

Intensive Care Management of Adult Intoxication Cases: A Retrospective Study

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Abstract

Objective/Rationale: To evaluate the demographic characteristics, clinical course, treatment processes, and prognostic factors associated with mortality in adult intoxication cases admitted to the intensive care unit (ICU). **Materials and Methods:** This single-center, retrospective study included 145 patients aged 18 years and older followed with a diagnosis of intoxication in the anesthesiology and reanimation ICU between January 2021 and December 2024. Demographic data, causative agent, admission clinical and laboratory findings, Glasgow Coma Scale (GCS), Acute Physiology and Chronic Health Evaluation II (APACHE II) score, treatments, and length of stay were recorded. Independent determinants of mortality were assessed by logistic regression, and the predictive performance of the APACHE II score was examined by receiver operating characteristic (ROC) analysis. **Results:** Of the cases, 52.4% were female, with a median age of 35 years. The most common agent was drugs (58.6%). In-hospital mortality was 6.2%. In non-survivors, the GCS was lower, the APACHE II score higher, and initial lactate higher (6.0 vs. 1.6 mmol/L) (all $p < 0.001$). The APACHE II score was associated with mortality in our cohort (odds ratio 1.19; 95% confidence interval 1.05-1.35; $p = 0.005$), with an area under the curve of 0.90 (95% CI: 0.82–0.98); at a cut-off of ≥ 14 , sensitivity was 77.8% and specificity 93.4%. **Conclusion:** In this cohort, a high APACHE II score was associated with mortality and may be useful for early risk stratification. Because of the small number of deaths, this finding should be interpreted with caution. Although a low GCS and high lactate were associated with mortality in the univariate comparison, this relationship was not confirmed in the multivariate analysis and warrants further investigation in larger prospective studies.

Keywords: APACHE; Critical care; Intensive care units; Lactic acid; Mortality; Poisoning

1. Introduction

Intoxications are among the important causes of morbidity and mortality worldwide and are frequently encountered clinical conditions in emergency departments and intensive care units.^{1,2} Easier access to drugs and chemical agents, the widespread use of pesticides in agriculture, and the more frequent presence of household chemicals in daily life

have markedly increased the incidence of acute intoxication cases.^{2,3} Consequently, intoxications are now regarded as an important public health problem beyond the individual level.^{1,3} According to World Health Organization data, hundreds of thousands of people die each year due to intoxication and millions present to healthcare facilities¹; pesticide intoxications are among the leading causes of death, particularly in low- and middle-income countries.³

In acute intoxications, early diagnosis and rapid treatment are of critical importance for prognosis.² Intensive care monitoring is required in cases that develop altered consciousness, respiratory failure, cardiovascular instability, and metabolic derangements.² Mortality in intoxication patients followed in the ICU is closely related to the characteristics of the toxic agent, time to presentation, treatment modalities applied, and accompanying comorbidities.² Nevertheless, data on the clinical parameters predicting mortality in intoxication patients admitted to the ICU and their use in clinical practice are limited.

This study aimed to retrospectively evaluate the demographic characteristics, intoxication etiologies, clinical course, and treatment outcomes of adult intoxication cases followed in a tertiary ICU, and in particular to determine the role of the APACHE II score—which reflects disease severity—in predicting mortality.

2. Materials and Methods

2.1. Study Design and Patient Selection

This study was conducted after approval by the Kahramanmaraş Sütçü İmam University Medical Research Ethics Committee (dated 13.01.2025, session 2025/02, decision no. 07). The study was planned as retrospective, observational, and single-center, and was carried out in the Anesthesiology and Reanimation ICU of Kahramanmaraş Sütçü İmam University Health Practice and Research Hospital.

Adult patients aged 18 years and older admitted to the ICU with a diagnosis of intoxication between 1 January 2021 and 31 December 2024 were included in the study. Cases with missing clinical data and poisoning cases followed outside the ICU were excluded. During the study period, no patients were excluded due to missing clinical data; all 145 eligible patients were included in the final analysis. During the study period, only one patient had a repeat ICU admission; thus, the 145 records corresponded to 144 individual patients. Both admissions were included as separate clinical events. Given that only one repeat admission was present, its impact on the independence assumption of the regression analysis was considered negligible. Patients were identified by screening ICU admission lists through the hospital information management system and determining cases registered with an “intoxication” complaint and/or diagnosis. Demographic and clinical information was obtained from hospital information management system records; detailed clinical data were supplemented by reviewing archived patient files.

2.2. Data Collection and Variables

Demographic data comprised age and sex. The etiology of intoxication was determined, and cases were classified as drug, organophosphate (pesticide), alcohol/methanol, carbon monoxide, and other intoxications. Drug intoxications were subdivided into antipsychotic/antidepressant, antiepileptic, antihypertensive, antiarrhythmic, nonsteroidal anti-inflammatory drugs, and others. The route of exposure was classified as oral, inhalation, parenteral, or dermal (e.g., snakebite, scorpion sting, or pesticide skin contact).

At admission, systolic and diastolic blood pressure, heart rate, respiratory rate, and peripheral oxygen saturation (SpO₂) were recorded. Neurological status was assessed using the GCS. Disease severity was assessed using the APACHE II score, calculated from the physiological and laboratory parameters recorded at the time of ICU admission (admission APACHE II). Laboratory assessment included pH, bicarbonate (HCO₃), lactate,

hemoglobin, platelets, glucose, ALT, AST, BUN, creatinine, INR, and APTT. In addition, ICU and total hospital lengths of stay and the clinical outcome (in-hospital mortality or discharge) were recorded. The primary outcome was in-hospital mortality; secondary outcomes were the need for mechanical ventilation, the need for hemodialysis, and the length of intensive care unit stay.

2.3. Statistical Analysis

Statistical analyses were performed using Jamovi (Version 2.7; The Jamovi Project, Sydney, Australia). The distribution of continuous variables was assessed by the Shapiro–Wilk test. Non-normally distributed continuous variables were presented as median (minimum–maximum) and categorical variables as number and percentage (%). The Mann–Whitney U test was used for comparisons between two independent groups, and the Kruskal–Wallis test for comparisons of more than two groups, followed by Dunn post-hoc analysis for significant variables; the effect size for multiple-group comparisons was reported as epsilon-squared (ϵ^2). Factors associated with mortality were assessed by univariate and multivariate binomial logistic regression analysis. Variables significant in the univariate analysis were considered for the multivariate model; the final multivariate logistic regression model included the APACHE II score and the initial lactate level. Multivariate results are reported as adjusted odds ratios (OR) with 95% confidence intervals. The predictive performance of the APACHE II score for mortality was examined by ROC analysis, and the area under the curve (AUC) was calculated. A p-value <0.05 was considered statistically significant.

3. Results

3.1. Demographic and Clinical Characteristics

All 145 patients who were admitted to the ICU with a diagnosis of intoxication during the study period and met the criteria were included in the analysis. The median age of the patients was 35 (18–114) years; 52.4% were female and 47.6% were male. The most common comorbidities were psychiatric illness (22.8%), hypertension (12.4%), and asthma (6.9%) (Table 1).

Table 1. Demographic characteristics and comorbidities of patients (n=145)

Variable	Value
Age (years), median (min–max)	35 (18–114)
BMI (kg/m ²), median (min–max)	25.6 (18.7–34.6)
Female, n (%)	76 (52.4)
Male, n (%)	69 (47.6)
Hypertension, n (%)	18 (12.4)
Diabetes mellitus, n (%)	12 (8.3)
Coronary artery disease, n (%)	5 (3.4)
COPD, n (%)	1 (0.7)
Asthma, n (%)	10 (6.9)
Psychiatric illness, n (%)	33 (22.8)
Central nervous system disease, n (%)	11 (7.6)

BMI: Body mass index; COPD: Chronic obstructive pulmonary disease.

The most common causative agent of intoxication was drugs, accounting for 58.6% of cases, followed by “other” poisonings (27.6%), pesticides (6.9%), alcohol/methanol (4.8%), and carbon monoxide (2.1%). Among drug intoxications, the

antipsychotic/antidepressant group (49.4%) and multiple-drug use (24.7%) were most common. In the “other” group, the most frequent cause was snakebite (55%), followed by rodenticide (17.5%). Of the poisonings, 66.9% were suicidal and 33.1% accidental, and the most common route of exposure was oral (74.5%) (Table 2).

Table 2. Characteristics of intoxications (n=145)

Variable	n (%)
Causative agent	
Drug	85 (58.6)
Pesticide	10 (6.9)
Alcohol/methanol	7 (4.8)
Carbon monoxide	3 (2.1)
Other	40 (27.6)
Drug subgroups (n=85)	
Antipsychotic/antidepressant	42 (49.4)
Multiple drugs	21 (24.7)
Antiepileptic	6 (7.1)
Oral antihypertensive	5 (5.9)
Antiarrhythmic	4 (4.7)
NSAID	3 (3.5)
Oral antidiabetic	1 (1.2)
Potassium chloride (intravenous)	1 (1.2)
Antiviral agent	1 (1.2)
Acetylsalicylic acid	1 (1.2)
“Other” group (n=40)	
Snakebite	22 (55.0)
Rodenticide	7 (17.5)
Scorpion sting	3 (7.5)
Chemical substance	3 (7.5)
Plant poisoning	2 (5.0)
Psychoactive substance	2 (5.0)
Mad honey	1 (2.5)
Cause of poisoning	
Suicidal	97 (66.9)
Accidental	48 (33.1)
Route of exposure	
Oral	108 (74.5)
Inhalation	6 (4.1)
Dermal	29 (20)
Parenteral (intravenous)	2 (1.4)

NSAID: Nonsteroidal anti-inflammatory drug.

At admission, the median GCS was 15 (3–15), APACHE II score 3 (0–42), and systolic blood pressure 130 (30–246) mmHg. On initial laboratory evaluation, the median pH was 7.40 (6.73–7.54), bicarbonate 23.3 (5.0–44.5) mmol/L, and lactate 1.70 (0.3–17.0) mmol/L. Among electrocardiographic findings, tachycardia (11.0%) was most frequent, followed

by bradycardia (6.3%) and QT prolongation (3.4%). Shock developed in 9.7% of patients (Table 3).

3.2. Treatment Processes and Outcomes

Antidote therapy was administered in 20.7% of patients; the most commonly used antidote was antivenom (15.9%). The need for hemodialysis was 10.3% and for mechanical ventilation 16.6%. The most frequent complication was cardiac arrhythmia (20.0%), followed by respiratory depression (17.9%) and central nervous system depression (17.9%). The median ICU length of stay was 3 (1–13) days and the total hospital length of stay 3 (1–26) days. While 90.3% of cases were discharged with complete recovery, 3.4% developed sequelae, and in-hospital mortality was 6.2% (n=9) (Table 3). During follow-up, the most frequently requested consultations were psychiatry (60.7%) and cardiology (42.1%). Compared with survivors, non-survivors more frequently required mechanical ventilation (100% vs 11.0%; $p<0.001$) and hemodialysis (77.8% vs 5.9%; $p<0.001$), whereas ICU length of stay did not differ significantly between the groups ($p=0.802$).

Table 3. Clinical–laboratory findings at admission and treatment outcomes (n=145)

Variable	Value
GCS, median (min–max)	15 (3–15)
APACHE II, median (min–max)	3 (0–42)
Systolic BP (mmHg), median (min–max)	130 (30–246)
Diastolic BP (mmHg), median (min–max)	71 (20–98)
Heart rate (bpm), median (min–max)	75 (35–187)
pH, median (min–max)	7.40 (6.73–7.54)
Bicarbonate (mmol/L), median (min–max)	23.3 (5.0–44.5)
Lactate (mmol/L), median (min–max)	1.70 (0.3–17.0)
Shock, n (%)	14 (9.7)
Antidote use, n (%)	30 (20.7)
Hemodialysis, n (%)	15 (10.3)
Mechanical ventilation, n (%)	24 (16.6)
ICU length of stay (days), median (min–max)	3 (1–13)
Hospital length of stay (days), median (min–max)	3 (1–26)
Complete recovery, n (%)	131 (90.3)
Sequelae, n (%)	5 (3.4)
Mortality, n (%)	9 (6.2)

GCS: Glasgow Coma Scale; APACHE II: Acute Physiology and Chronic Health Evaluation II; BP: Blood pressure; ICU: Intensive care unit.

3.3. Factors Associated with Mortality

In the non-survivor group, the GCS score was significantly lower than in survivors (3 [3–15] vs 15 [3–15]; $p<0.001$), whereas the APACHE II score was markedly higher (24 [1–42] vs 2 [0–42]; $p<0.001$). Systolic and diastolic blood pressures were significantly lower in the non-survivor group ($p<0.001$). When metabolic parameters were examined, both initial and final pH and HCO_3 levels were lower in the non-survivor group, whereas initial and final lactate levels were significantly higher (initial lactate: 6.0 vs 1.6 mmol/L; $p<0.001$). In addition, BUN, creatinine, ALT, AST, potassium, INR, and APTT values were significantly higher, whereas calcium was significantly lower in the non-survivor group (all $p<0.05$; exact p values are given in Table 4).

Table 4. Comparison of clinical and laboratory findings by mortality

Variable	Survivors (n=136)	Non-survivors (n=9)	p
GCS	15 (3–15)	3 (3–15)	<0.001
APACHE II	2 (0–42)	24 (1–42)	<0.001
Systolic BP (mmHg)	132 (55–246)	55 (30–120)	<0.001
Diastolic BP (mmHg)	74 (30–98)	30 (20–75)	<0.001
Initial pH	7.41 (7.08–7.54)	7.11 (6.73–7.50)	0.006
Initial HCO ₃ (mmol/L)	23.4 (9.7–44.5)	16.3 (5.0–25.3)	<0.001
Initial lactate (mmol/L)	1.60 (0.3–9.2)	6.00 (1.5–17.0)	<0.001
Potassium (mmol/L)	4.20 (2.90–7.10)	5.10 (3.80–6.60)	0.042
Calcium (mg/dL)	8.80 (6.80–10.0)	7.80 (7.20–10.2)	0.010
BUN (mg/dL)	11 (3–51)	17 (11–73)	0.003
Creatinine (mg/dL)	0.70 (0.27–3.49)	1.66 (0.81–3.06)	<0.001
ALT (U/L)	16 (4–323)	28 (14–573)	0.005
AST (U/L)	22 (8–943)	56 (19–573)	<0.001
INR	1.04 (0.82–2.47)	1.37 (1.14–2.05)	<0.001
APTT (s)	24.0 (12.1–49.7)	35.5 (22.8–68.5)	0.001

Data are presented as median (min–max). Mann–Whitney U test. GCS: Glasgow Coma Scale; BUN: Blood urea nitrogen; INR: International Normalized Ratio; APTT: Activated partial thromboplastin time.

In univariate logistic regression analysis, the APACHE II score was significantly associated with mortality (OR=1.23; 95% CI: 1.12–1.36; $p<0.001$); each one-unit increase in the score increased the odds of mortality approximately 1.23-fold. In the multivariate analysis including significant variables, the APACHE II score was identified as a useful predictor (OR=1.19; 95% CI: 1.05–1.35; $p=0.005$), whereas the initial lactate level did not show independent significance ($p=0.415$). The model fit indices were McFadden $R^2=0.461$ and AIC=42.4 (Table 5).

The predictive performance of the APACHE II score for mortality was evaluated by ROC analysis; the AUC was 0.90 (95% CI: 0.82–0.98; $p<0.001$). According to the Youden index, the optimal cut-off point corresponded to an APACHE II score of ≥ 14 , with a sensitivity of 77.8% and specificity of 93.4% at this value (Table 5). A moderate positive correlation was found between the APACHE II score and the initial lactate level (Spearman $r_s=0.473$; $p<0.001$).

Table 5. Logistic regression for mortality and ROC analysis of APACHE II

Analysis	Adjusted OR / Value (95% CI)	p
Logistic regression		
Univariate — APACHE II	1.23 (1.12–1.36)	<0.001
Multivariate — APACHE II	1.19 (1.05–1.35)	0.005
Multivariate — Initial lactate	1.21 (0.76–1.93)	0.415
Model fit — McFadden R^2	0.461	—
Model fit — AIC	42.4	—
ROC analysis for APACHE II		
AUC	0.90 (0.82–0.98)	<0.001
Optimal cut-off (Youden)	APACHE II ≥ 14	—
Sensitivity	77.8%	—

Analysis	Adjusted OR / Value (95% CI)	p
Specificity	93.4%	—

OR: Odds ratio; CI: Confidence interval; AUC: Area under the curve; AIC: Akaike information criterion. The multivariate logistic regression model included the APACHE II score and the initial lactate level, selected among the variables significant in the univariate analysis.

3.4. Comparison by Type of Poisoning

In the comparison by type of poisoning, significant differences were found between groups for age, systolic blood pressure, hemoglobin, platelets, glucose, ALT, AST, and BUN values ($p < 0.05$). In contrast, no significant differences were observed for GCS, APACHE II score, lactate, creatinine, ICU length of stay, or hospital length of stay. The highest median age was in the “other” group (55 [40–68] years) and the lowest in the carbon monoxide group (29 [22–40] years); Dunn post-hoc analysis indicated that the significant difference was particularly between the drug (32 [18–45] years) and “other” groups ($p < 0.001$). Liver enzymes were markedly higher in the alcohol/methanol group than in the other groups (drug–alcohol/methanol comparison for both ALT and AST: both $p < 0.05$). The highest median BUN level was observed in the alcohol/methanol group (28 mg/dL) ($p < 0.001$).

4. Discussion

In this study, the demographic, clinical, and laboratory characteristics and factors associated with mortality were evaluated in 145 patients admitted to a tertiary ICU with a diagnosis of intoxication. The principal finding is that the APACHE II score—reflecting disease severity—was a useful predictor of mortality and had high discriminative power.

In our study, the median age was 35 years and 52.4% of the patients were female. In the literature, intoxication cases are reported to occur predominantly in the young adult age group and in the female sex.^{4,5} The demographic findings in our study are consistent with these data and support that intoxications occurring in the young adult female population constitute a frequently encountered patient group in clinical practice. The detection of a history of psychiatric illness in 22.8% suggests that psychiatric disorders may be an important determinant in the occurrence of intoxication cases; this rate has been reported to be higher (up to 49.8%) in severe intoxication series.⁶ The reported high rates of re-admission with a similar intoxication type indicate that these patients are a group that should be closely monitored not only in terms of acute treatment but also in terms of recurrence risk and long-term prognosis.⁷

It was determined that the causative agent was drugs in 58.6% of cases, and that antipsychotics and/or antidepressants constituted 49.4% of this group. This finding is consistent with the literature; drug-related poisoning rates can reach up to 63% in different series, and antidepressants, antipsychotics, and anticonvulsants are reported as the most common causative groups.^{8,9} Acute drug poisonings constitute a substantial proportion of ICU admissions and are conditions whose clinical course may vary across a wide spectrum depending on the drug and dose.^{9,10} Particularly in intoxications due to psychiatric drugs, life-threatening complications such as central nervous system depression, cardiac conduction disturbances, and hemodynamic instability may develop; therefore, early recognition and close monitoring of this patient group are of critical importance. In our study, 66.9% of exposures were determined to be of suicidal intent; this rate is consistent with the values reported in the literature (55.7%–65.1%).^{8,11} Since suicidal intoxications are often associated with more severe clinical pictures due to high-dose ingestion, airway safety, close hemodynamic monitoring, and early supportive treatment are priorities in these patients.

While the median hemodynamic parameters at admission reflected a stable picture, systolic blood pressure was observed to decrease to 55 mmHg in cases that developed mortality, and this difference was significant ($p<0.001$). The development of shock in 9.7% of patients reflects the serious effect of toxic agents on the cardiovascular system. In the literature, hypotension, arrhythmia, and shock have also been reported to be associated with a severe clinical course and the need for intensive care.¹² Early appropriate fluid therapy, vasoactive agent support, and close hemodynamic monitoring are important in these patients; in selected cases that develop refractory cardiogenic shock or cardiac arrest, veno-arterial extracorporeal membrane oxygenation (VA-ECMO) has been reported to potentially reduce mortality.¹³

Although acid-base balance was largely preserved at admission for the entire cohort, pH was found to decrease to 7.11 and HCO_3^- to 16.3 mmol/L in cases that developed mortality, and these differences were significant ($p=0.006$ and $p<0.001$, respectively). Metabolic acidosis, as a reflection of tissue hypoperfusion and impaired cellular energy production, is associated with poor prognosis and is emphasized as an early indicator of mortality, particularly in alcohol/methanol and pesticide poisonings.¹⁴ Similarly, the initial lactate level was significantly higher in the non-survivor group (6.0 vs 1.6 mmol/L; $p<0.001$). Lactate is an important indicator of tissue hypoxia and anaerobic metabolism in critically ill patients, and elevated levels have been associated with mortality and disease severity.¹⁵ However, lactate did not retain its independent predictive value in the multivariate model ($p=0.415$). This may be explained by the moderate positive correlation between APACHE II and lactate ($r_s=0.473$; $p<0.001$); the APACHE II score, which more comprehensively reflects systemic disease severity, emerges as the dominant predictor in the multivariate model. This finding suggests that evaluating lactate together with clinical scores, rather than alone, may provide a more accurate risk prediction.

In cases that developed mortality, BUN, creatinine, potassium, liver enzymes, and coagulation parameters were significantly higher. Acute kidney injury is known as an important complication that independently increases mortality in critically ill patients.¹⁶ The elevation in liver function tests (AST: 56 vs 22 U/L; $p<0.001$) suggests that hepatocellular injury developing in acute intoxication may be associated with poor prognosis; drug-induced liver injury can lead to serious hepatotoxicity, particularly with high-dose ingestion of agents such as antiepileptics, paracetamol, and antidepressants.¹⁷ In the evaluation by type of poisoning, the markedly higher AST and ALT levels in the alcohol/methanol group may be explained by mitochondrial dysfunction due to formate accumulation in methanol toxicity.¹⁴ The higher INR and APTT in the non-survivor group indicate that the development of coagulopathy is associated with a poor clinical course; in large database analyses, the coagulopathy score has also been reported to show a strong association with ICU mortality.¹²

The APACHE II score is a scoring system widely used to assess disease severity and predict mortality risk in intensive care patients. In our study, while the median APACHE II score of the entire cohort was 3, it was significantly higher at 24 in the group that developed mortality ($p<0.001$); this value is consistent with the mortality-group scores reported in the literature.¹⁸ In multivariate analysis, the APACHE II score was identified as a useful predictor of mortality (OR=1.19; $p=0.005$) and demonstrated high discriminative power in ROC analysis (AUC=0.90). For the optimal cut-off point determined by the Youden index (APACHE II ≥ 14), sensitivity was 77.8% and specificity 93.4%. These findings are consistent with current literature emphasizing the importance of scoring systems for early risk stratification in intoxication patients followed in the ICU.¹⁹⁻²¹ Beyond being merely a prognostic indicator, the APACHE II score may contribute to the early identification of high-risk patients and the guidance of treatment strategies. Our study demonstrates that

clinical scores reflecting disease severity—particularly APACHE II—are more decisive than single biochemical parameters in predicting mortality.

Hemodialysis was required in 10.3% and mechanical ventilation in 16.6% of our cases. Our hemodialysis rate was consistent with the 11% in the French series and higher than the 3.7% in another Mediterranean series^{6,22}; this difference may be related to regional variations in the poisoning profile of our cohort. The need for mechanical ventilation, on the other hand, remained markedly below the 67.4% reported in Iran.²³ In the INTOXICATE study, approximately 40% of cases admitted to intensive care were reported to require active intervention within the first 24 hours²¹; the lower intervention rates in our study may be explained by our cohort consisting largely of relatively mild drug intoxications. Nevertheless, the relatively small number of severe cases (such as snakebite, organophosphate, and advanced central nervous system depression) that we admit as a tertiary center may have driven mortality upward, even though the overall intervention rate remained low. Indeed, the mortality rate in our study was 6.2%. This rate is higher than the low rates reported from our country and the Netherlands (2.1%–2.8%) and lower than the 10.3% reported from France.^{6,24–25} In multicenter series, mortality has been reported in the range of 3.7%–5.1%.^{21,26} Our relatively higher mortality rate may be related to the selective admission of these severe cases owing to our being a tertiary center. This suggests that mortality at the intensive care level depends not only on the causative agent but also on disease severity and the clinical condition at presentation. The demonstration that the 2-year cumulative mortality reaches 9.3% in this group with low in-hospital mortality reveals that these patients may be at risk in terms of long-term prognosis even when recovery is achieved in the acute period, and emphasizes the importance of post-discharge psychiatric and social follow-up.²⁴

In cases resulting in mortality, the GCS at admission was markedly low (median 3 vs 15; $p < 0.001$). A low GCS reflects the degree of central nervous system depression and is closely associated with the loss of airway reflexes and the risk of aspiration; therefore, ensuring early airway safety and close neurological monitoring in patients presenting with a low GCS form the basis of intensive care management. The median ICU length of stay was 3 days, consistent with the ranges in the literature^{24,27}; this suggests that clinical stabilization can generally be achieved within a short time with appropriate and timely intervention. The complete recovery rate of 90.3% supports that rapid improvement can be achieved with appropriate intensive care management in a substantial proportion of cases, while the development of sequelae in 3.4% indicates that the risk of neurological and systemic complications may persist in severe cases.

Among the “other” intoxication types, snakebite was the most common cause at 55% and constituted approximately 15% of the overall cohort. This finding reflects the semi-rural geographical structure of Kahramanmaraş and provides original data in terms of regional epidemiology. Coagulopathy and acute kidney injury due to hemotoxic vasculopathy are common in snakebites²⁸ and globally snakebites cause approximately 63,400 deaths per year.²⁹ The absence of mortality in snakebite cases in our study may be related to appropriate and timely antivenom treatment; this supports the critical role of early diagnosis and specific treatment in determining prognosis.

Our study has some limitations. Owing to the retrospective design, the reliance of the data on patient records carries the possibility that some parameters were recorded incompletely or in a non-standardized manner; in particular, variables such as the amount of substance ingested, the duration of exposure, and the time elapsed before presentation could not be reliably assessed in all cases and therefore could not be included in the analyses. The single-center design limits the generalizability of the findings, and the inclusion of only ICU-admitted patients may have led the results to reflect more severe clinical pictures. Disease severity was assessed only by APACHE II, without comparative analysis

using other scoring systems such as SOFA and SAPS II partly because the retrospective design did not allow standardized access to every specific parameter required to calculate these scores in all patients. Nevertheless, our study contributes by presenting comprehensive clinical, laboratory, and scoring data of intoxication cases followed in a tertiary ICU and by revealing the intoxication profile specific to our region. Several limitations should be considered. The small number of deaths ($n=9$) limited the statistical power of the multivariate analysis and resulted in wide confidence intervals. With only nine events, the number of events per variable was well below the commonly recommended threshold, which increases the risk of model overfitting. Consequently, the present regression results should be regarded as exploratory and hypothesis-generating rather than confirmatory; they do not establish causality and must be interpreted with caution. These findings require validation in larger, prospective, multicenter studies, for which the present study may provide a basis.

5. Conclusion

In patients admitted to the ICU with a diagnosis of intoxication, the parameters most strongly associated with mortality were determined to be low GCS, increased lactate level, and high APACHE II score. The finding that the APACHE II score was a useful predictor of mortality in multivariate analysis indicates that this score is a valuable tool for early risk stratification. Although acute intoxication cases are largely reversible conditions with early diagnosis, effective intensive care management, and a multidisciplinary approach, they carry a high risk of mortality in certain patient groups. The routine use of clinical scoring systems may contribute to the early identification of high-risk patients and the more effective planning of intensive care management. Future large-sample, multicenter prospective studies will contribute to a clearer definition of risk factors and the development of clinical management strategies.

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