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Description of Hospital Admissions for Acute Exacerbation of COPD

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Abstract

Background: Chronic obstructive pulmonary disease (COPD) affects 9.1% of the population aged 40-69 in Spain, with wide geographic variation. Acute exacerbations of COPD (AECOPD) are a frequent cause of hospital admission, significantly increasing healthcare costs and affecting the quality of life of patients. Patient characteristics and treatment procedures differ across geographic areas, even across hospitals in the same country.

Objective: To analyze epidemiological and clinical factors associated with hospital admissions for AECOPD in our health area.

Methods: Retrospective study reviewing the medical records of all patients admitted for AECOPD in the Hospital Complex of Santiago de Compostela, between 2007 and 2008.

Data are expressed as mean (±standard deviation) or median (interquartile range) values for continuous variables and as frequencies or percentages for categorical variables. Chi-square was used to compare proportions, and Student's t-test for mean values (Mann-Whitney's U-test for variables on non-normal distributions).Data analysis was performed with SPSS 15.

Results: We registered 1403 admissions for AECOPD of 757 patients, predominantly male (77% of cases), elderly (60% aged above 75), with moderate to severe forms of the disease, as 56.4% of patients were either in GOLD stage II or III. Smoking history was included in the records of 475 patients (63%), 30% of patients which were active smokers. Charlson index was above 2 in 64% of cases. The most common symptom was dyspnea. Hospital admissions were more common in the winter season. The average stay in the period under study was 12.3 days. 3.6% required admission to the ICU. 6% of patients were readmitted early and 4.8% died during hospitalization. As for baseline therapy, it notably included anticholinergics for 62% and inhaled corticosteroids (ICS) for 60% of patients. 26% followed home oxygen therapy. Smoking cessation care provision took place in 7.9% of cases.

Conclusions: AECOPD patients in our health area are mainly elderly males. Their overall health is not good, with significant comorbidity. The average stay is long. 4.8% die during hospitalization. 5.8% are readmitted within 15 days. 26% follow home oxygen therapy, but this indication is questionable in one in four cases. Smoking cessation care provision during hospitalization should be significantly improved.

Keywords: COPD; Exacerbation; Hospital admissions

Introduction

A chronic disease with high prevalence and healthcare resource consumption, COPD affects 9.1% of the population aged 40-69 in Spain, predominantly males, with wide geographic variation [1]. Acute exacerbations of COPD (AECOPD) are a frequent cause of hospital admission, significantly increasing healthcare costs and affecting the quality of life of patients [2-4]. Patient characteristics and treatment procedures differ across geographic areas, even across hospitals in the same country [5]. Our objective was to analyze epidemiological and clinical factors associated with hospital admissions for AECOPD in our health area.

Methods

We conducted a retrospective study reviewing the medical records of all patients admitted for AECOPD between 2007 and 2008. The data were provided by the Admissions and Clinical Documentation Department in the Hospital Complex of Santiago de Compostela, Spain. The study included patients admitted to the Internal Medicine, Pneumology and/or Intensive Care (ICU) Units. Baseline disease severity was defined following the criteria in the GOLD guide [6]. Baseline dyspnea was rated from the Medical Research Council (MRC)

scale, in five levels, ranging from 0 (no dyspnea) to 4 (dyspnea at rest) [7]. Comorbidity was assessed with the Charlson Index [8]. Early readmission was defined as that occurring within 15 days of discharge for the same reason [9]. Severity of acute exacerbation was defined as Type 1 for patients who met all three Anthonisen's criteria, as Type 2 for those with two out of three symptoms, and Type 3 for those with only one [10].

Vital signs were obtained from the first examination in the Emergency Department (ED). Blood chemistry and complete blood count data were taken from the first analysis performed at the time of hospital admission. Arterial blood gas (ABG) values were obtained from the first ABG analysis available following the arrival to the ED. Oxygen saturation measured by pulse oximetry was included for those patients without ABG analysis. The data obtained are expressed as mean (± standard deviation) or median (interquartile range) values for continuous variables and as frequencies or percentages for categorical variables. Chi-square was used to compare proportions, and Student's t-test for mean values (Mann-Whitney's U-test for variables on non-normal distributions). Data analysis was performed with SPSS 15.

Results

In the period under study, we registered 1403 admissions for AECOPD of 757 patients, predominantly male (77% of cases), elderly (60% aged above 75), with moderate to severe forms of the disease, as 56.4% of patients were either in GOLD stage II or III. Notably, smoking history was included in the records of 475 patients (63%) only, 30% of which were active smokers. Spirometry was included in the records of 202 patients (26.68%). Comorbidity was common, as the Charlson index was above 2 in 64% of cases. 30% of patients had been admitted the previous year due to AECOPD (Table 1).

The most common reason for consultation was dyspnea (84.8%), which was also the most common symptom (reported by 94.1% of patients), followed by coughing (74.5%). 70% of patients were admitted to the Pneumology Service. 3.6% required admission to the ICU. Hospital admissions were more common in the winter season, as 40% of them occurred between January and March. The average stay in the period under study was 12.3 days. 6% of patients were readmitted early and 4.8% died during hospitalization (Table 2). As for baseline therapy, it notably included anticholinergics for 62% and inhaled corticosteroids (ICS) for 60% of patients (Table 3). 26% followed home oxygen therapy, but this indication was questionable in one in four cases, as gas analysis following stabilization could not be verified in 22.5% of patients, and 0.5% of patients had no respiratory failure. Smoking cessation care provision took place in 7.9% of cases.

Discussion

Hospital admissions for AECOPD in our health area occur mainly in elderly males. The higher male rate is referred to in other studies including Spanish populations [11,12], but it is much higher than the rate reported in other countries, ranging 52-70%, probably or at least partly related to the late access of women to tobacco in our population [5,13-15]. Old age is a common feature in the various studies of patients admitted for AECOPD, as most studies report a mean age above 70 [16-20]. In those cases where data on tobacco use were recorded, we found that 86% of patients were active smokers or former smokers, as befits a disease closely associated with smoking [6], and as reported in other studies [12,16].

The majority of patients were admitted to the Pneumology Service, with a relative participation higher than that by the same specialists in other European countries, where assistance to AECOPD patients is less dependent on this specialty [13,15]. Seasonality in admissions for AECOPD—more frequent in winter, as for viral respiratory infections—confirms the trend observed in other studies [19,21,22]. The hospital stay of our patients seems long compared to that observed in other populations [18,19,21,23,24]. Hospital mortality was 4.8%, lower than that in most published studies [19,21,24-26]. The possible factors related to hospital stay and mortality have not been addressed in this study. Being complex issues, they will require a specific study [24,27-30].

The indication of bronchodilators and ICS at discharge shows a significant increase in the use of maintenance therapy for our patients. One quarter of the patients discharged were prescribed home oxygen therapy, although not always in accordance with blood gas criteria. Recent studies in other European countries show that the prescription of home oxygen therapy is inadequate for 10-15% of patients [31,32]. Notably, attention to smoking cessation care—even in COPD patients—is poor, as data on tobacco use were recorded only for 63% of patients, and anti-smoking advice at discharge was given to less than 8% of patients. As these figures are clearly better in other populations, this suggests the urgency to alert healthcare professionals on the need to increase proactivity against tobacco use [33-35].

Conclusions

AECOPD patients in our health area are mainly elderly males. Their overall health is not good, with significant comorbidity. 70% are admitted to the Pneumology Service. The average stay is long. 4.8% die during hospitalization. 5.8% are readmitted within 15 days. 26% follow home oxygen therapy, but this indication is questionable in one in four cases. Smoking cessation care provision during hospitalization should be significantly improved.

Age (years)	
Mean (SD)	74.8 (11.26)
Median (IR)	77 (69.83)
< 65	117 (15.5%)
65-74	200 (26.4%)
75-84	301 (39.8%)
≥ 85	139 (18.4%)
Males	585 (77.3%)
Tobacco use (n=475)	
Never smoker	67 (14.1%)
Smoker	144 (30.3%)
Former smoker	255 (53.7%)
Passive smoker	9 (1.9%)
Charlson	
0	4 (0.5%)
1, 2	270 (35.7%)

>2	483 (63.8%)
GOLD (n= 202)	
I	28 (13.9%)
II	58 (28.7%)
III	57 (28.2%)
IV	59 (7.8%)
FEV1% (SD) (n=202)	51.16 (26.68%)
Admissions previous year	
None	539 (71.2%)
1	156 (19.3%)
2 or more	72 (9.5%)
Emergencies previous year	
None	460 (60.8%)
1	161 (21.3%)
2 or more	136 (18%)

Table 1: Socio-demographic and clinical characteristics (N =757)

	Total (n=757)	< 85 years (n=618)	≥ 85 years (n=139)	P
Department of admission				
PNE	527 (70%)	445 (72.2%)	82 (59.9%)	0.003
IM	218 (29%)	163 (26.5%)	55 (40.1%)	
Mean stay (SD)	12.3 (9.12)	12.4 (9.5)	11.6 (7.1)	NS
ICU	27 (3.6%)	26 (4.2%)	1 (0.7%)	0.045
Season				NS
Spring	199 (26.3%)	158 (25.6%)	41 (29.5%)	
Summer	116 (15.3%)	94 (15.2%)	22 (23%)	
Fall	141 (18.6%)	109 (17.6%)	32 (23%)	
Winter	301 (39.8%)	257 (41.6%)	44 (31.7%)	
Reason for consultation				0.015
Dyspnea	642 (84.8%)	530 (85.9%)	112 (80.6%)	
Temperature	31 (4.1%)	28 (4.5%)	3 (2.2%)	
Coughing	13 (1.7%)	12 (1.9%)	1 (0.7%)	
Symptoms				
Dyspnea	712 (94,1%)	585 (94,7%)	127 (91,4%)	NS
Coughing	564 (74,5%)	460 (74,4%)	104 (74,8%)	NS
Increased sputum amount	452 (59,7%)	368 (59,5%)	84 (60,4%)	NS
Sputum purulence	261 (34,5%)	215 (34,8%)	46 (33,1%)	NS
Temperature	231 (30,5%)	194 (31,4%)	37 (26,6%)	NS
Hemoptysis	36 (4,8%)	29 (4,7%)	7 (5%)	NS
Exacerbation (Anthonisen)				NS
Type 1	245 (32.4%)	200 (32.4%)	45 (32.4%)	
Type 2	206 (27.2%)	169 (27.3%)	37 (26.6%)	
Type 3	278 (36.7%)	230 (37.2%)	48 (34.5%)	
Vital signs (SD)				

T (C)	36.9 (0.94)	36.9 (0.96)	36.8 (0.85)	NS
Respiratory rate	23 (6.4)	23 (6.5)	20 (5)	0.018
SBP (mmHg)	131 (24.1)	131 (24)	132 (24.3)	NS
DBP (mmHg)	74 (13.5)	74.7 (13.4)	70.7 (13.2)	0.001
Laboratory data (SD)				
Hemoglobin (g/dl)	13.5 (2.2)	13.6 (2.2)	13.1 (1.9)	0.015
Hematocrit (%)	40 (6.7)	40.2 (6.8)	39.2 (5.8)	NS
Leukocytes (106/L)	12 160 (9424.3)	11 993 (9273)	12 880 (10068)	NS
Platelets (106/L)	249 514 (104 336)	249 243 (107 745)	250 717 (87 944)	NS
Fibrinogen (mg/dl)	454 (152.7)	450 (159)	468 (127)	NS
Glycemia (mg/dl)	143 (67.7)	142 (68)	143 (62)	NS
Urea (mg/dl)	68.4 (38)	56.5 (31.2)	77.2 (44.5)	< 0.0001
Creatinine (mg/dl)	1.15 (0.7)	1.14 (0.7)	1.4 (0.7)	0.001
PaO_2 (mmHg)	58 (19.1)	59 (20.2)	55 (13)	0.049
$PaCO_2$ (mmHg)	47.7 (15.3)	46.9 (15.8)	45.6 (12.7)	NS
Early readmission	44 (5.8%)	34 (5.6%)	10 (7.4%)	NS
Hospital mortality	36 (4.8%)	25 (4%)	11 (7.9%)	0.053

Table 2: Characteristics of the acute exacerbation

	Before admission	Indication at discharge
Anticholinergics	422(61.9%)	559 (79.1%)
SABA	230(33.8%)	208 (29.5%)
LABA	393(57.8%)	521 (73.7%)
Inhaled corticosteroids	410(60.3%)	543 (76.8%)
Theophylline	36(5.3%)	22 (3.1%)
Oral corticosteroids	34(5%)	358 (50.4%)
Home oxygen therapy		196 (26%)
Anti-smoking advice		60 (7.9%)

Table 3: Baseline treatment and treatment at discharge

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