the mean age of the patients admitted to the intensive care unit, 29.54±13.51, 26.23±11.16, and 33.12±15.61 were found in studies from our country. The mean age of patients is younger in suicidal cases and older in accidental

admissions.^{2,8,9} In our study, the mean age of patients admitted to the ICU for suicide attempts was higher. The mean age of patients with mushroom intoxication, carbon monoxide (CO) intoxication, and scorpion and snake bites was higher than the others.

In the study of Gürcü et al.,¹⁰ the mean length of stay in the ICU for acute intoxication cases was 2.3 days. Yuzkat et al.¹¹ 2.69±0.89 days, Arikan et al.¹² 2.02 days, Bilge et al.,¹³ 2.48±0.76 days. In the study of Totoz et al.,¹⁴ the minimum ICU stay was one day, and the maximum stay was 12 days.

The percentage of ICU admission for carbon monoxide intoxication was 7.7% in the study of Gürcü et al.,¹⁰ 4.9% in the study of Tüfek et al.,¹ 1.6% in the study of Özayar et al.,⁴ and 4.5% in the study of Yeşiler et al.¹⁵ In Arikan et al.¹² study, 24 patients were admitted to the intensive care unit with CO intoxication, and three of them died. In our study, this rate was 9.5%, and all but two of our patients were discharged after their general condition, and arterial blood gas improved after 100% oxygen treatment. Two patients were referred to an advanced center for hyperbaric oxygen therapy.

In developed countries, individuals unable to cope with the stress and socioeconomic problems of modern life often turn to substances such as drugs, alcohol, and narcotics. The more widespread use of alcohol and drugs in developed countries leads to more frequent intoxications.^{16,17} In the study by Özayar et al.,⁴ acute intoxications occurred with suicidal intent and were mostly realized with drug ingestion.¹⁸ Patients who develop acute intoxication with a single drug or more than two drugs intake occur after taking drugs used in psychiatric diseases, such as antidepressants and antipsychotics.¹⁹ In the study by Kaydu et al.,⁹ 41.4% of patients were reported with a single drug, 21.7% with two drugs, and 26.2% with more than two drugs. In our study, drug intake was also prevalent in cases of acute intoxication. Upon initial presentation to the emergency department, patients were treated with an antidote according to the ingested substance and their clinical and laboratory findings, and then continued care in the intensive care unit. We found that these patients attempted suicide either by taking their own medications or by ingesting drugs found in their homes.

In some parts of our country, collecting mushrooms and selling some of these mushrooms in city markets and then eating them cause acute intoxication. Mushroom intoxication is very serious compared to other intoxications and can cause acute liver failure and may have a fatal course.²⁰ In the study of Yuzkat et al.,¹¹ the rate of patients admitted to ICU with mushroom intoxication was 1.2%. In the Arikan et al.¹² study, six patients were followed up in the ICU with mushroom intoxication, and all patients were discharged without any complications. Gürcü et al.¹⁰ five patients were followed up in the ICU, and all of them were discharged with a cure. In our study, three of the nine patients admitted to our ICU were referred to an advanced liver transplant center because their general condition was poor. One patient died in the ICU. When we received the information about the referred patients later, we learned that liver transplantation was performed in two patients, and the other patient was an exitus.

Most of the patients we followed in the intensive care unit after alcohol consumption was admitted to the intensive care unit for follow-up, and most of them voluntarily refused treatment and left the intensive care unit before 24 hours.

The seasonal distribution of intoxications varies between countries and regions. In a study conducted in Iran, the highest number of intoxications occurred in the spring and summer months.²¹ Kaydu et al.⁹ found that the highest number of intoxications occurred in the summer months. Similarly, Gürcü et al.¹⁰ reported that intoxications mostly occurred in the summer months. In our study, we also found that the season with the highest incidence of acute intoxication was summer, which is consistent with the literature.

Mortality rates in acute intoxications vary. Yuzkat et al.¹¹ reported a mortality rate of 0.31%, Altay et al.²² 0.38%, Kaydu et al.⁹ 0.6%, Aydın et al.²³ 1.4%, Özayar et al.⁴ 1% and Arikan et al.¹² 5.5%. In our study, we found this rate to be 0.6% in accordance with the literature.

Limitations

The most important limitations of our study are its single-center and retrospective nature. Our results may differ from those of other intensive care units with other socioeconomic and cultural profiles.

CONCLUSION

In our study, we found that the majority of acute intoxications were suicidal. We also found that the most common cause of intoxication was drugs. In addition, the COVID-19 pandemic and changes in the intensive care patient profile during the specified date range made data analysis difficult. The fact that drugs were the most common cause of intoxication suggests that issues such as raising public awareness about drug use, reducing the sale of over-the-counter medicines, and keeping medicines out of the reach of everyone should be taken into consideration. Providing in-service training on intoxications to doctors and nurses working in emergency departments and intensive care units can increase awareness about intoxications.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of University of Health Sciences Diyarbakir Gazi Yasargil Training and Research Hospital Clinical Researches Ethics Committee (Date: 10.05.2024, Decision No: 52).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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Author Contributions

All of the authors declare that they have all participated in the design, execution and analysis of the paper and that they have approved the final version.

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