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Original Article

Alcohol Use Disorders and Community-Acquired Pneumococcal Pneumonia: Associated Mortality, Prolonged Hospital Stay and Increased Hospital Spending[☆]

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A B S T R A C T

Introduction: The aim of this study was to investigate the impact of alcohol use disorders (AUD) on community-acquired pneumococcal pneumonia (CAPP) admissions, in terms of in-hospital mortality, prolonged stay and increased hospital spending.
Methods: Retrospective observational study of a sample of CAPP patients from the minimum basic datasets of 87 Spanish hospitals during 2008–2010. Mortality, length of hospital stay and additional spending attributable to AUD were calculated after multivariate covariance analysis for variables such as age and sex, type of hospital, addictions and comorbidities.
Results: Among 16,202 non-elective admissions for CAPP in patients aged 18–74 years, 2685 had AUD. Patients admitted with CAPP and AUD were predominantly men with a higher prevalence of tobacco or drug use disorders and higher Charlson comorbidity index. Patients with CAPP and AUD had notably higher in-hospital mortality (50.8%; CI 95%: 44.3–54.3%), prolonged length of stay (2.3 days; CI 95%: 2.0–2.7 days) and increased costs (1869.2 €; CI 95%: 1498.6–2239.8 €).
Conclusions: According to the results of this study, AUD in CAPP patients was associated with increased in-hospital mortality, length of hospital stay and hospital spending.

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Trastornos por consumo de alcohol y neumonía neumocócica adquirida en la comunidad: mortalidad atribuible, prolongación de estancias y sobrecostes hospitalarios

R E S U M E N

Introducción: El objetivo de este estudio es el análisis del impacto de los trastornos asociados al consumo de alcohol (TCA) en las neumonías neumocócicas adquiridas en la comunidad (NNAC), en términos de exceso de mortalidad intrahospitalaria, prolongación de estancias y sobrecostes.
Material y métodos: Estudio observacional retrospectivo de una muestra de pacientes que presentaron NNAC recogidos en los conjuntos mínimos básicos de datos de 87 hospitales españoles durante el periodo 2008-2010. Se calculó la mortalidad, la prolongación de estancias y los sobrecostes atribuibles a los TCA

controlando mediante análisis multivariado de la covarianza variables como la edad y el sexo, el tipo de hospital, los trastornos adictivos y las comorbilidades.

Resultados: Se estudiaron 16.202 ingresos urgentes por NNAC de 18 a 74 años de edad, entre los cuales hubo 2.685 pacientes con TCA. Los ingresos con NNAC y TCA fueron predominantemente varones, con mayor prevalencia de trastornos por tabaco y drogas y con índices de comorbilidad de Charlson más elevados. Los pacientes con NNAC y TCA presentaron importantes excesos de mortalidad (50,8%; IC 95%: 44,3-54,3%), prolongación indebida de estancias (2,3 días; IC 95%: 2,0-2,7 días) y sobrecostes (1.869,2 €; IC 95%: 1.498,6-2.239,8 €).

Conclusiones: De acuerdo con los resultados de este estudio, los TCA en pacientes con NNAC aumentan significativamente la mortalidad, la duración de la estancia hospitalaria y sus costes.

Introduction

Mortality due to infectious diseases in Spain has been falling over the last few decades, but pneumonia remains the primary cause of death in this group (35.9%).[1] The most common type of pneumonia, and the one that causes most hospitalizations, is community-acquired pneumococcal pneumonia (CAPP),[2,3] the incidence of which remains high in Spain and the rest of Europe.[4]

Alcohol use disorders (AUDs) are a well-recognized risk factor for CAPP and have an impact on complications and outcomes of patients during admission.[5–13] AUDs increase the risk of developing sepsis during pneumonia, a complication that prolongs hospital stay, worsens prognosis[14] and increases the rate of unscheduled readmissions.[15]

We explored this problem in patients aged 18–74 years, admitted to a selected group of 87 Spanish hospitals between 2008 and 2010, and attempted to control for other confounding and interaction factors, such as age, sex, type of hospital, other addictions and comorbidities. The aim of this study was to analyze the potential influence of AUDs on mortality, prolonged stay and increased costs among patients admitted due to CAPP.

Methods

Type of Study, Sample and Participants

This was a retrospective, observational study conducted in a selected group of Spanish hospitals.

For the group to be representative of the national situation and the autonomous communities in Spain, 87 hospitals were selected from all the autonomous communities using a stepwise sampling method that took into account the Health Ministry stratification of hospitals according to size and complexity.[16]

Written or computerized clinical history data were used to code the diagnosis of each patient and the procedures he/she underwent, in accordance with the 9th Revision of the International Classification of Diseases and Causes of Death (ICD-9). Specialist personnel were responsible for coding the data and entering it in the database. These databases, known as minimum basic datasets (MBD), contain demographic information, dates of admission and discharge, type of admission and type of discharge, diagnostic codes for the main and secondary diagnoses, external causes and procedures, classified using ICD-9 codes. They also include diagnosis-related groups (DRGs), and each hospital is categorized according to size and complexity.[16]

Variables

Cases with ICD-9 code 481 in any of the MBD diagnostic codes were defined as cases of CAPP.[17,18] Scheduled admissions and patients transferred to another hospital were excluded.

Inclusion in the study was restricted to patients between 18 and 74 years of age. The Charlson comorbidity index[19] was calculated as an indicator of comorbidity, using the ICD-9 codes proposed by Quan et al.[20] for comorbidities in this index. Other comorbidities were also calculated using the codes proposed by the same authors.[20] Alcohol use disorders were defined as any problem associated with the sporadic or chronic excessive consumption of alcohol, identified in the ICD-9 codes as: alcohol dependence (303.00–303.93), alcohol abuse (305.00–305.03), alcohol-induced mental disorders (291.0–291.9), alcoholic polyneuropathy (357.5), alcoholic cardiomyopathy (425.5), alcoholic gastritis (535.30–535.31), alcoholic liver disease (571.0–571.3), excessive blood-alcohol level (790.3), and alcohol poisoning (980.0–980.9 and E860.0-E860.9). ICD-9 codes were also used for the definition of disorders associated with smoking and other addictive drugs.[21]

Hospitals were divided by size and complexity of care into 5 groups, according to the Ministry of Health, Social Services and Equality classification,[16] as required for controlling bias and calculating healthcare costs.

Data Analysis

The main objective was to determine mortality, duration of stay and hospital costs in patients with CAPP attributable to AUDs. Costs were calculated from specific hospital costs for each DRG, stratified by hospital group, according to the estimates published by the Ministry of Health for the period 2008–2010.[16]

A bivariate analysis was performed to examine the relationship between CAPP and AUDs, and age, sex, other addictive disorders and comorbidities, using the Chi-squared test (or non-parametric variants of this test) and the Student's t-test (or non-parametric variants). To minimize the confounding bias, a multivariate analysis of covariance was performed to determine the effect of AUDs on CAPP patients with regard to in-hospital mortality, stay and costs. The requirements of the continuous variables were verified after identifying the best-fit model, and data were adjusted for age, sex, addictions, hospital group, and patient severity (according to the Charlson index). Statistical significance was set at <.0001, due to the sample size and the multiple comparison performed. The adjusted mean of each of the dependent variables (mortality, days of hospital stay, and costs on discharge) was calculated for CAPP patients with and without AUDs, and differences were measured. The analysis was performed using the STATA statistical package, version MP 13.1.

The recommendations of the STROBE guidelines for observational studies were followed in the design, analysis and presentation of results, as applicable.

Results

Patient Characteristics

At total of 16,202 admissions for CAPP were identified: 10,635 men (65.6%) and 5567 women (34.4%). Distribution by age group