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Original article

Cocaine Use Disorders and Acute Myocardial Infarction, Excess Length of Hospital Stay and Overexpenditure

Miguel Gili,[a,b,*] Gloria Ramírez,[a,b] Luis Béjar,[b] Julio López,[a,b] Dolores Franco,[c,d] and José Sala[e]

[a] Unidad de Gestión Clínica de Medicina Preventiva, Vigilancia y Promoción de la Salud, Hospital Universitario Virgen Macarena, Seville, Spain
[b] Departamento de Medicina Preventiva y Salud Pública, Universidad de Sevilla, Seville, Spain
[c] Unidad de Gestión Clínica de Salud Mental, Hospital Universitario Virgen Macarena, Seville, Spain
[d] Departamento de Psiquiatría, Universidad de Sevilla, Seville, Spain
[e] Servicio de Documentación Clínica, Hospital Universitario Virgen Macarena, Seville, Spain

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ABSTRACT

Introduction and objectives: To investigate the relationship between the prevalence of cocaine use disorders and acute myocardial infarction in patients aged ≥ 18 years and to estimate the influence of cocaine use disorders on mortality, excess length of stay, and overexpenditure among hospitalized patients with acute myocardial infarction.
Methods: Retrospective study of the minimum basic data set of 87 Spanish hospitals from 2008 to 2010.
Results: Among 5 575 325 admissions reviewed, there were 24 126 patients with cocaine use disorders and 79 076 cases of acute myocardial infarction. The incidence of acute myocardial infarction among patients with cocaine use disorders increased with age and reached a peak at 55 years to 64 years ($P < .0001$). Multivariate analysis showed that cocaine use disorders were more prevalent among patients with acute myocardial infarction independently of age, sex, other addictive disorders, and 30 other comorbidities (odds ratio = 3.0). Among patients with acute myocardial infarction, those with cocaine use disorders did not show an increase of in-hospital death, but did show excess length of hospital stay (1.5 days) and overexpenditure (382 euros).
Conclusions: Cocaine use disorders are associated with acute myocardial infarction and increase the length of hospital stay and overexpenditure among acute myocardial infarction patients. Cessation of cocaine use among these patients should be one of the primary therapeutic goals after hospital discharge.

Trastornos por cocaína e infarto agudo de miocardio, prolongación de estancias y exceso de costes hospitalarios

Palabras clave:
Cocaína
Infarto de miocardio
Prolongación de estancias
Exceso de costes

RESUMEN

Introducción y objetivos: Analizar la relación entre la prevalencia de trastornos por cocaína y el infarto agudo de miocardio en pacientes ≥ 18 años y su influencia en la mortalidad, la prolongación de estancias y el exceso de costes de los pacientes con infarto agudo de miocardio.
Métodos: Estudio retrospectivo de los datos del conjunto mínimo básico de datos de 87 hospitales españoles durante 2008-2010.
Resultados: Se estudiaron 5.575.325 ingresos, entre los cuales hubo 24.126 pacientes con trastornos por cocaína y 79.076 casos de infarto agudo de miocardio. La prevalencia de infarto agudo de miocardio entre los pacientes con trastornos por cocaína aumentó con la edad, y fue máxima entre los de 55-64 años de edad ($p < 0{,}0001$). El análisis multivariable indicó que los trastornos por cocaína son más prevalentes entre los pacientes con infarto agudo de miocardio (*odds ratio* = 3,0) e independientemente de edad, sexo, otras adicciones y 30 comorbilidades. Entre los pacientes con infarto agudo de miocardio, aquellos con trastornos por cocaína no presentaron mayor mortalidad, pero sí una prolongación indebida de las estancias hospitalarias (1,5 días) y un exceso de costes (382 euros).
Conclusiones: Hay una asociación entre los trastornos por cocaína y el infarto agudo de miocardio. Estos trastornos prolongan las estancias hospitalarias y aumentan los costes de los pacientes hospitalizados. La interrupción del uso de la droga debe ser uno de los principales objetivos terapéuticos tras el alta del paciente.

* Corresponding author: Unidad de Gestión Clínica de Medicina Preventiva, Vigilancia y Promoción de la Salud, Hospital Universitario Virgen Macarena, Avda. Dr. Fedriani s/n, 41070 Seville, Spain.
E-mail address: mgili@us.es (M. Gili).

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Abbreviations

AMI: acute myocardial infarction
MBDS: Minimum Basic Data Set

INTRODUCTION

Cocaine use has increased in the last 10 years, and this substance is now the second most frequently consumed drug in Europe after cannabis.[1,2] After the United Kingdom, Spain is the country with the highest prevalence of cocaine use among persons aged 15 years to 64 years, with 8.3% having consumed the drug at some time. Consumption is particularly high among young men (15-34 years): 5.5% during the last year and 1.9% during the last month,[2] which has been attributed to its wide availability, ease of administration, increasingly lower cost, and the mistaken belief that recreational cocaine use is not dangerous.

Cocaine is the most widely used illicit drug among patients attending hospital emergency departments and drug rehabilitation centers.[2–4]

While cocaine use has been increasing, there has been an extraordinary rise in the number of its cardiovascular complications, such as unstable angina pectoris, acute myocardial infarction (AMI), aortic dissection, infectious endocarditis, and other entities.[5,6] A topic that has been analyzed in the last few years is the impact of cocaine use disorders (cocaine abuse and dependence) on cardiovascular diseases in persons > 50 years, since, in many developed countries, there has been an increase in older cohorts with this addiction.[7,8]

To analyze the association between the prevalence of cocaine use disorders and AMI, we studied this phenomenon in patients aged ≥ 18 years admitted to a sample of 87 Spanish hospitals from 2008 to 2010 and attempted to control for other confounding and interaction variables, such as age, sex, other addictions, and a considerable number of comorbidities. Another aim of this study was to evaluate the possible influence of these disorders on mortality, excess length of hospital stay, and overexpenditure among patients hospitalized for AMI.

METHODS

Sample and Participants

Multistage sampling was performed, initially based on calculating the sample size of the study nationally and for autonomous communities, adjusted to their population weights. Problems related to alcohol, smoking and other drugs were analyzed with an alpha error of 5%, a 2-tailed test, a statistical power of 90%, a control:case ratio of at least 4:1, and a more unfavorable proportion of cases in which cases were exposed and controls were not exposed, based on the available scientific evidence. The hospital selection was adjusted to the distribution of hospital groups in each autonomous community, which resulted in 87 hospitals being selected from all the autonomous communities in Spain.

Based on the written or digitalized information in the medical record, each patient's diagnoses, the external causes and the procedures applied were codified, following the ICD-9 (ninth revision of the International Classification of Diseases and Causes of Death). Specialized personnel, with solid training and experience in data recording, codified the data and introduced the information in the databases. These databases contained information on demographic characteristics, admission and discharge dates, type of admission and discharge, diagnostic codes for the main and secondary diagnoses, and external causes and procedures, classified using ICD-9 codes. These databases also included diagnosis-related groups and each hospital was classified into a group, depending on its size and complexity.[9] The analysis was restricted to patients ≥ 18 years of age at the time of hospital discharge.

Variables

Cases of AMI, first episode, were defined as those in which the code appeared in the main diagnosis (codes 410.01-410.91). Cases were excluded if the code appeared in one of the secondary diagnoses, but not the main diagnosis. The ICD-9 codes were used to define cocaine use disorders as cocaine dependence (304.20-304.23) and cocaine abuse (305.60-305.63). Disorders due to cannabis, opioid, amphetamine, sedative or hypnotic, alcohol use and smoking were defined in a similar manner.

Age was quantified in years. The following comorbidities were identified: obesity, uncomplicated hypertension, complicated hypertension, arrhythmias, pulmonary circulation disorders, valvular disease, deficiency anemia, posthemorrhagic anemia, electrolyte disorders, weight loss, hypothyroidism, coagulopathy, previous AMI, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, rheumatic disease, peptic ulcer, diabetes mellitus without chronic complications, diabetes mellitus with chronic complications, hemiplegia or paraplegia, kidney disease, moderate or severe liver disease, cancer, leukemia or lymphoma, metastatic cancer, AIDS, and depression. We used the ICD-9 codes proposed by Quan et al[10] for these comorbidities. The Charlson comorbidity index was also calculated for each patient.[11]

Data Analysis

The main aim was to calculate the association between the incidence of AMI and cocaine use disorders in patients admitted to hospital. The secondary aims were to determine mortality, length of hospital stay, and hospital costs in patients with and without cocaine use disorders who had experienced an AMI. We calculated costs by using the specific hospital costs for each diagnosis-related group stratified by hospital group and using the estimates published by the Ministry of health for 2008 to 2010.[9]

A univariate analysis was performed to examine the association between AMI and addictive disorders, age, sex, and comorbidities. Then, multivariate models were constructed, using unconditional logistic regression analysis to determine the association between cocaine disorders and other addictions with AMI and in-hospital death due to AMI, and controlling for the remaining variables. A multivariate analysis of covariance was performed to determine the effect of cocaine use disorders on length of hospital stay in days and on costs in patients with AMI. The data were adjusted by age, sex, addictions, hospital group, and the above-mentioned comorbidities. The analysis was performed with the STATA statistical program, version MP 12.1.

RESULTS

Patient Characteristics

The characteristics of patients with and without cocaine use disorders are shown in Table 1. We identified 5 475 325 patients, of which 24 126 (0.44%) had cocaine use disorders and 79 076 (1.4%) were admitted for AMI. A total of 538 (2.2%) patients with cocaine use disorders were admitted for AMI, while 78 538 (1.4%) without these disorders were admitted.