

Incidence and impact of undisclosed cocaine use in emergency department chest pain and trauma patients

Guillermo Burillo-Putze ·
Juan María Borreguero León ·
Jose Antonio García Dopico ·
Jose Francisco Fernández Rodríguez ·
Maria Angeles Pérez Carrillo ·
Maria Jesús Jorge Pérez ·
Antonia María de Vera González ·
Eva Vallbona Afonso · Alejandro Jiménez Sosa

Received: 17 January 2008 / Accepted: 31 March 2008 / Published online: 7 June 2008
© Springer-Verlag London Ltd 2008

Abstract

Background One of the highest rates of illicit cocaine consumption in Europe is in Spain. Our objective was to study the incidence and impact of undisclosed cocaine consumption in patients attending the emergency department (ED) for trauma or chest pain.

Methods We analysed urine samples from consecutive patients attending the ED for trauma or chest pain to determine the presence of cocaine, cannabis, amphetamine/

metaamphetamine and opioids by semiquantitative tests with fluorescence polarization immunoassay (FPIA).

Results Thirty percent of eligible patients participated. Of 75 cases, 61.3% had trauma and 38.7% chest pain; 25% presented a positive test for drugs. Cocaine was present in 13.3% and cannabis in the same proportion. No differences were found regarding positive cocaine test and chief complaint, ED or hospital stay, or additional tests. Cocaine-positive patients were significantly younger.

This study was supported by Delegacion del Gobierno para el Plan Nacional sobre Drogas, Ministerio de Sanidad y Consumo, 2004

The views expressed in this paper are those of the author(s), and not those of the editors, editorial board or publisher.

G. Burillo-Putze · J. F. Fernández Rodríguez ·
M. A. Pérez Carrillo · M. J. Jorge Pérez · E. Vallbona Afonso
Emergency Department,
University Hospital of the Canary Islands,
La Laguna, Santa Cruz de Tenerife, Spain

J. M. Borreguero León · J. A. García Dopico ·
A. M. de Vera González
Clinical Laboratory, University Hospital of the Canary Islands,
La Laguna, Santa Cruz de Tenerife, Spain

G. Burillo-Putze · A. Jiménez Sosa
Research Unit, University Hospital of the Canary Islands,
La Laguna, Santa Cruz de Tenerife, Spain

G. Burillo-Putze (✉)
Servicio de Urgencias, Hospital Universitario de Canarias,
Ofra S/N,
La Laguna 38320 Santa Cruz de Tenerife, Spain
e-mail: gburillo@huc.canarias.org

Keywords Cocaine · Trauma · Chest pain

Introduction

The highest illicit cocaine consumption in Europe is in Spain and the UK [1], on a par with that in the USA [2]. Furthermore, it has increased alarmingly among young people [3].

Various studies have established a relationship between acute cocaine consumption and medical attention for chest pain, especially in people under 45 years of age [4, 5]. Chronic abuse has been postulated as a new factor in cardiovascular risk [6]. In addition, illicit drug use is involved to the same extent as alcohol abuse in vehicle accidents [7] and accidental or violent trauma [8], especially in severe cases or deaths [9].

To our knowledge, no studies have been performed in Spain on the prevalence of cocaine consumption in patients seeking emergency department attention when this was not the direct reason for the visit [10, 11].

The objective of this work was to study the incidence of cocaine consumption in patients attending the emergency department (ED) for trauma or cardiovascular pathology, and whether such consumption influenced clinical management of the patient.

Patients and methods

Between 1 April and 30 June 2006, we prospectively studied urine samples from consecutive patients over 16 years who presented to a university hospital ED for any trauma secondary to vehicle accident, work accident, aggression, or non-traumatic chest pain of probable cardiovascular origin. Informed consent was obtained from these participants except those patients for whom toxicological analysis was performed for clinical reasons. The samples were stored at -80°C for subsequent analysis.

The following variables were studied: age, sex, reason for visit (trauma or chest pain), complementary tests needed (blood tests, X-rays, CT scans and ultrasound), number of tests performed, outcome (death, hospital admission, discharge), duration of ED stay for non-admissions and days of hospital stay.

The detection of drugs in urine samples was performed by semiquantitative tests with fluorescence polarisation immunoassay (FPIA)(AxSYM System, Abbott laboratories, Abbott Park, IL), measuring levels of cocaine (benzoylecgonine and methylecgonine ether), cannabis (delta-9-tetrahydrocannabinol), amphetamine/metaamphetamine, opioids (morphine and normorphine) and benzodiazepine (nordiazepam). We considered the following values as positive: cocaine >300 ng/ml, cannabis >50 ng/ml, opioids >300 ng/ml, amphetamine/metaamphetamine $>1,000$ ng/ml and benzodiazepine >200 ng/ml. Polyconsumption was defined as the presence of two or more drugs in the samples analyzed.

The project was approved by the local research ethics committee.

Statistical analysis

Results for categorical variables are expressed as frequency and percentage. Results for numerical and ordinal variables are expressed as mean and standard deviation. Proportions were compared with chi-square test or Fisher's exact test whenever required. Ranks between groups were compared with Mann-Whitney U test or Wilcoxon-Mann-Whitney test whenever required. A *P* value of less than 0.05 was considered to indicate statistical significance.

Statistical analysis was carried out with SPSS v. 14.0.1 (Chicago, IL) and StatXact 5.0 (Cytel Co., Cambridge, MA).

Results

Two hundred and fifty patients fulfilled the inclusion criteria, but only 91 gave their consent to be included in the study. Finally, after 16 were excluded due to incomplete clinical information (patients left ED before the discharge process was completed), the data from 75 patients were included for statistical analysis.

Clinical and demographic characteristics are shown in Table 1. Physical trauma was present in 63.3% of the whole sample. The chest pain group was older than the trauma group (36.8 years \pm 17.73 vs. 47.0 years \pm 16.06; $P<0.001$), received more blood tests (86.2% vs. 52.2%; $P=0.002$) and more electrocardiograms (93.1% vs. 4.3%; $P=0.001$). No differences were found in the other variables (see Table 1). No patients died.

Remarkably, 25.3% (19 of 75) of the patients showed positive drugs test for drugs. Of these, 13.3% (10 of 75) were positive for cocaine, and the same percentage was positive for cannabinoids (Table 2). Patients with positive

Table 1 Clinical and demographic characteristics of patients grouped according to reason for ED visit

	Total <i>n</i> =75	Chest pain group <i>n</i> =29	Trauma group <i>n</i> =46	<i>P</i> value
Age (years)	36.8 \pm 17.73	47.0 \pm 16.06	27.6 \pm 9.90	<0.001
Male sex—no. (%)	59 (78.7)	23 (79.3)	36 (78.3)	0.58
Emergency dept. stay (h)	5.2 \pm 6.52	6.6 \pm 8.50	4.3 \pm 4.93	0.99
Hospital admission—no. (%)	19 (25.7)	10 (34.5)	9 (20)	0.13
Hospital stay (days)	4.23 \pm 10.43	4.3 \pm 6.09	4.19 \pm 12.53	0.06
Additional tests—no. (%)	67 (94.4)	26 (96.3)	41 (93.2)	0.51
Blood tests—no. (%)	49 (65.3)	25 (86.2)	24 (52.2)	0.002
X-ray—no. (%)	62 (82.7)	22 (75.9)	40 (87)	0.18
ECG—no. (%)	26 (38.7)	27 (93.1)	2 (4.3)	<0.001
CT—no. (%)	11 (14.7)	5 (17.2)	6 (13)	0.43
Echography—no. (%)	5 (6.7)	3 (10.3)	2 (4.2)	0.3

X-ray: radiography, ECG: electrocardiogram, CT: computerized tomography

Table 2 Positive drug tests classified according to the reason for ED visit

	Total <i>n</i> =75	Chest pain group <i>n</i> =29	Trauma group <i>n</i> =46	<i>P</i> value
Cocaine (+)—no. (%)	10 (13.3)	5 (17.2)	5 (10.96)	0.32
Cannabinoids (+)—no. (%)	10 (13.3)	5 (17.2)	5 (10.96)	0.32
Opioids (+)—no. (%)	3 (4)	2 (6.9)	1 (2.2)	0.33
Amphetamines (+)—no. (%)	0 (0)	0 (0)	0 (0)	-
Any illicit drug—no. (%)	19 (25.3)	8 (27.6)	11 (23.9)	0.46
Polyconsumption—no. (%)	5 (6.7)	5 (17.2)	0 (0)	0.007

test for cocaine were younger than those with negative test (26.6 years±5.04 vs. 39.7 years±18.96, respectively; *P*=0.036). No differences were found between patients with positive and negative cocaine tests in sex, duration of ED stay, hospital stay or need for additional tests (Table 3). However, the proportion of patients with positive test for more than one illegal drug was higher in the chest pain group (17.2%) than in the trauma group (0%); *P*=0.007.

Discussion

A remarkable finding of this study was that one in four ED patients presenting for reasons other than illicit drug consumption showed positive drug urine analyses. This coincides with the findings of Sanjurjo et al. [11], but they only included undisclosed cases suspected of drug consumption. Moreover, the fact that only 30% of patients eligible for inclusion in the present study consented to participate suggests that the number of illicit drug users attending hospital emergency departments in Spain may be higher than was previously estimated. A limitation of our study was precisely this low rate of consent, which contrasts with that of approximately 70% in other series, although in those studies the reasons for patients attending ED were medical problems specifically related with cocaine

consumption [11, 12]. Another limitation may be not having taken into account the degree of severity or admission diagnoses to determine their relation with cocaine use. This was not done because of the small sample size.

Despite studying two groups of patients as aetiologically different as trauma and chest pain of probable cardiologic aetiology, we found no significant differences in clinical characteristics such as ED stay, hospitalisation or hospital stay. Neither did we find differences in cocaine consumption between the two groups. Both our groups showed positive cocaine results at the lower limit of other series (16% [13] to 56.2% [14] for cocaine-related chest pain and from 6% [15] to 11.8% [12, 16] for trauma patients). A possible explanation may be that they included mainly severe cases.

Polyconsumption was higher in the chest-pain group, probably because the trauma group included any degree of severity, not just severe trauma as in other series, especially those associated with alcohol consumption [15, 17].

The use of cocaine was not associated with increased ED stay, complementary studies, rate of hospital admission or length of hospital stay. It appears that the use of this substance had little influence as an independent factor on expenditure and health resources. This may be partly attributable to the fact that the cocaine-positive patients were significantly younger than the cocaine-negative

Table 3 Demographics, ED management and polyconsumption in cocaine-positive patients

	Total <i>n</i> =75	Cocaine-positive patients <i>n</i> =10	Cocaine-negative patients <i>n</i> =65	<i>P</i> value
Age (years)	36.8±17.73	26.6±5.04	39.7±18.96	0.04
Male sex—no. (%)	59 (78.7)	10 (16.9)	49 (83.1)	0.08
ED stay (h)	5.2±6.52	5.3±4.5	4.1±6.85	0.39
Hospitalization—no. (%)	19 (25.7)	2 (10.5)	17 (89.5)	0.50
Hospital stay (days)	4.23±10.43	5.0±15.12	4.1±9.57	0.39
Additional tests—no. (%)	67 (94.4)	9 (90)	58 (95.1)	0.46
Blood tests—no. (%)	49 (65.3)	9 (90)	40 (61.5)	0.07
X-ray—no. (%)	62 (82.7)	7 (70)	55 (84.6)	0.24
ECG—no. (%)	26 (38.7)	5 (50)	24 (36.9)	0.32
CT—no. (%)	11 (14.7)	1 (10)	10 (15.4)	0.55
Echography—no. (%)	5 (6.7)	1 (10)	4 (6.2)	0.52
Cannabinoids (positive test)—no. (%)	10 (13.3)	4 (40)	6 (60)	0.24
Opioids (positive test)—no. (%)	3 (4)	0 (0)	3 (100)	0.65

X-ray: radiography, ECG:electrocardiogram, CT: computerized tomography

patients compared in this study. Precisely for this reason, we cannot know the future impact of this consumption by young people [6].

Further research with longer study periods and a greater number of patients is required to confirm these preliminary findings.

Conclusions

This study found undisclosed cocaine and cannabis use in 25% of consecutive adult patients presenting at the emergency department for trauma or chest pain. The low participation suggests higher real incidence.

The use of cocaine was not associated with greater health care burden, but cocaine-positive patients were significantly younger.

References

1. The European Monitoring Centre for Drugs and Drug Addiction. 2007 Annual report on the state of the drugs problem in Europe. Available at: <http://www.emcdda.europa.eu/html.cfm/index419EN.html>
2. United Nations. Office on Drugs and Crime. 2007 World Drug Report-Global illicit drug trends. Available at: <http://www.unodc.org/unodc/en/data-and-analysis/WDR-2007.html>
3. Delegación del Gobierno para el Plan Nacional sobre Drogas. Observatorio español sobre drogas. Informe 2004. Ministerio de Sanidad y Consumo. Available at <http://www.pnsd.msc.es/Categoria2/publica/pdf/oed-2004.pdf>
4. Hahn I, Hoffman RS (2001) Cocaine use and acute myocardial infarction. *Emerg Med Clin North Am* 19:493–510
5. Weber JE, Shofer FS, Larkin GL, Kalaria AS, Hollander JE (2003) Validation of a brief observation period for patients with cocaine-associated chest pain. *N Engl J Med* 348:507–510
6. Burillo-Putze G, Hoffman RS, Duenas-Laita A (2004) Cocaína como posible factor de riesgo cardiovascular. *Rev Esp Cardiol* 57:5956
7. Giovanardi D, Castellana CN, Pisa S, Poppi B, Pinetti D, Bertolini A, et al. (2005) Prevalence of abuse of alcohol and other drugs among injured drivers presenting to the emergency department of the University Hospital of Modena, Italy. *Drug Alcohol Depend* 80:135–138
8. Langdorf MI, Rudkin SE, Dellota K, Fox JC, Munden S (2002) Decision rule and utility of routine urine toxicology screening of trauma patients. *Eur J Emerg Med* 9:115–217
9. del Río MC, Alvarez FJ (2000) Presence of illegal drugs in drivers involved in fatal road traffic accidents in Spain. *Drug Alcohol Depend* 57:177–182
10. Sanjurjo E, Montori E, Nogué S, Sánchez M, Munné P (2006) Urgencias por cocaína: un problema emergente. *Med Clin (Barc)* 126:616–619
11. Sanjurjo E, Camara M, Nogue S, Negrodo M, Garcia S, To-Figueras J, et al. (2005) Urgencias por consumo de drogas de abuso: confrontación entre los datos clínicos y los analíticos. *Emergencias* 17:26–31
12. Blondell RD, Dodds HN, Looney SW, Lewis CM, Hagan JL, Lukan JK, et al. (2005) Toxicology screening results: injury associations among hospitalized trauma patients. *J Trauma* 58: 561–570
13. Rich JA, Singer DE (1991) Cocaine-related symptoms in patients presenting to an urban emergency department. *Ann Emerg Med* 20:616–621
14. Brody SL, Slovis CM, Wrenn KD (1990) Cocaine-related medical problems: consecutive series of 233 patients. *Am J Med* 88:325–331
15. Giovanardi D, Castellana CN, Pisa S, Poppi B, Pinetti D, Bertolini A, et al. (2005) Prevalence of abuse of alcohol and other drugs among injured drivers presenting to the emergency department of the University Hospital of Modena, Italy. *Drug Alcohol Depend* 80:135–138
16. Rich JA, Singer DE (1991) Cocaine-related symptoms in patients presenting to an urban emergency department. *Ann Emerg Med* 20:616–621
17. Demetriades D, Gkiokas G, Velamos GC, Brown C, Murria J, Noguchi T (2004) Alcohol and illicit drugs in traumatic deaths: prevalence and association with type and severity of injuries. *J Am Coll Surg* 199:687–692

GUILLERMO BURILLO-PUTZE received his medical degree in 1992 from the University of La Laguna, Canary Islands, Spain. He is specialist in Family Medicine and Board in Toxicology by EUROTOX, and is currently attending physician of the Emergency Department, Hospital Universitario de Canarias, Tenerife. His research interests include emergency medicine administration and clinical toxicology, mainly epidemiology, gut decontamination techniques, street drugs and agricultural products.