

Clinical and epidemiological profile of patients hospitalized for asthma in public hospitals in Minas Gerais, Brazil

Perfil clínico e epidemiológico de pacientes internados por asma em hospital público de Minas Gerais, Brasil

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ABSTRACT

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Introduction: The hospitalization event is a marker for the severity of bronchial asthma, which is increasing in morbidity in recent decades. **Objective:** to describe clinical and epidemiological characteristics of adults admitted for asthma. **Methods:** in the period from April to November of 2008, all patients hospitalized for asthma in the adult pulmonology ward according to the diagnostic criteria from the Global Initiative for Asthma were evaluated with clinical and epidemiological data collection. The inclusion criteria were age over 14 years and indication of hospitalization due to asthma exacerbation. **Results:** 33 patients were included. The female gender predominated with 24 cases (72.7%); the average age was 52.2 years, and schooling was less than four years in 30 patients (90.9%). The average forced expiratory volume in the first second (VEF₁) performed in 30 patients was 1.43 L (55% of the predicted) and hospitalization in the intensive care unit occurred in three (9%) cases without deaths. The regular use of inhaled corticosteroid (CI) before hospitalization was identified in 13 patients (39.4%). The CI group showed lower VEF₁ ($p = 0.025$) and a higher number of previous hospitalizations in the intensive care unit ($p = 0.023$) compared to those who did not use CI. **Conclusion:** there was a predominance of female patients in hospitalizations for bronchial asthma, with high average age and low average schooling. The absence in the use of CI in most patients may indicate inadequate ambulatory control and unnecessary hospitalizations.

Key words: Asthma; Hospitalization; Hydroxycorticosteroids.

RESUMO

Introdução: a internação hospitalar é marcador de gravidade da asma brônquica, que vem aumentando sua morbidade nas últimas décadas. **Objetivo:** descrever características clínicas e epidemiológicas de adultos internados por asma. **Métodos:** no período de abril a novembro de 2008, todos os pacientes internados por asma, segundo critérios diagnósticos do Global Initiative for Asthma, em enfermaria de pneumologia de adultos foram avaliados com coleta de dados epidemiológicos e clínicos. Os critérios de inclusão foram idade acima de 14 anos e indicação de internação por exacerbção de asma. **Resultados:** foram incluídos 33 pacientes. O sexo feminino predominou com 24 casos (72,7%); a idade média foi de 52,2 anos; e a escolaridade menor que quatro anos, em 30 (90,9%). O volume expiratório forçado no primeiro segundo (VEF₁) médio, realizado em 30 pacientes, foi de 1,43 L (55% do previsto) e internação em unidade de terapia intensiva ocorreu em três (9%) casos, sem haver óbito. O uso de corticoide inalatório (CI) regular antes da internação foi anotado em 13 pacientes (39,4%). O grupo CI teve menor VEF₁ ($p=0,025$) e maior número de internações progressivas em unidade de terapia intensiva ($p=0,023$) em comparação com os que não usavam CI. **Conclusão:** houve predominância de internação hospitalar por asma brônquica de pacientes femininos, com idade média alta e baixa escolaridade. A ausência de uso de CI pela maioria dos pacientes pode indicar controle ambulatorial inadequado e internações desnecessárias.

Palavras-chave: Asma; Hospitalização; Hidroxicorticosteroides.

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INTRODUCTION

Bronchial asthma (BA) is a prevalent disease worldwide affecting 300 million people¹ and with a corresponding prevalence of 2 to 26% in Latin America.² Its causative factors are usually associated with poverty, difficulty of access to treatment and medications, ethnicity, female gender, and residences in suburbs of big cities.³ Approximately 10% of patients with BA does not respond well to conventional therapy, with huge economic expenditures, worsening of quality of life, 15 times more likely to seek emergency service, and 20 times more hospitalizations.⁴

The number of hospitalizations due to BA still is significant. In Brazil, despite that hospitalization rates for over 20 years of age have declined to 49% between 2000 and 2010, 160 thousand hospitalizations in all ages were recorded in 2011 by DATASUS, being the fourth cause of hospitalization.⁵ In 2010, the Global Initiative for Asthma (GINA) launched a campaign to decrease hospitalization due to BA in the world in 50%, targeting control of the largest possible number of patients.⁶

Several programs for BA and official measures in Brazil decreased significantly the hospitalization of these patients.⁷ From 2002, information and access to medications for BA were established⁸ through governmental measures and improved organization of care in Brazil. These initiatives focused on the important point of the use of inhaled corticosteroid (IC).

The use of IC associated or not with long-acting bronchodilators may reduce hospitalizations and mortality caused by BA.^{9,10} The use of IC was reported, however, in 36.2% of patients with BA admitted in Latin America and Spain.¹¹

The aim of this study was to evaluate the clinical and epidemiological data of patients hospitalized due to BA in a public hospital in Minas Gerais by identifying factors that could contribute to worsening the disease's clinic and hospitalization.

METHODS

In the period between April and November of 2008, all patients hospitalized for asthma, according to the diagnostic criteria of GINA,⁶ in the adult Pulmonology ward from the Santa Casa of Belo Horizonte, were evaluated in a prospective non-interventional study with epidemiological and clinical

data collection. The inclusion criteria were: age over 14 years and an indication of hospitalization due to asthma exacerbation. The exclusion criteria were: smoking for more than 10 years/pack, chronic obstructive pulmonary disease (COPD), acute pneumonia, lung parenchyma diffuse diseases, bronchiectasis disease, lung congestion, pulmonary embolism, and hospitalizations for other causes having BA as the intercurrent disease.

The epidemiological data were collected in a questionnaire after hospitalization including demographic data, previous treatments for asthma, and current medication. The regular use of IC and bronchodilators was defined as the use for five or more times a week, for at least six months. The IC doses were suitable for the equivalent dose of beclomethasone.

The collected clinical data were physical examination, asthma control test questionnaire (ACT),¹² and asthma classification according to severity and control.⁶ The spirometry was performed after initial stabilization of the patient and use of bronchodilator with measures of forced vital capacity (FVC), expiratory volume in the first second (FEV₁), and FEV₁/FVC, following guidelines from the Brazilian Guidelines for Pulmonary Function.¹³ Dosing of serum IgE was performed and thorax radiographs conducted for differential diagnosis of other diseases.

The data was compiled into the Epiinfo 2000 program used for statistics. The values were expressed in median or mean \pm standard deviation for continuous variables. Differences between groups were evaluated using the Mann-Whitney/Wilcoxon test. The Chi-square test or the Fisher exact test was used for categorical variables. The values of $p < 0.05$ were considered significant.

The project was approved by the Ethics and Research Committee from the Santa Casa of Belo Horizonte and all participants voluntarily signed an informed consent.

RESULTS

In the period from April to November of 2008, 43 patients with probable diagnosis of BA were evaluated; six patients were excluded for smoking for more than 10 years/pack, one patient due to pneumonia, one due to diffuse bronchiectasis, one due to pulmonary parenchyma diffuse disease, and one due to light intercurrent BA in pre-operative evaluation. A total of 33 patients were included in this study (Table 1).

Table 1 - Characteristics of patients hospitalized for asthma between April and November of 2008 at Santa Casa of Belo Horizonte. Pre-admission variables and variables related to the evaluated admission

Variables	Sample	Values
Gender (M/F) %	n=33	(9/33) 33.3/72.7
Average age + sd in years	n= 33	52.2 + 16.2
Color (white/non-white) %	n=33	(23/10) 69.7/ 30.3
Schooling < 4 years n%	n=33	30 (90.9)
Previous hospitalization for asthma. avg + sd	n=33	2.36 + 1.2
Previous ICU patients n (%)	n=33	10 (30.3)
Consultations in emergency services in the last year avg + sd	n=33	8.4 + 11.8
Asthma control test avg + sd	n=33	11.5 + 5.2
Regular use of IC n (%)	n=33	13 (39.4)
Dose of IC used avg + sd*	n=13	961.5 + 320.2
Regular use of long-acting bronchodilators n (%)	n=33	10 (30.3)
VEF1 in ml avg + sd	n=30	1436+ 622
VEF1 in % of the predicted avg + sd	n=30	55.2 + 17.6
Hospital stay avg + sd	n=33	10.2 + 5.2

*Corrected dose equivalent to beclomethasone; sd: standard deviation.

This sample presented predominantly female patients, with an average age of 50 years, low schooling level, and the predominance of the white race. The patients reported history of previous hospitalizations and frequent stays in intensive care unit (ICU) due to BA and high average of visits to emergency services last year. The FEV₁ was measured in 30 patients because three of them failed to take the examination due to respiratory failure.

The ACT questionnaire showed low average values indicating poorly controlled BA. The hospital stay ranged from 4 to 28 days, with an average of 10.3 days. The use of mechanical ventilation was required in three patients (9.1%) and there were no deaths. In 31 patients (93.4%) the dosing of serum IgE was conducted and ranged from 56 to 2.980 IU/mL, with a median of 573 IU/mL.

Only three patients (9.1%) received medication for BA from the public health system; and eight (25%) were under an outpatient treatment with a BA expert before hospitalization.

IC was regularly used by 13 patients (39.3%) in the average dose of 961.5 mcg equivalent to beclomethasone,⁶ being nine associated with a beta-2-agonist of long duration (Table 2).

DISCUSSION

The hospitalizations due to BA corresponded to 4.6% of all hospitalizations in the pneumology ward.

The number of cases admitted for BA in the same period (March to November 2008) in Belo Horizonte, according to DataSus,¹⁴ was 3,597 cases, corresponding to 2% of all hospitalizations. A total of 299 patients admitted for BA were patients above the age of 14, far less common than in children. These corresponded to 8.3% of the total hospitalizations for BA in Belo Horizonte.

In the US, about 400,000 annual hospitalizations for BA occurred, which consumes a third of the budget for this disease.¹⁵ In Brazil, despite the reduction of hospitalizations by BA to 42% between 2000 and 2010, it still constitutes the fourth cause of hospitalization,⁵ with 160,000 cases per year. The TENOR study¹⁶ suggests that repeated hospitalizations for BA were due to moderate and severe poorly controlled forms of the disease, represented by 5% of hospitalization in adults and 10% of children.

The patients admitted for BA presented higher average age (52.2 years) in this study compared to that in another study in Spain and Latin America (42.3 years).¹¹ Hospitalizations predominated in the female gender, (72.7%), which may reflect the high prevalence of serious BA in this gender. In an European multi-center study⁴ comparing patients with mild and severe BA, the occurrence in females was more frequent in the severe than in the mild group in ratio of female/male gender of 4.4/1 and 1.1/1, respectively. The female predominance of 69.3% in patients admitted for BA is also reported in a study between 1994 and 2004.¹¹

Table 2 - Profile of adult patients hospitalized for asthma between April and November of 2008 at the Santa Casa of Belo Horizonte, compared in the ambulatory use of regular inhaled corticosteroid

Variables	Regular use of inhaled corticosteroid		p
	Yes, N=13 (39.4%)	No, N=20 (60.6%)	
Severe asthma	9 (69%)	8 (40%)	0.19
EU consultations in the last 12 months (median)	9	3	0.015
ACT (median)	8.9	13.2	0.01
Female gender	8 (61.5%)	16 (80%)	0.42
Age (median-years)	55.5	50.1	0.35
Regular use of short-acting beta-2-agonist	2 (15.4%)	13 (65%)	0.01
Use of oral corticosteroid > 30 days in the last year	8 (61.6%)	5 (25%)	0.08
Previous ICU hospitalization	7 (53.8%)	3(15%)	0.023
Consultation with an asthma specialist	4 (33.3%)	4 (20%)	0.68
VEF ₁ (mL) avg (in analyzed patients)	1001 (11)	1500 (19)	0.048
VEF ₁ (% of predicted) avg (n of analyzed patients)	40.7% (11)	56.3% (19)	0.025
Average dosing of serum IgE UI/mL (in analyzed patients)	482.1 (13)	850.6 (18)	0.27

EU: Emergency unit; FEV1: expiratory volume in the first second; ACT: Asthma control test.

There was no death in this sample; however, BA mortality is linked to the hospital environment. Increased mortality by BA was detected in the decades of 1960 and 1970 in several countries.¹ Despite that the causes of this increase are multifactorial, the inappropriate clinical management of BA was the most important explanatory hypothesis for the increased mortality.¹⁷

Approximately 2,000 deaths per year whose root cause was BA has been observed in Brazil in patients older than five years of age, between 1980 and 1990; 70% of these deaths occurred in hospitals.¹⁷ In a study in Spain and Latin America, hospital mortality was 0.8%.¹¹

The patients in this study attended emergency services in impressive numbers in the last 12 months (8.4 visits) and, despite that this fact may be indicative of severity, 39.4% of patients used IC regularly and 30% used long-acting beta-agonist (LABA) and IC.

These data are similar to those of another study about hospitalizations by BA in adults in Spain and Latin America, where 36.2% of patients used IC.¹¹

The previous frequent hospitalizations (average of 2.36 + 1.2) may reflect the seriousness of the cases and inefficient care in outpatient clinics.¹¹ In a study conducted in Belo Horizonte, 18.6% of asthmatics received suitable approach according to GINA in a public ambulatory.³ In a study about BA hospitalizations in children and adolescents in Recife, 16% received specific ambulatory treatment for BA, 13% used prophylactic medication, and 67% were attended exclusively by emergency services.¹⁸

Despite that asthma controlling medications (IC and LABA) are distributed by the public health system, only

three patients (9%) received medication for BA due to serious BA public protocols, indicating difficulties in this population to access the public health service.

Treatment requiring mechanical ventilation was observed in three patients (9%). In some studies the need for intubation ranged from 5.3¹¹ to 13%¹⁶ in those hospitalized for BA.

The dosing of serum IgE in 31 patients showed high values in all results ranging from 56 to 2,980, with an average of 573 IU/mL. A European study⁴ showed patients with serious BA and serum IgE dosage lower than those with the mild form and less prick positive tests. Another research does not allow the correlation directly between severity of BA and serum levels of IgE.¹⁶ The absence of atopy was also associated with severe BA, history of professional asthma, allergy to acetylsalicylic acid, and reduced pulmonary function.⁴ The average hospitalization stay of these patients was 10.3 days, ranging from 4 to 28 days, being longer than in another study conducted in Spain and Latin America, which was of 7.3 days.¹¹

The use of IC (Table 2) was not regular in 60.6% of the patients. However, in clinical and epidemiological correlation, this group showed better lung function and better control of BA using relief medication more frequently. Nevertheless, 40% of them were classified as with the severe form. Studies of outpatients in Brazil^{2,18} show that a group of patients are treated only during a crisis and do not use controlling medication.

According to the World Health Organization (WHO), the severity of BA is defined as uncontrolled, with risk of

serious exacerbations or death and/or severe reactions to medication and/or chronic morbidity; one of the subgroups was defined as severe untreated BA.¹⁹ Health services and access to medication is recommended for this group. This shows, from the perspective of inpatients, the existence of a large group of patients whose hospitalization and morbidity can be preventable with appropriate ambulatory control. These patients deserve post-discharge guidance to control BA in the primary health system, requiring specialty clinics, with the recommendation for the use of controlling medication.⁵

The group that received IC (39.4%) was the most serious, with the lowest FEV₁, the highest number of urgent consultations over the past year, and worst BA control. These patients, even with the use of regular controlling medication, cannot control BA. There is a group defined as serious and difficult to treat BA, and another severe and resistant to treatment;¹⁹ these patients should be treated for comorbidities with the provision of intensive BA monitoring and indication, when relevant, of new therapies. This profile can be identified in about 10% of the patients with BA^{4,16} who need to be addressed after discharge in specialized BA clinics.

CONCLUSION

The use of IC was of low prevalence in patients admitted for asthma. Patients without proper treatment for asthma and those with asthma resistant to treatment are observed during hospitalization and must be identified and forwarded properly after hospital discharge. Asthma control programs must be organized following current guidelines^{5, 6, 19} with the aim of reducing hospitalizations and deaths.

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