Emergencies following cocaine use: factors related to hospital admission

Urgencias tras consumo de cocaína: factores relacionados con el ingreso hospitalario

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Drug use problems are a frequent and growing reason for consultation in hospital emergency departments (ED) in Spain and surrounding countries[1-3]. In the EuroDEN plus study (2017), cocaine was the most consumed illicit drug in Europe, present in almost 20% of the intoxications registered in that multicenter study of 27 countries, but with differences between centers located even in the same country[3,4]. Cocaine consumption (CC) generally occurs in a recreational context and within a polyconsumption with other intoxicants, which increases the risk of acute complications, some of which are very serious, while at the same time masking its clinical presentations, making its correct initial management difficult[5]. The aim of this study is to detect the factors that may be related to a greater probability of hospital admission after the CC.

A retrospective observational study was conducted between 2011 and 2017 on patients treated for symptoms referred to a CC in a third-level hospital ED, equipped with a toxicology unit. A CC case was considered according to analytical (positive in urine immunoassay) and clinical (evidence of compatible symptoms) criteria, excluding ED consultations for judicial or legal reasons that were asymptomatic. Epidemiological and toxicological variables, vital signs, initial ED symptoms, ECG findings, treatment administered in the ED and final destination were reviewed, comparing patients who were admitted with those who were not. An analysis of the predictive capacity for admission of these variables was performed using the chi-square test with categorical variables, together with Cramer's V test (Φ_c) as a measure of the strength of the association, and the t test together with Cohen's d (effect size) with qualitative variables. The study was approved by the Hospital Son Espases Research Committee (reference CI-400-20).

A total of 815 patients were studied, and 108 (13.3%) were admitted, with an annual increase in the number of cases, but not in the number of admissions (Figure 1). Most of those admitted were admitted to critical care (34.3%, n = 37) and psychiatric units (33.3%, n = 36). Seventy-five percent were men, with a

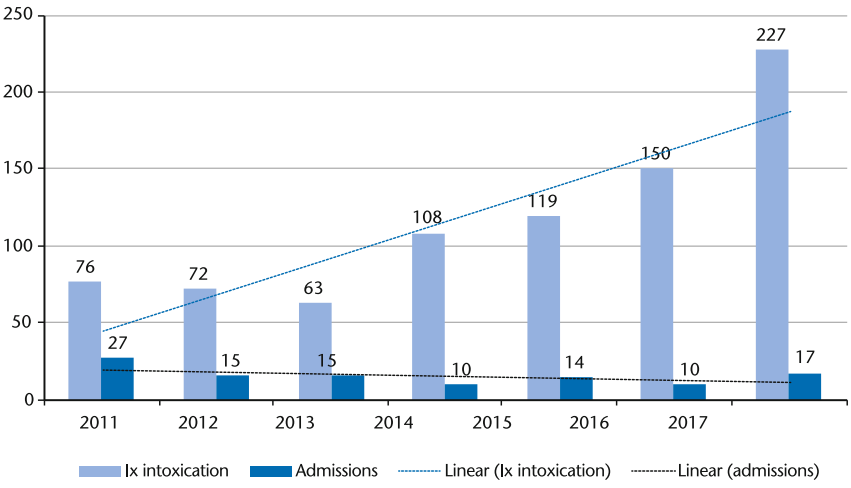

Figure 1. Annual evolution of cocaine intoxicated patients attended in the emergency department between 2011 and 2017, and of hospital admissions due to cocaine use. Ix: intoxication.

higher percentage of admissions than women.

The percentage of admissions was significantly higher in residents compared to tourists (p = 0.009, Φ_c = 0.093), and in patients with a suicidal versus recreational cause (p < 0.001, Φ_c = 0.154) (Table 1). The CC route with the highest probability of admission was the intravenous route[6]. Recording of oxygen saturation level (p < 0.001, Φ_c = 0.116) was less frequent in the admitted group. The ECG alterations significantly associated with admission were ST-segment elevation/descent (p < 0.001, Φ_c = 0.212) and ventricular arrhythmias (p = 0.004, Φ_c = 0.197). The percentage of patients admitted for renal (9.3%), rhabdomyolysis (12%) or respiratory (20.4%) symptoms was higher than the percentage not admitted (p < 0.001), with a significant positive relationship with admission in cases requiring support measures (observation, monitoring, serum therapy), catheterization, and in those treated with antiplatelet and antiarrhythmic drugs, but not after mechanical or pharmacological containment measures. Six men and 2 women died (mean 39.6 years; SD 10.01), all from the group of patients admitted to hospital, except for one case who died of cardiorespiratory arrest during transfer to hospital.

Analyzing poly-drug use, the combination of cocaine + other drugs shows a higher percentage of non-admissions (p = 0.002, Φ_c = 0.123). However, the presence of alcohol in any combination significantly increases the percentage of non-admissions (Table 2).

There was no evidence of an increase in admissions after CC in other series[2,3]. We agree with other toxicological studies on the deficient recording of vital signs, mainly temperature and respiratory rate, and therefore we should continue to insist on the need to do so routinely. It is one of the cornerstones of correct initial care[7] and allows early detection of clinical situations that may represent a true emergency (hypertension, shock, hyperthermia or respiratory depression)[8].

Although the combination of cocaine and alcohol (cocaethylene) is associated with increased morbidity and mortality compared to cocaine consumed alone[9,10], we found that, paradoxically, alcohol consumption, in any combination, decreased the possibility of admission. In no case is it intended to trivialize this combined consumption, nor to attribute a protective role to alcohol, since the potential mortality in combination is well documented[11].

The most serious clinical situations defined for CC (hyperthermia, cardiovascular or neurological disor-

Table 1. Results of the comparative analysis of the variables analyzed between cases admitted and not admitted after cocaine intoxication

	Admitted N = 108 n (%)	**Not admitted N = 707** n (%)	**p**	Φ_c
Age [mean (SD)]	38.8 (9.9)	35.01 (9.9)	< 0.001	(d = 0.38)
Sex			0.093	0.059
Male	88 (14.4)	523 (85.6)		
Female	20 (9.8)	184 (90.2)		
Origin			0.009	0.093
Resident	97 (14.2)	584 (85.8)		
Tourist	7 (5.6)	117 (94.4)		
Reason			< 0.001	0.154
Recreational	84 (11.5)	649 (88.5)		
Suicide	22 (29.3)	53 (70.7)		
Accidental	1 (20)	4 (80)		
Route of consumption			0.119	0.085
Nasal	88 (12.3)	630 (87.7)		
Smoked	3 (25)	9 (75)		
Intravenous	13 (18.8)	56 (81.2)		
Oral	4 (25)	12 (75)		
Vital signs				
No HR recording	14 (13)	61(8.6)	0.147	0.051
HR > 100 bpm	7 (28.7)*	227 (35.1)*	0.221	0.045
No BP recording	14 (13)	69 (9.8)	0.305	0.036
SBP > 140 mmHg	18 (19.1)*	131 (20.5)*	0.756	0.011
No record of temperature	50 (46.3)	396 (56)	0.059	0.066
Temperature > 37ºC	17 (29.3)*	19 (6.1)*	< 0.001	0.285
No recording RR	104 (96.3)	651 (92.1)	0.118	0.055
No record $SatO_2$	48 (44.4)	203 (28.7)	< 0.001	0.116
Clinical				
Asymptomatic	0 (0)	21 (3)	0.096	0.064
Cardiac	19 (17.6)	128 (18.1)	0.897	0.005
Neurological	54 (50)	298 (42.1)	0.125	0.054
Psychiatric	45 (41.7)	367 (51.9)	0.047	0.069
Traumatic	18 (16.7)	75 (10.6)	0.065	0.065
Renal	10 (9.3)	3 (0.4)	< 0.001	0.239
Digestive	3 (2.8)	73 (10.3)	0.012	0.088
Rhabdomyolysis	13 (12)	6 (0.8)	< 0.001	0.251
Respiratory	22 (20.4)	42 (5.9)	< 0.001	0.182
ECG				
Not performed	42 (38.9)	344 (48.7)		
Performed	66 (61.1)	363 (51.3)	0.058	0.066
Normal	29 (43.9)*	180 (49.6)*	0.398	0.041
Sinus tachycardia	23 (34.8)*	148 (40.8)*	0.366	0.044
Supraventricular arrhythmia	1 (1.5)*	2 (0.6)*	0.395	0.042
ST alteration	17 (25.8)*	28 (7.7)*	< 0.001	0.212
Ventricular arrhythmia	3 (4.5)*	0 (0)*	0.004	0.197
Other	9 (13.6)*	17 (4.7)*	0.01	0.135
Treatment				
None	17 (15.7)	214 (30.3)	0.002	0.109
Observation	42 (46.2)	66 (13.4)	≦ 0.001	0.306
Monitoring	53 (58.2)	52 (10.5)	≦ 0.001	0.450
Serum therapy	40 (44)	99 (20.1)	≦ 0.001	0.203
Antidotes	17 (18.7)	63 (12.8)	0.132	0.062
Mechanical containment	9 (9.9)	77 (15.6)	0.157	0.059
Pharmacological containment	32 (35.2)	333 (67.5)	< 0.001	0.243
Antiarrhythmics	3 (3.3)	2 (0.4)	0.029	0.114
Beta-blockers	3 (3.3)	0 (0)	0.004	0.167
Catheterization	10 (11)	1 (0.2)	< 0.001	0.288
Acetylsalicylic acid	7 (7.7)	1 (0.2)	< 0.001	0.234
Deaths	7 (6.5)	1 (0.1)	< 0.001	0.218

*% relative to the total number of recordings made.
HR: heart rate; BP: blood pressure; SBP: systolic blood pressure; RR: respiratory rate.

Table 2. Relationship between admission/non-admission of cocaine intoxications treated, with the different combinations of cocaine use

	Admitted N = 108 n (%)	Not admitted N = 707 n (%)	p	Φ_c	Total
Single vs. multiple toxicants					
Single Toxic (cocaine)	28 (25.9)	129 (18.2)	0.059	0.066	157
Multiple toxic	80 (74.1)	578 (81.8)			658
Type of abuse (multiple)					
Cocaine + alcohol	27 (25)	236 (33.4)	0.083	0.061	263
Cocaine + other drugs	20 (18.5)	107 (15.1)	0.366	0.032	127
Cocaine + drugs	12 (11.1)	25 (3.5)	0.002	0.123	37
Cocaine + alcohol + other drugs	8 (7.4)	123 (17.4)	0.008	0.092	131
Cocaine + alcohol + drugs	2 (1.9)	36 (5.1)	0.137	0.052	38
Cocaine + other drugs + medicines	5 (4.6)	30 (4.2)	0.854	0.006	35
Cocaine + alcohol + other drugs + medicines	6 (5.6)	21 (3)	0.162	0.049	27

*% of total registrations completed.

ders) occurred only occasionally in our series, with the exception of ST-segment abnormalities and ventricular arrhythmias in the ECG, which were the causes of death in our deceased patients[12,13].

Regarding the ECG, the most common finding in this registry was sinus tachycardia, usually in the context of palpitations, anxiety or chest pain after consumption. Other frequent clinical presentations after CC (behavioral disorders, anxiety, aggressiveness) were clearly related to non-admission, but required extended periods of observation to address them symptomatically. This demonstrates the growing role of the ED in this type of pathology, and also gives an idea of the impact and workload that these poisonings represent for these services and their professionals. On the contrary, patients with less common symptoms (renal, respiratory or rhabdomyolysis) were admitted more often, which should alert us to the need for assistance aimed at detecting them specifically specific detection[14].

The limitations of this study are its retrospective and single-center nature, which may have biased its results due to the high impact of leisure activities in our setting. Furthermore, it did not take into account frequent or recidivist intoxicated patients, who in the case of cocaine account for 18.9% of annual consultations.

This study provides data on the clinical variables that condition hospital admission after CC, which are: age over 35, joint consumption with drugs (without alcohol), the use of the intravenous route, the presence of ECG disorders (ST alteration and ventricular arrhythmias) and when renal, respiratory or rhabdomyolysis symptoms are detected.

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Conflicting interests: The authors declare no conflicts of interest in relation to this article.

Contribution of the authors, financing and ethical responsibilities: All authors have confirmed their authorship, the non-existence of external financing and the maintenance of confidentiality and respect for patients' rights in the author's responsibilities document, publication agreement and assignment of rights to EMERGENCIAS. This study was carried out by the Toxicology Working Group, included in the neurosciences area of the Balearic Islands Health Research Institute (IdISBA), without financial support. The study was approved by the Hospital Research Committee with reference number CI-400-20.

Article not commissioned by the Editorial Committee and with external peer review.

Editor in charge: Guillermo Burillo Putze.

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