REUE | Original Article

Differences in Emergency Department care for patients with exacerbated acute chronic obstructive pulmonary disease according to level of care: Phase 1 in a study of COPD care in the Emergency Departments of Castilla-León, Spain

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BACKGROUND AND OBJECTIVE. After previously demonstrating variability in care for patients with exacerbated chronic obstructive pulmonary disease (COPD) in hospital emergency departments (EDs) in Castile-León, we aimed to assess whether care varies according to the hospitals' care level.

MATERIAL AND METHODS. We stratified the database from Phase 1 of the cross-sectional descriptive study of care in 14 EDs in our Spanish autonomous community, according to university affiliation (yes/no) and level of care available at each hospital in 2021. Univariate and bivariate analyses were performed on all continuous variables, and Fisher or Kruskal-Wallis tests were used to assess associations between continuous variables and ED classification. The level of significance was set at $P < .05$.

RESULTS. We detected significant differences in care according to hospital classification in 2 variables: the number of patients with exacerbated COPD attended in the ED ($P = .01$) and the number of hospitalizations ($P = .03$). However, we found no differences in the number of patients with re-exacerbations ($P = .43$), the mean duration of hospital stay in days ($P = .80$), or the number of patients kept under observation ($P = .13$).

CONCLUSIONS. Care for patients with exacerbated COPD does not differ significantly according to the hospitals' care-level classification, in spite of the various differences between the hospitals. Better internal and external organization of hospital resources in Castile-León is required in the interest of providing better ED management of COPD in this Spanish autonomous community.

Keywords: Emergency department. Chronic obstructive pulmonary disease (COPD). Level of care.

Diferencias en la atención del paciente con exacerbación aguda de EPOC en los servicios de urgencias hospitalarias de Castilla y León según nivel asistencial

OBJETIVO. Evaluar si existen diferencias en la atención de pacientes con exacerbación EPOC (enfermedad pulmonar obstructiva crónica) atendidos en los servicios de urgencias hospitalarias de la red SACYL, según nivel asistencial.

MATERIA Y MÉTODOS. Análisis secundario de la base de datos de la FASE I del Proyecto EPOC URG CyL que compara los 14 SUH SACYL según nivel asistencial y rango universitario durante el año 2021. Se realizó un análisis uni y bivariante de todas las variables continuas, con la prueba de Fisher/ Kruskal-Wallis para conocer la asociación de la variable continua y la de clasificación, considerando significativo una p-valor < 0,05.

RESULTADOS. Existieron diferencias significativas según nivel asistencial respecto al número de urgencias atendidas durante el año 2021 y el número de ingresos en planta desde urgencias por exacerbación EPOC (p-valor 0,01 y 0,03 respectivamente), pero no hubo diferencias a la hora de atender pacientes con exacerbación en los 14 SUH SACYL (p-valor 0,43), tiempo medio de ingreso en días por EA EPOC (p-valor 0,80) e ingreso en observación (p-valor 0,13).

CONCLUSIONES. No existen diferencias significativas en la atención de exacerbación EPOC en los SUH SACYL según nivel asistencial, a pesar de que existen variabilidades que dependen del centro al que acuda el paciente, nivel asistencial, geografía y disponibilidad de medios. Se requiere una mejor organización tanto a nivel interno como externo, en beneficio del paciente atendido en los servicios de urgencias hospitalarias de SACYL.

Palabras clave: Urgencias. EPOC. Nivel asistencial.

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Introduction

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are defined as a worsening of respiratory symptoms that negatively affect patients (disease progression, hospital admission and readmission) and require additional treatment because of their complexity. Increased dyspnea, wheezing, purulent sputum, and/or increased mucus production are common reasons for consultation among patients presenting to emergency departments (EDs).[1-3]

EDs play a fundamental role in the management of AECOPD.[4] In 2022, the EPOC URG CyL Project (Castile and León) was created with the aim of updating knowledge of this disease and providing high-quality care for patients in SACYL (Castile and León Health Service) EDs. The project has 3 phases: Phase I has been completed, and Phases II and III are in progress.

In Phase I, a concerning degree of variability was identified among SACYL EDs,[5] depending on the hospital attended and taking into consideration the logical differences across centers related to level of care, geography, and available resources. Evidence on the management of AECOPD across SACYL EDs is limited, and the objective of this study was to assess whether there are differences in AECOPD according to level of care.

Material and methods

We conducted a secondary analysis using the Phase I database from the EPOC URG CyL Project, which is based on a cross-sectional, descriptive variability study[5] comparing the 14 SACYL EDs according to level of care and teaching status (Table 1) during 2021. We conducted a uni- and bivariate analysis for all continuous variables (contingency tables were constructed, and mean, median, and range were calculated if the distribution was non-normal). The Fisher/Kruskal–Wallis test was used to assess the association between continuous variables and the classification variable, considering $P < .05$ as statistically significant. Then, we evaluated whether significant differences existed among the 14 SACYL EDs participating in the EPOC URG CyL Project.

This study was approved by *Hospital Clínico Universitario de Valladolid* Clinical Research Ethics Committee (PI 22-2656), as well as by the ethics committees of the other participant centers.

The EPOC URG CyL Project was designed after institutional team sessions and meetings with SACYL ED chiefs in January and February 2022. It was divided into 3 phases that define the "before, during, and after" of AECOPD care. Initially, the degree of implementation of management protocols and access to logistical and therapeutic resources for AECOPD in SACYL EDs was analyzed (Phase I), and variability across EDs was described.[5] In Phase II, an autonomous-region consensus manual was developed (pending publication), and in Phase III, a prospective multipurpose study is currently being conducted; at present, data analysis is underway after completion of case recruitment. The aim of this last phase is to characterize the clinical profile of patients with AECOPD presenting to SACYL EDs and develop a risk-prediction model for short-term adverse events, which will allow better management of health care resources and more specific care and referral protocols, to the benefit of patients.

An expert committee was formed, representative of the SACYL EDs and, at institutional level, through the *Instituto de Ciencias de la Salud de Castilla y León* (Castile and León, Spain) (ICSCYL). Selection of principal investigators and collaborators was delegated to the ED heads. The team consists of 126 health care professionals (82 physicians and 44 nurses) representing the 14 SACYL EDs. For Phase I, a cross-sectional, descriptive study was conducted using a multicenter digital survey of 27 questions,[5] sent in April 2022 via corporate e-mail to the 14 principal investigators (one for each SACYL ED), who represented the entire project research team. Data collected were stored on the ICSCYL electronic platform and subsequently analyzed using IBM SPSS version 27 (Harmon, CA, USA).

Results

With respect to the number of emergency visits attended during 2021 and the number of hospital admissions from the ED due to AECOPD in that year, there were statistically significant differences according to level of care and university affiliation ($P = .01$ and $P = .03$, respectively). However, there were no differences regarding the care provided to patients

Table 1. SACYL hospitals by care level and university status

Level 1	Level 2	Level 3
Hospital de Medina del Campo	*Complejo Asistencial de Ávila*	*Complejo Asistencial Universitario de Burgos*
Hospital Santos Reyes de Aranda de Duero	*Complejo Asistencial Universitario de Palencia*	*Complejo Asistencial Universitario de León*
Hospital Santiago Apóstol de Miranda de Ebro	*Complejo Asistencia de Segovia*	*Complejo Asistencial Universitario de Salamanca*
	Complejo Asistencial Universitario de Soria	*Hospital Clínico Universitario de Valladolid*
	Complejo Asistencial de Zamora	*Hospital Universitario Río Hortega de Valladolid*
	Hospital El Bierzo de Ponferrada	

University	Non-university
Complejo Asistencial Univesitario de Palencia	*Hospital de Medina del Campo (Valladolid)*
Complejo Asistencial Universitario de Soria	*Hospital Santos Reyes de Aranda de Duero (Burgos)*
Complejo Asistencial Universitario de Burgos	*Hospital Santiago Apóstol de Miranda de Ebro (Burgos)*
Complejo Asistencial Universitario de León	*Hospital El Bierzo de Ponferrada (León)*
Complejo Asistencial Universitario de Salamanca	*Complejo Asistencial de Segovia*
Hospital Clínico Universitario de Valladolid	*Complejo Asistencial de Zamora*
Hospital Universitario Río Hortega de Valladolid	*Complejo Asistencial de Ávila*

Table 2. Bivariate analysis of continuous variables with classification variables according to university status

SUH SACYL (14)	Mean		Interquartile Range		*P*-value
	Non-university	University	Non-university	University	
Number of emergencies attended in 2021	36,204.3	84,650.6	16,400.5	52,904.5	.01
Number of emergencies attended in 2021 with COPD exacerbation	256.2	2,203.8	235	1,569.8	.43
Number of hospital ward admissions for COPD exacerbation from ED in 2021	148.2	398.3	120.2	260	.03
If applicable, include mean length of stay in days	6.8	6.2	1.2	1.0	.80
Patients admitted from ED when destination was Pulmonology	98.7	157.6	26.5	97	.27
Number of patients admitted to observation for COPD exacerbation in 2021	55	206	82.5	240	.13
From previous question, indicate how many were admitted to the ward	74	140.8	96	251	.55
Indicate how many were discharged from ED observation	45	65.2	67.5	11	.55
If yes, indicate year of implementation of COPD ED protocol	2016	2015	1.8	3.8	.88
If yes, indicate number of physicians in your unit assigned to this task	2.0	0.4	3.5	0.5	.32
Patients admitted from ED when destination was Internal Medicine	78.5	157.7	55	163.5	.29
Patients admitted from ED when destination was the ICU	1	4	2.0	3.5	.19
Patients admitted from ED when destination was Cardiology	1.5	10.9	2.0	2.5	.79

COPD: chronic obstructive pulmonary disease; ED: emergency department; ICU: intensive care unit.

with AECOPD across the 14 SACYL EDs ($P = .43$), the mean length of stay (in days) for AECOPD ($P = .80$), admissions to observation units ($P = .13$), number of patients discharged from observation ($P = .55$) or admitted to inpatient wards from observation ($P = .55$), or the specialties to which patients were admitted (Pulmonology, $P = .27$; Internal Medicine, $P = .29$; ICU, $P = .19$; Cardiology, $P = .79$). There were no differences in the implementation of AECOPD protocols ($P = .88$) or the creation of AECOPD reference units within EDs and the staffing of such units ($P = .32$) (Table 2).

Discussion

Of note, the asynchrony between the variability findings reported in Phase I of the project[5] and the results of the present study. We were unable to demonstrate the expected differences between levels of care, likely due to inherent limitations of retrospective observational studies and surveys. Nonetheless, the study provides a reliable overview of AECOPD management across SACYL EDs. It is also possible that other relevant variables were not considered. Although the sample size was large—with 100% of SACYL EDs participating—the statistical power was limited (given an alpha significance level of 5%, most bivariate analyses did not reach statistical significance), and no comparable studies with similar samples were identified. A multicenter study conducted among Andalusian hospitals evaluating quality outcomes for hospitalizations due to severe COPD exacerbations compared a tertiary referral center with 2 community hospitals.[6] The authors concluded that quality of care, measured through outcome indicators, did not differ from that reported in the literature—and that quality might even be better given the lower mortality observed in the tertiary referral center.

Moreover, the EPISCAN II trial[7] examined the demographic changes and risk factor exposure determining COPD prevalence in Spain. Only 1 SACYL hospital participated and the trial focused on demonstrating that COPD remains underdiagnosed and undertreated according to GesEPOC[8] and GOLD[9] guidelines, rather than assessing differences across centers based on level of care.

Another study examined coordination across different health care levels from the perspective of administrators and professionals in integrated health systems.[10] Coordination was described as complicated, complex, yet necessary for improving efficiency, communication, knowledge, and interprofessional relationships. Coordination depends on structural and organizational factors, both internal and external to institutions, which shape its development. Proposed improvement strategies directly relate to these influencing factors.

Conclusions

In conclusion, this study did not identify significant differences in AECOPD management across SACYL EDs according to level of care. To date, there is insufficient evidence to recommend different levels of care despite existing variability linked to hospital characteristics, level of care, geography, and availability of resources. The inability to detect the expected differences across care levels highlights the need for more targeted and specific organizational strategies—not only within SACYL hospitals, but also externally and among their service providers—to facilitate improvements in clinical care, training, research, and resource management. Ultimately, the main beneficiary of such improvements would be the patient.

ARTICLE INFORMATION

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ADDENDUM

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