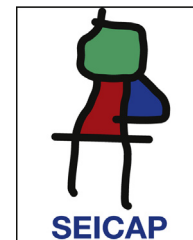




# Allergologia et immunopathologia

Sociedad Española de Inmunología Clínica,  
Alergología y Asma Pediátrica

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## ORIGINAL ARTICLE

# Nasal endoscopic findings and nasal symptoms in patients with asthma: A clinical study from a rhinological perspective



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Received 10 July 2013; accepted 29 October 2013

Available online 21 March 2014

### KEYWORDS

Nasal symptoms;  
Nasal endoscopy;  
Asthma;  
Clinical study

### Abstract

**Objective:** Allergic rhinitis (AR), non-allergic rhinitis (NAR), chronic rhinosinusitis with nasal polyps (CRSwNP), and chronic rhinosinusitis without nasal polyps (CRSsNP) occur frequently in asthmatic patients. We evaluated nasal symptoms and nasal endoscopic findings in patients with asthma and correlated them to asthma severity.

**Methods:** Subjects ( $n = 150$ ) with asthma completed questionnaires designed to provide information related to asthma and nasal disease. Patients were divided into four groups based on asthma severity. Pulmonary function tests, skin-prick tests (SPTs) and nasal endoscopy were performed on every patient. Clinical findings were compared in asthma patients by rhinologists.

**Results:** The total incidence of AR, NAR, CRSwNP and CRSsNP in these patients with asthma was 76%. By using Fisher's Exact Test, there was no statistical significance between asthma severity and the incidence of AR, NAR, CRSwNP and CRSsNP ( $P = 0.311$ ). There was a significant difference in the total nasal symptoms score among subjects with different grades of asthma ( $P = 0.002$ ). However, there were no significant differences in the total Lund–Kennedy endoscopic score (LKS) ( $P = 0.736$ ). The nasal endoscopic scores were significantly correlated at a high degree with the nasal symptoms score ( $P = 0.000$ ). A significant correlation was found between the nasal endoscopic score and the duration of asthma in the patients with different grades of asthma ( $P < 0.05$ ).

**Conclusions:** The relationship between rhinitis and asthma is complex. Nasal airways should become part of standard clinical assessment and follow-up in patients with asthma.

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## Introduction

A large body of evidence from clinical epidemiology, pathophysiology, histology, and treatment outcomes supports the concept of a unified airway in which signs of disease in one part of the respiratory tract should be considered a disease of the whole. This concept is sometimes expressed as "one way, one disease".<sup>1</sup>

Clinical observations show that the vast majority of patients with asthma have nasal disease. Unfortunately, when examining all available data, the prevalence of rhinitis in asthma ranges tremendously, from 6.2% to 95%.<sup>2-8</sup> The explanation behind this wide variability is that there is little standardisation as to the types of questions that need to be asked for establishing the diagnosis of nasal disease. Many epidemiologists use similar tools as in asthma, primarily a positive response to the question of whether their surveyed subjects were given a diagnosis of allergic rhinitis or hay fever by a physician/paediatrician. However, patients with rhinitis are notoriously unaware of such diagnoses, primarily because their physicians ignore the presence of nasal disease. Actually very few physicians lay emphasis on nasal disease and refer their asthmatic patients to the otolaryngologist, due to limitations of their profession. The correlation among the subjective nasal symptoms in asthmatic patients, the representation of nasal mucosal inflammation and the severity of asthma are seldom investigated from a rhinological perspective.

Nasal endoscopy, with rigid and flexible instruments, is a traditional standardised technique and used regularly by otolaryngologist for diagnostic and surgical aims. Nasal endoscopy provides reliable visualisation of all the accessible areas of the nasal cavity and the representation of nasal mucosal inflammation. It is a useful and practicable technique after an appropriate local topical anaesthesia, since it offers the possibility of an *in situ* examination for numerous nasal structures.

Our principal aims were to demonstrate that nasal endoscopy may be easily feasible and necessary in asthmatic patients, and to evaluate nasal symptoms and nasal endoscopic findings in patients with asthma and correlate them to asthma severity.

## Materials and methods

One hundred and fifty adult asthmatic subjects were recruited from the outpatient clinic of the pneumology department in the Fifth Affiliated Hospital of Sun Yat-Sen University, China. A detailed clinical history and a complete physical examination, including allergy evaluation, were carried out by a respiratory physician and a rhinologist for each patient. Diagnosis of asthma was supported by: (1) affirmative answers to the following questions: "In the past 12 months, have you experienced wheezing or whistling in your chest?" or "In the past 12 months, have you taken any asthma medication?" (2) a positive bronchodilator test (minimum 12% relative improvement in the volume FEV1 after bronchodilator administration) and/or a prior positive methacholine challenge test (PC20 < 16 mg/ml) when available. Asthma severity, in accordance with GINA criteria,<sup>9</sup> was ascertained by the patient's level of symptoms and

his/her level of treatment. Moreover, pulmonary function tests (spirometry) were carried out on each patient using the same equipment and the data were recorded in detail.

According to GINA criteria,<sup>9</sup> inhaled corticosteroids (ICSs) are the most effective controller medications currently available. Reliever medication (such as short-acting  $\beta_2$ -agonist) should be provided for quick relief of symptoms as needed. Control of the disease was assessed by measuring daytime symptom frequency, night-time awakenings, interference with normal activity, and the peak expiratory flow rate.

We excluded all patients who met the following exclusion criteria: use of antibiotics, nasal corticosteroids, and nasal/oral antihistamines within the previous two weeks. The study was approved by the Institutional Review Board and informed oral consent was obtained from the patients.

Current symptoms of nasal blockage, secretion, itching and sneezing were rated on a 0–10 visual analogue scale (VAS, 0 – no symptoms, 10 – worst possible symptoms). An aggregate of the four symptom scores was calculated (total score).

The nasal endoscopic examinations were performed with rigid nasal endoscopes. The images were recorded with a camera for documentation. White balance was successfully performed for each evaluation in a consistent fashion. The Lund–Kennedy endoscopic score (LKS) was used to rank the subjective appearance of the nasal endoscopy<sup>10</sup> before and after decongestion. The items for measurement included polyp, oedema, discharge, scarring, and crusting. The possible scores for each side were 0–10, and the total ranged from 0 to 20. Nasal endoscopy findings and the LKS scores were evaluated independently by two physicians who were unaware of the patients' history.

Allergic rhinitis (AR) was diagnosed in patients with at least one sensitisation clearly related to the actual symptomatic period of the year, or associated with exposure to particular antigens; endoscopic representation is characterised by swelling or pale nasal mucosa; allergic sensitisation was assessed using skin-prick tests (SPTs) with a panel of 14 inhalant standard allergens. Non-allergic rhinitis (NAR) similarly has the symptoms of nasal congestion, rhinorrhoea, sneezing and sometimes the same endoscopic feature as AR but without positive SPTs. Chronic rhinosinusitis (CRS) is clinically defined as an inflammation of the nose and the paranasal sinuses for >3 months characterised by two or more symptoms including nasal blockage, anterior or postnasal drip, facial pain or pressure, and a reduction in or loss of smell. Furthermore, together with the symptoms, there must be identifiable endoscopic signs. Depending on the endoscopic finding, CRS was divided into two categories: chronic rhinosinusitis with nasal polyps (CRSwNP) and without nasal polyps (CRSsNP).

## Statistical analysis

The data regarding the four groups of patients with different grades of asthma were compared using the non-parametric Kruskal–Wallis rank-sum test. The correlation analysis was accomplished using the Spearman rank test. The frequency analysis of nasal symptom score and endoscopic score distribution were obtained using the  $\chi^2$  test. Results are

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