

Severe acute poisoning treated in intensive care

Intoxicaciones agudas graves atendidas en cuidados intensivos

Severe acute poisonings (SAP) constitute a social and health care problem, with an incidence rate ranging from 22 to 170 poisonings per million inhabitants per year.¹⁻³ In Spain, the number of acute poisonings is increasing.^{4,5} They account for 0.6% of all emergency department admissions and 2% of intensive care unit (ICU) admissions.¹⁻³ The profile of intoxicated patients and the toxic agents involved has also changed in recent decades, with an increase in mean age.⁴

Although clinical progression is usually favorable, with mortality rate < 0.2%,⁶ these figures rise to 13% in ICUs when organ failure is present.¹ However, few studies published in Spain have analyzed the characteristics of intoxicated patients treated in intensive care units. The aim of this study was to describe the epidemiology of SAP requiring ICU admission.

We conducted a descriptive, observational, retrospective study that included patients older than 18 years admitted for more than 24 hours to the ICU of the Hospital Universitario Central de Asturias (HUCA) (Asturias, Spain) from November 1st, 2016 through November 31st, 2020.

Continuous variables were expressed using means and standard devia-

tions and compared using Student's t test. Categorical variables were expressed using absolute and relative frequencies and compared using the chi-square test. A *P* value < .05 was considered statistically significant. Statistical analysis was performed using IBM SPSS Statistics 24 (SPSS, Chicago, IL). The study was approved by the Ethics Committee of the Principality of Asturias.

A total of 137 acute poisonings were recorded, whose characteristics are shown in Table 1. The mean age was 47.9 ± 13.8 years (range 19–84). A total of 80 patients (58.4%) were women. Medical care was provided between 4 and 24 hours after intoxication (25.5% within the first hour and 5.8% after more than 24 hours). In most cases (89.1%), ICU admission occurred within the first 12 hours after arrival at the emergency department. The median Glasgow Coma Scale score was 9 ± 5 points (45.3% scored ≤ 8). The

mean APACHE II score was 13 ± 7 points.

Intentional poisonings represented 76.6%, and accidental cases 19.7%. Except in poisonings in patients older than 70 years, recurrence was observed in 39.5% of patients younger than 40 years and 43.3% between 40 and 70 years. Moreover, 77.4% were on psychiatric treatment. Regarding the toxic agent involved, psychotropic drugs—mainly benzodiazepines—were the most frequent (68.6% overall; 31.6% in those < 40 years, 56.7% in patients 40–70 years, and 77.8% in those > 70 years).

According to sex, a significant association was observed between intentional intoxication, younger age, and female sex (*P* = .000). In both men and women, the mean age of patients with cocaine intoxication was lower (*P* = .010 in men and *P* = .000 in women). Regarding mean age, intentional poisonings were more common than unin-

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Table 1. Demographic characteristics and toxic agents involved in severe acute poisonings

	N (%)		N (%)
Sex		Toxic agents	
Women	80 (58.4)	Alcohol	30 (8.6)
Men	57 (41.6)	Medications	240 (68.6)
Age		Salicylates	3 (0.9)
< 40 years	38 (27.7)	Barbiturates	1 (0.3)
40–70 years	90 (65.7)	Insulin	4 (1.1)
> 70 years	9 (6.6)	Metformin	7 (2)
Mechanism of poisoning		Paracetamol	17 (4.9)
Intentional self-harm	105 (76.6)	Antiepileptics	19 (5.4)
Accidental	27 (19.7)	Neuroleptics	30 (8.6)
Other	5 (3.7)	Antidepressants	51 (14.6)
Type of previous psychiatric disorder		Benzodiazepines	98 (28)
Depression	57 (41.6)	Drugs of abuse	78 (22.3)
Anxiety	31 (22.6)	Amphetamines	8 (2.3)
Personality disorders	15 (10.9)	Cannabis	20 (5.7)
Schizophrenia or other psychoses	10 (7.3)	Cocaine	22 (6.3)
Bipolar affective disorder	9 (6.6)	Opiates	28 (8)
Alcohol use disorder	5 (3.7)	Gases	2 (0.6)
Other	10 (7.3)	Other	10 (2.9)

Table 2. Clinical characteristics, treatment, and outcomes of severe acute poisonings

	N (%)		N (%)
Clinical findings		Treatment	
Neurological	101 (73.7)	Antidote	90 (65.7)
Metabolic-renal disorders	11 (8)	Advanced life support	74 (54)
Liver failure	9 (6.6)	Mechanical ventilation	51 (37.2)
Shock	7 (5.1)	Vasoactive drugs	18 (13.1)
Cardiac rhythm disorders	4 (2.9)	Cardiopulmonary resuscitation	5 (3.6)
Acute respiratory failure	1 (0.7)	Gastrointestinal decontamination	40 (29.2)
Complications		Renal/extrarenal elimination	13 (9.5)
Renal-metabolic	26 (19.1)	Cause of death	
Respiratory	25 (18)	Anoxic encephalopathy	3 (2.2)
Neurological	16 (12)	Cardiorespiratory arrest	2 (1.5)
Cardiovascular	15 (10.9)	Multiorgan failure	2 (1.5)
Digestive	5 (3.8)	Brain death	1 (0.7)
Hematologic	2 (1.7)		
Cutaneous	2 (1.7)		

tentional ones across all age groups, although they occurred more frequently in younger patients ($P = .018$). When comparing patient age by sex, younger intoxicated patients were predominantly male (55.3%), whereas poisonings in patients older than 40 years were more common in women.

Neurological symptoms (73.7%) predominated clinically. During their ICU stay, 33.3% presented no significant complications. Among those who did, the most frequent were metabolic-renal complications (19.1%) (Table 2).

Regarding treatment in the emergency department and ICU, 65.7% received specific treatment with an antidote, while renal or extracorporeal elimination was less frequently used (Table 2).

Median ICU stay was 2 ± 9 days, and ward stay was 4 ± 11 days, with a median total length of stay of 7 ± 15 days. Finally, mortality rate was 5.1% (8 deaths, including 1 patient who died in the hospital ward).

In our population, SAP represented 2.7% of ICU admissions, which is a figure consistent with current publications, where they range from 1.9% in the EMPIUCI study⁴ to 4.5% in the study by Mir *et al.*¹ This downward trend is likely due to improved clinical management in emergency departments.

Regarding sex distribution, prior studies report SAP as more frequent in men.^{2,5,7} However, in our study the majority were women, which may be related to the association between psychotropic-drug poisonings and fe-

male sex.^{1,5} The mean age was 48 years, higher than in other reports^{1,2,5,7} and consistent with more recent studies.⁴ Although poisonings in patients older than 70 remain infrequent, it will be important in the future to focus specifically on this group, given the growing elderly population in Spain and their distinct toxicokinetic characteristics.

Intentional intoxication accounted for 76.6%, much higher than in other studies, likely reflecting the high suicide rate in Asturias compared with the rest of Spain.⁵ Recurrence was high, though similar to that reported in emergency department series.⁸ As in other studies from our region,^{5,7} most patients had a history of psychiatric disorders, mainly depression and anxiety.

Regarding time to care, most patients were treated within the first hours after intoxication, and time to ICU admission was under 12 hours, similar to the 4-hour median reported by Ojuel Gros *et al.*¹

Clinically, and consistent with the literature^{2,9,10} neurological symptoms were the most prevalent, likely due to benzodiazepine, opioid, and alcohol use. As in other studies, the rate of specific treatments increased,² with one-third of patients receiving an antidote. However, GI decontamination techniques (activated charcoal and/or gastric lavage) were used less frequently.

The length of the ICU stay was short, between 3 and 4 days. Clinical progression was favorable, with a low

rate of complications. Mortality, although not negligible (5.1%), was lower compared with other SAP-ICU studies, where it ranges between 6%⁴ and 13%.¹ The most frequent causes of death were anoxic encephalopathy and multiorgan failure, similar to those reported in the EXITOX registry.¹¹

The main limitation of this study is its retrospective and single-center design. However, the number of patients included was large. Another limitation was information bias due to missing clinical data, especially regarding pre-hospital treatment and assessment.

Based on our findings, we believe that conducting multicenter, standardized toxicological studies in ICUs—with harmonized inclusion criteria and study variables—would allow better characterization of this patient population and likely help refine treatment protocols and admission criteria, preventing both under- and over-triage.

Note of the editors: This is a BOWMAN-generated English translation of the officially indexed Spanish-language article, which should be cited as *Rev Esp Urg Emerg.* 2022;1:48-50. In this translated version, the editors have supervised the process; however, it cannot be ruled out that some errors resulting from the artificial intelligence translation process may have gone unnoticed.

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