Local adverse effects associated with the use of inhaled corticosteroids in patients with moderate or severe asthma*

Eventos adversos locais associados ao uso de corticosteroides inalatórios em pacientes com asma moderada ou grave*

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Abstract

Objective: To describe and characterize local adverse effects (in the oral cavity, pharynx, and larynx) associated with the use of inhaled corticosteroids (ICSs) in patients with moderate or severe asthma. **Methods:** This was a cross-sectional study involving a convenience sample of 200 asthma patients followed in the Department of Pharmaceutical Care of the Bahia State Asthma and Allergic Rhinitis Control Program Referral Center, located in the city of Salvador, Brazil. The patients were ≥ 18 years of age and had been using ICSs regularly for at least 6 months. Local adverse effects (irritation, pain, dry throat, throat clearing, hoarseness, reduced vocal intensity, loss of voice, sensation of thirst, cough during ICS use, altered sense of taste, and presence of oral candidiasis) were assessed using a 30-day recall questionnaire. **Results:** Of the 200 patients studied, 159 (79.5%) were women. The mean age was 50.7 ± 14.4 years. In this sample, 55 patients (27.5%) were using high doses of ICS, with a median treatment duration of 38 months. Regarding the symptoms, 163 patients (81.5%) reported at least one adverse effect, and 131 (65.5%) had a daily perception of at least one symptom. Vocal and pharyngeal symptoms were identified in 57 (28.5%) and 154 (77.0%) of the patients, respectively. The most commonly reported adverse effects were dry throat, throat clearing, sensation of thirst, and hoarseness. **Conclusions:** Self-reported adverse effects related to ICS use were common among the asthma patients evaluated here.

Keywords: Asthma; Glucocorticoids; Administration, inhalation; Pharmaceutical services.

Resumo

Objetivo: Descrever e caracterizar os eventos adversos locais na orofaringe e laringe associados ao uso de corticosteroide inalatório (CI) em pacientes com asma moderada ou grave. **Métodos:** Estudo de corte transversal, com amostra de conveniência composta por 200 pacientes acompanhados no Serviço de Assistência Farmacêutica da Central de Referência do Programa para Controle da Asma na Bahia, em Salvador (BA). Os pacientes tinham ≥ 18 anos e estavam em uso regular de CI por período ≥ 6 meses. Os eventos adversos locais (irritação, dor, garganta seca, pigarro, rouquidão, redução da potência da voz, perda de voz; sensação de sede, tosse durante inalação, alteração do paladar e presença de moniliase oral) foram avaliados por meio de um questionário com período recordatório de 30 dias. **Resultados:** Dos 200 pacientes estudados, 159 (79,5%) eram mulheres. A média de idade foi de 50,7 ± 14,4 anos. Nesta amostra, 55 pacientes (27,5%) utilizavam altas doses de CI, com mediana de duração de tratamento de 38 meses. Em relação aos sintomas, 163 pacientes (81,5%) reportaram ao menos um evento adverso, e 131 (65,5%) tinham a percepção diária de pelo menos um sintoma. Os sintomas de voz e de faringe foram identificados em 57 (28,5%) e 154 (77,0%) pacientes, respectivamente. Os eventos adversos mais frequentemente relatados foram garganta seca, pigarros, sensação de sede e rouquidão. **Conclusões:** Eventos adversos relacionados ao uso de CI foram queixas frequentemente referidas e percebidas por esta amostra de asmáticos.

Descritores: Asma; Glucocorticoides; Administração por inalação; Assistência farmacêutica.

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Introduction

Inhaled corticosteroids (ICSs) are currently the most effective therapeutic strategy for asthma control and are recommended by national and international guidelines for the management of the disease. Maintenance treatment with ICSs reduces asthma symptoms, the frequency and severity of exacerbations, and the number of hospitalizations, as well as improving the quality of life of patients.[1-3]

Despite their efficacy, ICSs can cause local and systemic adverse effects.[1-8] Their frequent use, for longer periods and in high doses, has been accompanied by concerns about their potential adverse effects in the oral cavity and pharynx, such as hoarseness, dysphonia, candidiasis, pharyngitis, and cough reflex.[3,5,7]

Approximately 5-10% of subjects treated with ICSs report adverse effects in the oral cavity and pharynx, which are considered to be an immediate cause of clinical discomfort, with poorer patient adherence to treatment and a consequent increase in asthma morbidity.[3-6,9]

Adverse effects resulting from the use of ICSs are underestimated by patients and physicians and often are not identified in daily clinical practice.[7,10-13] In addition, information about the frequency and intensity with which local adverse effects induced by ICSs strike patients is limited.[7] Patient reports about the adverse effects experienced are considered an important source of information on adverse effects in pharmacovigilance and in clinical practice.[14]

The *Programa para o Controle da Asma na Bahia* (ProAR, Bahia State Asthma Control Program) is a project involving care, education, and research and aiming at ensuring concomitant control of asthma and allergic rhinitis by means of a multidisciplinary approach including medical care, nursing care, psychological follow-up, and pharmaceutical care.

The objective of the present study was to describe and characterize local adverse effects (in the oral cavity, pharynx, and larynx) associated with the use of ICSs in patients with moderate or severe asthma and under treatment in the Department of Pharmaceutical Care of the ProAR Referral Center.

Methods

The protocol for the treatment of ProAR patients includes non-pharmacological measures, such as asthma self-management plans, psychological support, and an education program for patients and their families, all of which are associated with the Department of Pharmaceutical Care, which provides access to medications at no cost and on a regular basis, including ICSs alone (budesonide, 200 µg; and beclomethasone, 250 µg and 400 µg), a long-acting β_2 agonist combined with an ICS (formoterol + budesonide, 6/200 and 12/400 µg), and a short-acting β_2 agonist (fenoterol, 100 µg).

The patients are followed monthly at the Department of Pharmaceutical Care, in which the medications are dispensed and support is provided by means of strategic interventions designed to promote the effectiveness and safety of the pharmacological treatment, as well as adherence to it. These interventions include assessment of the level of asthma control, systematic guidance on the proper inhalation technique on a regular basis, intensive monitoring of adherence to treatment, use of a spacer, and oral hygiene after ICS use.

This cross-sectional descriptive study was conducted between June of 2009 and January of 2010 and involved a convenience sample of 200 patients followed at the ProAR Referral Center, located in the city of Salvador, Brazil.

We included male and female subjects (≥ 18 years of age) who had been diagnosed with moderate or severe persistent asthma,[1] were being regularly followed in the ProAR Department of Pharmaceutical Care, and had been using ICSs regularly for at least 6 months.

Patients who used oral, parenteral, ocular, or topic corticosteroids in the last three months prior to the beginning of the study were not selected. A daily dose of 800 µg of beclomethasone was considered equivalent to a daily dose of 800 µg of budesonide. Daily doses of 400-800 µg of budesonide were considered medium doses, whereas daily doses above 800 µg of budesonide were considered high doses.[1]

The devices evaluated were classified into two groups: metered dose inhalers (MDIs), with or without a spacer; and dry powder inhalers (DPIs), including Pulvinal®, Aerolizer®, and Turbohaler®.

All patients were evaluated by a pulmonologist and a pharmacist, both of whom had been previously trained, after medical visits, in a room in the Department of Pharmaceutical Care. The interview elicited information about the patient (gender and age) and the characteristics of the ICS (formulation, daily dose, type of inhaler, and duration of

use), as well as about the practice of oral hygiene after ICS use and about the use of nasal corticosteroids. The practice of oral hygiene was considered correct when the patients rinsed their mouths with water immediately after ICS use, gargled, and subsequently spat out the wash water.[1]

Adverse effects were assessed using a 30-day recall questionnaire. The following parameters were evaluated: throat conditions, such as irritation, pain, dryness, and throat clearing; hoarseness; reduced vocal intensity and loss of voice; sensation of thirst; cough during ICS use; altered sense of taste; and presence of oral candidiasis. The frequency of adverse effects was classified into one of the following categories: never; occasionally; on most days; or daily.

The present study was approved by the Research Ethics Committee of the Federal University of Bahia Climério de Oliveira Maternity Hospital. All patients gave written informed consent, and their personal data were kept confidential.

Data were analyzed with the Statistical Package for the Social Sciences, version 17.0 (SPSS Inc., Chicago, IL, USA). Simple descriptive frequency statistics was used to determine the prevalence of each adverse effect and its degree of intensity. The overall prevalence of adverse effects was estimated on the basis of the cases with at least one adverse effect and the total number of asthma patients evaluated. Means and standard deviations were calculated for quantitative variables with normal distribution. Categorical variables are expressed as proportions. The chi-square test was used to assess the statistical significance between categorical variables, and the Student's t-test was used to compare the means of quantitative data. The level of statistical significance was set at $p < 0.05$ for all tests.

Results

We evaluated 200 patients, of whom 159 (79.5%) were female and 41 (20.5%) were male. The mean age was 50.7 ± 14.4 years. In this sample, 55 patients (27.5%) were using high doses of ICS (budesonide > 800 µg/day). The mean daily dose of ICS was 945 ± 345 µg, and 171 patients (85.5%) were found to be using budesonide. The duration of treatment with ICSs was long, with the median being 38 months (range, 6-84 months).

Of the sample as a whole, 153 (76.5%) reported performing oral hygiene after ICS use. The general characteristics of the patients are shown in Table 1.

In general, 95% of the patients used ICSs + long-acting β_2 agonists (formoterol + budesonide, in 85.5%; formoterol + budesonide and beclomethasone, in 14.5%) and only 5% used an ICS alone (beclomethasone, in 3.0%; and budesonide, in 2.0%). We found that 149 patients (74.5%) used only one inhaler and 51 (25.5%) used two inhalers. Of the 200 patients, 162 (81.0%) used an Aerolizer® DPI, 45 (22.5%) used an MDI, 28 (14.0%) used a Turbohaler® DPI, and 17 (8.5%) used a Pulvinal® DPI. Approximately two thirds of the patients (65%) used a nasal corticosteroid (budesonide, in 91.5%, and beclomethasone, in 8.5%).

Patient perception of adverse effects in the pharynx/larynx was found to be high among the subjects with severe asthma, with at least one effect being observed in 81.5% of them, one to three effects being observed in 51.5%, and four to six effects being observed in 23.5%.

Table 1 - General characteristics of the 200 patients with moderate or severe asthma evaluated.[a]

Characteristic	Result
Gender	
Female	159 (79.5)
Male	41 (20.5)
Age, years[b]	50.7 ± 14.4
Daily dose of ICS	
= 800 µg	145 (72.5)
> 800 µg	55 (27.5)
Treatment duration, months[b]	38
ICS	
Budesonide	171 (85.5)
Beclomethasone	6 (3.0)
Budesonide + beclomethasone	23 (11.5)
Type of inhaler	
DPI	144 (72)
DPI + MDI	51 (25.5)
MDI	5 (2.5)

ICS: inhaled corticosteroid; DPI: dry powder inhaler; and MDI: metered dose inhaler with or without a spacer. [a]Values expressed as n (%), except where otherwise indicated. [b]Values expressed as mean ± SD or as median.

Table 2 - Frequency of adverse effects (in the oral cavity and pharynx) reported by the 200 patients studied.[a]

Adverse effects	Frequency			Total
	Occasionally	On most days	Daily	
Vocal symptoms				
Reduced vocal intensity	16 (8.0)	5 (2.5)	2 (1.0)	23 (11.5)
Loss of voice	6 (3.0)	5 (2.5)	–	11 (5.5)
Hoarseness	32 (16.0)	11 (5.5)	9 (4.5)	52 (26.0)
Pharyngeal symptoms				
Irritated throat	32 (16.0)	8 (4.0)	11 (5.5)	51 (25.5)
Sore throat	10 (5.0)	4 (2.0)	4 (2.0)	17 (9.0)
Dry throat	42 (21.0)	19 (9.5)	33 (16.5)	83 (47.0)
Need for throat clearing	51 (25.5)	14 (7.0)	23 (11.5)	88 (44.0)
Sensation of thirst	36 (18.0)	11 (5.5)	36 (18.0)	83 (41.5)
Cough during ICS use	36 (18.0)	6 (3.0)	8 (4.0)	50 (25.0)
Anosmia	14 (7.0)	4 (2.0)	5 (2.5)	23 (11.5)
Oral candidiasis	16 (10.5)	3 (1.5)	–	19 (12.0)

ICS: inhaled corticosteroid. [a]Values expressed as n (%).

Table 3 - Frequency of local adverse effects in the patients studied, by use of medium- or high-dose inhaled corticosteroids.[a]

Characteristic	Daily dose of ICS		p*
	Medium (= 800 µg)	High (> 800 µg)	
	(n = 145)	(n = 55)	
Duration of ICS use, months[b]	41.59 ± 18.73	36.65 ± 16.56	0.088
Number of adverse effects[b]	2.52 ± 2.21	2.76 ± 2.33	0.513
Report of at least 1 adverse effect	116 (80.0)	47 (85.5)	0.375
Vocal symptoms			
Reduced vocal intensity	16 (11)	7 (12.7)	0.738
Loss of voice	6 (4.1)	5 (9.1)	0.170
Hoarseness	37 (25.5)	15 (27.3)	0.800
Pharyngeal symptoms			
Irritated throat	34 (23.4)	17 (30.9)	0.280
Sore throat	10 (6.9)	8 (14.5)	0.091
Dry throat	67 (46.2)	27 (49.1)	0.715
Need for throat clearing	65 (44.8)	23 (41.8)	0.702
Sensation of thirst	57 (39.3)	26 (47.3)	0.308
Cough during ICS use	35 (24.1)	15 (27.3)	0.648
Anosmia	18 (12.4)	5 (9.1)	0.511
Oral candidiasis	20 (13.8)	4 (7.3)	0.205

ICS: inhaled corticosteroid. [a]Values expressed as n (%), except where otherwise indicated. [b]Values expressed as mean ± SD. *Student's t-test or chi-square test.

Of the patients evaluated, 58 (29.0%) perceived at least one vocal symptoms, with 37 (18.5%) reporting at least one voice-related adverse effect, 14 (7.0%) reporting two adverse effects, and 7 (3.5%) reporting three adverse effects. The prevalence of vocal symptoms found in the study was 26.0% for hoarseness and 11.5% for reduced vocal intensity. The proportion of patients with the symptom of loss of voice was found to be low (5.0%; Table 2).

Pharyngeal adverse effects induced by the use of ICSs were found to be the most prevalent. In 77% of the patients, there was at least one pharyngeal effect. The symptoms of dry throat

Table 4 - Comparison of general characteristics between patients with and without at least one self-reported local adverse effect.[a]

Characteristic	Presence of local adverse effects		p*
	No	Yes	
	(n = 37)	(n = 163)	
Age, years[b]	48.59 ± 12.86	51.13 ± 14.74	0.296
Female gender	27 (73)	132 (80.9)	0.276
Dose of ICS, µg[b]	908.10 ± 304.02	953.98 ± 320.34	0.416
Use of high doses of ICS	8 (21.6)	47 (28.8)	0.375
Use of DPI + MDI	5 (13.5)	33 (20.2)	0.346
Duration of ICS use, months[b]	41.05 ± 20.84	40.09 ± 17.68	0.787
Nasal corticosteroid use	20 (54.1)	110 (67.5)	0.122
Oral hygiene after ICS use	29 (78.4)	124 (76.1)	0.765

ICS: inhaled corticosteroid; DPI: dry powder inhaler; and MDI: metered dose inhaler with or without a spacer. [a]Values expressed as n (%), except where otherwise indicated. [b]Values expressed as mean ± SD. *Student 's t-test or chi-square test.

and throat clearing were observed in 47% and 44% of the patients, respectively. Of the patients who reported adverse effects related to ICS use, 131 (65.5%) had a daily perception of symptoms, with the most commonly perceived effects being sensation of thirst, in 36 (18.0%); dry throat, in 33 (16.5%); and throat clearing, in 23 (11.5%).

The frequencies of local symptoms reported by patients using medium and high doses of ICS are shown in Table 3. Although no statistically significant differences were identified between the two groups, the patients using high doses were more commonly affected by adverse effects than were those using medium doses (frequency of patients with one or more effects, 85.5% vs. 80.0%), as well as having reported a larger number of effects (mean number by patient, 2.76 effects vs. 2.52 effects). In addition, we observed that, for most of the adverse effects evaluated, prevalence increased as the daily dose of ICS was increased, especially for loss of voice (9.1% vs. 4.1%) and sore throat (14.5% vs. 6.9%).

Although no statistically significant differences were identified between the groups of patients with and without self-reported adverse effects for any of the characteristics evaluated (Table 4), the former group included older patients (mean age, 51.13 years vs. 48.59 years), as well as higher proportions of females (80.9% vs. 73.0%), patients who used high doses of ICS (28.8% vs. 21.6%), and patients who used a combination of two inhalers (DPI + MDI; (20.2% vs. 13.5%).

Discussion

In the present study, patient perception of adverse effects in the oral cavity and pharynx was found to be high among the subjects with moderate or severe asthma being evaluated in clinical practice. Approximately 80% of the patients reported at least one local adverse effect, which confirms the high prevalence of these effects. More than half of the patients (65.5%) had a daily perception of at least one symptom. The most prevalent symptoms were dry throat, need for throat clearing, and sensation of thirst, the last being the most commonly reported adverse effect, affecting approximately one quarter of the subjects daily.

The high frequency of local adverse effects induced by ICSs found in the present study is in agreement with the findings of various authors who used structured questionnaires.[6-10,15,16] It is possible that our results are due to the fact that our sample comprised patients with moderate or severe asthma who had been using medium or high doses of ICS for extended periods of time, as well as to the fact that the adverse effects experienced by the patients were assessed using a structured questionnaire.

The frequency of adverse effects in the oral cavity and pharynx varies widely. Reviews on the subject describe symptoms that vary widely in frequency, such as candidiasis (in 0-70% of patients), dysphonia (in 5-58%), and pharyngitis (in 4-25%).[3-5,12] This variation has been associated with differences in the study designs, as well as in

the length of the observation period and in the method of collecting data on adverse effects, which usually involves using questionnaires or clinical tests.[5,11] Although several clinical trials have estimated that these symptoms affect 5-10% of the treated population, there is no scientific evidence from real-life studies to support those findings.[5] However, some questionnaire-based studies have estimated the prevalence of local adverse effects at 24-81%.[6,12] In the present study, the prevalence of symptoms in the oral cavity and pharynx in asthma patients is at the upper end of this range. The frequency of these local effects can vary depending on the ICS dose and potency, as well as on the type of inhaler used.[3,5,7,10,11]

Pharyngeal symptoms affected more than half of the patients. The study revealed that approximately half (47%) of the asthma patients had the symptom of dry throat and that 33 (16%) had a daily perception of this symptom. The high frequency and intensity of this adverse effect was also observed in a recent study evaluating the prevalence of potential adverse effects associated with the use of ICSs combined with long-acting β_2 agonists in asthma patients and COPD patients.[17] The authors observed that the symptom of dry throat was reported by 52% of the patients and that it was perceived, on average, 14 days per month. In addition, a reduction in the total dose of ICS was responsible for a 47% reduction in patient perception of this symptom, suggesting the dose-dependent nature of this adverse effect.[17]

A large proportion of patients (44%) reported the need for throat clearing, this being the second most prevalent pharyngeal symptom. Throat clearing is a very common adverse effect, affecting 24-65% of ICS users[6,7,15,16] and being more prevalent in patients using high daily doses. This local adverse effect is defined as laryngitis caused by ICSs, which act by inducing a form of chemical laryngopharyngitis, mimicking the clinical profile of laryngopharyngeal reflux.[18]

Sensation of thirst after ICS use was found in more than 40% of the subjects evaluated in our study. This local symptom can correspond to a manifestation of oral candidiasis or be caused by throat irritation.[3,5,9] In a cross-sectional questionnaire-based study, the prevalence of this symptom ranged from 42% to 60% and was found to be dose-dependent.[6] In contrast, in another study, involving children with asthma and also using a questionnaire, this symptom was present in 21.9% of ICS users, and combination therapy with ICSs and long-acting β_2 agonists was found to be the only risk factor for the onset of this symptom.[5,9]

The impact of ICSs on voice production has received considerable attention in recent studies.[6-8,10,16,18] Vocal symptoms affect 39-83% of ICS users,[6,7,10,15,16] and the magnitude and extent of these symptoms have been found to be dose-dependent.[6,7,15,16,18] In our study, we observed a lower frequency of vocal complaints than that reported by other authors (28.5% in our study vs. 39-83% in other studies).[6,10,15,16]

Hoarseness was found to be most common vocal symptom reported by the patients (in 26%). In three questionnaire-based studies using methodologies similar to that used in our study, the prevalence of hoarseness ranged from 10% to 57%.[8,9,11,15,16] According to a study, hoarseness is a local adverse effect dependent on factors such as ICS formulation, type of inhaler, frequency of use, total daily dose, ICS particle size, and local effect of the lactose contained in DPIs.[18] The exact mechanism leading to hoarseness is unknown; however, hoarseness can be attributed to steroid myopathy affecting the vocal muscles, which causes a bilateral adduction deformity and bowing of the vocal cords during phonation.[4,5,9,18,19]

Although the mechanisms by which ICSs cause local adverse effects have yet to be clarified, they appear to be related to the deposition of the active ICS into the oral cavity, pharynx, and larynx during drug administration.[3,8,10] Several factors can affect the fraction of an inhaled dose that is deposited in the oral cavity. These factors include ICS formulation, type of drug delivery system, and patient adherence to the instructions for use.[3]

Our results showed no significant differences in the frequency of adverse events between the groups being treated with moderate or high daily doses of ICS; however, we observed an overall increase in the frequency of local effects, including vocal symptoms, sore throat, and sensation of thirst, as the daily dose was increased. According to one group of authors, high doses of ICS are associated with a higher intensity and frequency of patient-perceived adverse events. [7]

Although no significant differences were found in the general characteristics between the patients who reported at least one adverse event and those who perceived no adverse events, previous studies have demonstrated that the chronic use of ICSs, usually in high doses, for long periods, and via different inhalers, is an important risk factor for the incidence of adverse effects in the oral cavity and pharynx.[1,2,8,15]

One of the aspects that should be considered in the present study is the fact that our sample of patients, who have moderate or severe asthma, participate in a multidisciplinary outpatient care program in which there is good communication between patients and health professionals, particularly regarding the cost-benefit ratio of the treatment for asthma control. The good relationship between the health care team and the patient makes it possible for the asthma patients in our study to discuss their symptoms and their concerns regarding the pharmacological treatment more frequently, and this favors spontaneous reporting of adverse effects of medications. According to one group of authors, open and honest communication with patients, taking their concerns seriously, can reduce the impact caused by adverse reactions to medications.[20] A previous qualitative study involving patients who reported suspected reactions to paroxetine has suggested that understanding how the medication produced the symptom can bring relief to the patient.[20,21]

Assessment of the local adverse effects of ICSs, using a multidisciplinary approach supported by a pharmaceutical care service, can be a useful tool in monitoring the safety of use of these medications, since, in clinical practice, such effects tend to be seen as "side effects" and, therefore, as deviations from the priorities of patients and physicians.

A previous study has demonstrated that asthma patients prefer not to discuss their concerns regarding ICS use with their physicians.[13] According to one group of authors, of 24% of patients who experienced symptoms in the oral cavity and pharynx, only 16% reported their symptoms to their physicians, and this might be associated with the existing communication gap between patients and physicians.[12] In contrast, physicians tend not to discuss the potential adverse effects associated with the use of the prescribed medications with their patients.[22,23] Good safety monitoring encourages health professionals to take full responsibility for the medications they prescribe, improving clinical effectiveness and increasing the confidence with which they and their patients use these medications.[24]

With regard to the local symptoms (in the oral cavity, pharynx, and larynx) associated with the use of ICSs, as well as to management recommendations and preventive measures, the educational approach provided by the ProAR Department of Pharmaceutical Care appears not to be sufficient for ensuring a lesser impact of these symptoms, although it favors an improvement in patient perception of local adverse effects. A study conducted in Canada showed that, although some recommendations for the management of symptoms in the oral cavity and pharynx made by family physicians are logical, they can be insufficient in some situations.[12] In the present study, we observed that more than 70% of the patients reported performing oral hygiene after ICS use. Although the practice of oral hygiene after ICS use is an important measure to remove ICSs from the oral cavity, this measure is ineffective in cleaning the larynx.[18] Previous studies have demonstrated that rinsing the mouth after ICS use reduces the incidence of candidiasis; however, this does not have an impact on voice or throat symptoms.[9,15,18,19]

Although the questionnaire used in the present study was designed to assess the occurrence of local symptoms associated with the use of ICSs, we cannot absolutely rule out the possibility that, for some patients, these symptoms were related to other alternative causes, such as comorbidities and continuous use of other medications.

The study design allowed us to control the use of systemic corticosteroids in the three months preceding the study; however, we could not control their use beyond this point. In addition, it was not possible to control the use of nasal corticosteroids, the use of which was identified in more than half of the patients evaluated. Nasal corticosteroids can penetrate the pharynx and larynx, and, consequently, they have the potential to cause symptoms in the oral cavity and pharynx.

In conclusion, patient perception of local adverse effects associated with the use of ICSs,

especially pharyngeal symptoms, including dry mouth and need for throat clearing, is high among the asthma patients followed in the ProAR Department of Pharmaceutical Care. This high frequency of local symptoms might be associated with the use of medium and high doses of ICS, as well as with long-term exposure to ICSs. Assessment of asthma patient perception of local adverse effects of ICSs could provide a greater understanding of the extent and severity of these effects and could aid in determining the risk-benefit ratio of the use of ICSs in clinical practice. Although ICSs are highly effective in the treatment of asthma, their rational use, on the basis of a step-down therapeutic approach, must be ensured in order to reach the lowest maintenance dose consistent with the best level of disease control.

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