Incidence of Asthma and COPD in Primary Care

Incidencia de Asma y EPOC en atención primaria

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Abstract

Introduction: COPD and Asthma have many similarities; they can be difficult to differentiate and may coexist in some patients.
Objective: To determine the incidence of asthma and COPD exacerbations in primary care.
Methods: A multicenter prospective cohort study was conducted with an initial enrollment and a 12-month follow-up period. The study was conducted in seven primary care practices.
Results: The best predictor of one or two or more exacerbations during the 1-year follow-up was an exacerbation in the year prior to baseline, OR 9.2 and OR 8.9, respectively.
Conclusions: Early identification and treatment when an exacerbation occurs can reduce the detrimental effect on patients' health.

Keywords: asthma, COPD, primary care, exacerbations source: DeCS

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Resumen

Introducción: la EPOC y el Asma tienen muchas similitudes; pueden ser difíciles de diferenciar y pueden coexistir en algunos pacientes.
Objetivo: Determinar la incidencia de exacerbaciones de asma y EPOC en atención primaria
Método: Se realizó un estudio de cohorte prospectiva multicéntrico con un registro inicial y un período de seguimiento de 12 meses. El estudio se llevó a cabo en siete prácticas de atención primaria
Resultados: El mejor predictor de una o dos o más exacerbaciones durante el seguimiento de 1 año fue una exacerbación el año anterior al inicio, OR 9.2 y OR 8.9, respectivamente
Conclusiones:La identificación y el tratamiento tempranos cuando se produce una exacerbación pueden reducir el efecto perjudicial sobre la salud de los pacientes.
Palabras clave: asma, EPOC, atención primaria, exacerbacionesfuente:DeCS

Introduction

Chronic obstructive pulmonary disease (COPD) causes a permanent decline in lung function, resulting in a high degree of disability and mortality[1]. Asthma is a reversible chronic inflammatory disorder of the airways in which chronic inflammation is associated with airway hyperresponsiveness leading to recurrent episodes of wheezing, dyspnea, chest tightness and cough. These episodes are usually associated with generalized but variable airway obstruction within the lung that is often reversible spontaneously or after treatment. These two obstructive lung diseases have many similarities; they can be difficult to differentiate and may coexist in some patients. COPD is among the five leading causes of death worldwide. The incidence of COPD increases with age and the number of people aged 65 years and older is expected to double by 2025 in developed and underdeveloped countries[2].

Increased symptoms, known as exacerbations, mark the course of COPD. COPD exacerbations are associated with significant health and economic burden, marking the need for early detection and treatment. Early identification and timely treatment of exacerbations are essential to reduce the costs and consequences of such exacerbations by reducing recovery time, improving health-related quality of life, and reducing the risk of hospital admission. In addition, COPD exacerbations increase the risk of cardiovascular events responsible for much of the morbidity and mortality associated with the disease[3].

When it comes to the prediction of future exacerbations, not many studies have been performed. However, the predictive value of previous COPD exacerbations has recently been highlighted and Donaldson et al.[4] found, after a follow-up of COPD patients for four years, that the number of exacerbations experienced by a patient during the first year correlated highly and positively with the number of exacerbations suffered during the following year.

Patients with asthma, whether adults or children, can also suffer acute exacerbations ranging in severity from mild to life-threatening events[5]. Recent work shows interest in identifying subtypes of asthma more prone to exacerbations and their associated predictive factors. For example, although the frequency of exacerbations may increase in patients with severe asthma, patients with mild asthma may also experience severe asthma exacerbations. In addition, studies have shown that patients with a history of asthma exacerbations have an increased risk of future episodes of severe asthma exacerbations[6].

Further studies, especially in the primary care setting, are needed to validate the results of previous studies. Therefore, this study aimed to identify the frequency of exacerbations among patients diagnosed with asthma and COPD in primary care and to evaluate possible predictors of such exacerbations.

Methods

A multicenter prospective cohort study was conducted with initial enrollment and a 12-month follow-up period. The study was conducted in seven primary care practices in Ambato; of the 43 241 patients registered in these seven practices, 18 931 (43.8%) were 40 years of age or older. Of these, 1 784 patients with a diagnosis of asthma and COPD registered 5 years before the start of the study were identified. Of these, a random sample of 1111 patients, following alphabetical order, was invited by mail, and 380 patients participated in the baseline registry. Each clinic was asked to send invitations to at least 150 patients each to ensure the reception of 50 patients from each clinic, but the response rate varied among these clinics. The participants were described previously in more detail. Participation involved a baseline examination during the stable phase of the disease, including spirometry, performed between April 2020 and March 2021, and examinations during exacerbations the following 12 months. This study was approved by the Universidad Regional Autónoma de Los Andes (UNIANDES).

Patients were asked to report symptoms and limitations in daily activities in the previous seven days on the COPD Clinical Questionnaire (CCE)[7]. Spirometry was performed according to American Thoracic Society/European Respiratory Society guidelines[8], using a spirometer both before and 20 minutes after inhalation of a short-acting bronchodilator (0.4 mg salbutamol). A 12% increase in forced expiratory volume in the first second of expiration (FEV 1), with a minimum increase of 200 ml, was used as a reversibility test. Patients

with post-bronchodilator FEV 1/forced vital capacity (FVC) < 0.7 were classified as having COPD.

An exacerbation of COPD is defined as an increase in dyspnea, cough, or amount of sputum that has an acute onset for at least one day, requiring an adjustment of the medication dose. Asthma exacerbations are episodes of a progressive increase in shortness of breath, cough, wheezing, chest tightness, or a combination of these symptoms. Patients were asked to consult their primary care physician within 2 to 3 days when experiencing such an increase in symptoms.

In addition to recording consultations during the 1-year follow-up, a questionnaire was sent to all participating patients at 12 months, asking about exacerbations that had occurred during the previous year (after baseline recording). Patients were asked how often they had visited the physician, had been hospitalized for an exacerbation or had been treated with antibiotics or oral corticosteroids.

Treatment of asthma or COPD exacerbations with antibiotics and systemic corticosteroids (recorded by the primary care physician) or hospitalization due to exacerbations of these diseases in the year prior to baseline recording (recorded by the patients) was used as evidence of the occurrence of exacerbations in the previous year (event-based exacerbation).

SCC variables were dichotomized and receiver operating characteristic curves with future exacerbations were used to find optimal cut-off points. Potential predictors of exacerbations during the follow-up year were assessed by univariate logistic regression. The database and statistical processing of the data were performed and analyzed in SPSS 26 statistical software (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used for the results collection, presentation and interpretation.

Results

Of the 380 who accepted the invitation and participated in the baseline examination, two patients were excluded from the analysis because of an ongoing exacerbation that prompted the prescription of antibiotics; two patients were excluded because they did not perform post-bronchodilator spirometry, and 36 patients were excluded from the analysis because they did not attend the primary care physician's office during exacerbations or return the exacerbation questionnaire in the year of follow-up. Patients were most often female (62.9%) and 42.1% were ≥65 years old. Almost half of the participants were former smokers (46.8%) and the remainder had never smoked (25.6%) or were current smokers (27.6%). Asthma was the most frequently recorded diagnosis by primary care physicians. COPD (post-bronchodilator FEV1/CVF < 0.7) was found in 132 (38.8%) patients. Among those with FEV1/CVF ≥ 0.7, 160 patients were registered with asthma alone, 13 patients had been diagnosed with COPD alone, and 35 with both asthma and COPD. During the initial registration, 88 patients (25.9%) reported an exacerbation in the year prior to baseline (prior exacerbation).

The SCC results at baseline are shown in Table 1. Shortness of breath during physical activities was the most frequently reported; 89.4% scored more than zero, with a mean score of 2.83. Limitation in strenuous activities was scored more than zero by 82.6% of patients, with a mean score of 2.36 (Table 1).

Table 1. Symptoms and limitations in daily activities the seven days prior to baseline in 340 patients with a diagnosis of asthma or COPD using the SCC.

	Number of patients with a score above 0 (%)	Average score
SCC score		
Difficultybreathing at rest	210 (61,9)	1.20
Shortness of breath during physical activity	304 (89,4)	2.83
Concern about the common cold	207 (60,9)	1.37
Depressedbybreathing	162 (47,6)	1.00
Cough	287 (84,4)	2.35

Phlegm	259 (76,2)	2.09
Limitationofstrenuousactivities	281 (82,6)	2.36
Limitation in moderateactivities	244 (71,8)	1.74
Limitation in dailyactivities	132 (38,9)	0,66
Limitation in social activities	150 (44,3)	0.85
Total score	313 (92,0)	1.63

Source: statisticalanalysis, $p \leq 0.05$

During the follow-up period, there were 159 patients (46.8%) with one or more exacerbations and 101 (29.1%) with two or more exacerbations. Prolonged exhalation was a significant predictor of having one or more exacerbations, while all chest finding variables except decreased breath sounds were significant predictors of having two or more exacerbations. CRP ≥ 8 mg/l was a significant predictor of two or more exacerbations. Exacerbation in the previous year was the strongest predictor of one or more and two or more exacerbations, with an OR of 7.78 and 7.46, respectively.

In multivariable logistic regression, the best predictor of one or two exacerbations during the 1-year follow-up was an exacerbation prior to baseline, with an odds ratio (OR) of 9.2 and OR of 8.9, respectively. Age ≥ 65 years was also associated with both outcomes, with an OR 1.8 [95 % confidence interval (CI) 1.1-2.9] for one or more exacerbations and an OR 2.7 (95 % CI 1.5-4.9) for two or more exacerbations. CRP ≥ 8 mg/l alone significantly predicted two or more exacerbations with OR 2.2 (95 % CI 1.1-4.8). Among the SCC items, “preoccupation with the common cold” and “phlegm production” were significant predictors of two or more exacerbations alone, with OR 1.2 and 1.3, respectively.

Among 132 patients with COPD (FEV 1 /CVF < 0.7), 64 (48.5%) experienced one or more exacerbations during the 1-year follow-up. Among the 208 with FEV 1 /CVF ≥ 0.7, this was experienced by 95 (45.7 %). When assessing predictors of exacerbations in these two subgroups, age was only a significant predictor in those without COPD (P = 0.04). All CCE variables were stronger predictors in the COPD group than those with FEV 1 /CVF ≥ 0.7, but preoccupation with the common cold and limitation in social activities were also significant predictors in those without COPD (P = 0.007 and P = 0.008, respectively).

Discussion

This study showed that the main determinant of future exacerbations, independent of lung function, was an exacerbation in the previous year severe enough to be hospitalized or treated with antibiotics or systemic corticosteroids. Respiratory symptoms and limitations in daily activities were also strong predictors of future exacerbations, supporting the new Global Initiatives for Chronic Obstructive Lung Disease (GOLD) guidelines with greater emphasis on symptoms and frequent exacerbations and less emphasis on lung function in grading COPD severity.

The main strength of this study is that it is a purely primary care study and is relevant to patients with asthma and COPD and patients who may be difficult to classify. However, the number of patients included in the study is not very high; only one-third of those invited participated. One possible explanation for the low participation rate is that many of the invited patients had mild asthma or COPD or no disease at all, which made them less interested in participating in this study. Another explanation is that patients with difficult-to-treat asthma or severe COPD had difficulty participating, followed for 12 months, and had a sufficient follow-up in secondary care. Although this may influence the representativeness of the study sample, patient characteristics in terms of sex and age were similar to those eligible to participate, as was the frequency of patients diagnosed only with asthma[9]. The cohort is representative of primary care, as most cases of severe patients with comorbidities are followed up in secondary care. The majority of patients in the COPD subgroup had moderate COPD, according to GOLD spirometry-based staging, as has also

been found in previous primary care studies[10,11].

It may seem a limitation that most patients in the COPD subgroup were diagnosed with both asthma and COPD, and even some with asthma alone. Some of these patients certainly had both diagnoses[12]. However, some patients may have been mislabeled with a diagnosis of asthma. There has been a shift in the labeling of obstructive lung diseases over the past 20 years with increasing use of the COPD diagnosis and decreasing use of the asthma diagnosis[13] and patients with little contact with health care are likely to have mistakenly stuck with their old diagnosis.

The CCE has been developed and validated for use among patients with COPD and not for patients with asthma. This questionnaire was used because of the uncertainty of the patient's diagnosis and because all questions were relevant for asthma patients. An additional asthma questionnairecould be used, such as the asthma control questionnaire[14,15], but the patients already had another questionnaire to complete. The SCC responses predicted future exacerbations more strongly in the COPD group than in those with 'possible asthma.' However, concern about contracting a common cold and limitations in social activities should also raise awareness in patients with FEV 1 /CVF ≥ 0.7.

The strong predictive value of previous exacerbations has also been found among patients with asthma by Miller et al.[16] and in cluster analyses by Ortega et al.[17], including adults and children with asthma.

Self-reported shortness of breath was a significant predictor of exacerbation one year of follow-up (two or more) in the univariate analysis, but this symptom did not reach statistical significance in the multivariate analysis in any of the studies. This parallels the finding of Wan et al.[18] that lung function assessed by FEV 1% of the theoretical value was not significantly associated with frequent exacerbations. However, they found that frequent exacerbations were significantly associated with low mid-expiratory flow rates (FEF 25%-75% of the theoretical value), which was not analyzed in our study. In addition, wan et al.[18] found physician-diagnosed asthma to be a significant predictor of exacerbations in severe COPD. This study found a similar, but not statistically significant, trend among COPD patients [19,20].

Conclusions

Preventing asthma and COPD exacerbations can be an ambitious goal; however, early identification and treatment when an exacerbation occurs can reduce the detrimental effect that severe exacerbations can exert on patients' health. In addition, easy access to care is crucial, and our study indicates that patients with frequent exacerbations and limitations in social activities need such care from healthcare providers.

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