



Characteristics of a patient population seeking medical advice for nasal symptoms in Bulgaria

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ARTICLE INFO

Article history:

Received for publication December 22, 2011.

Received in revised form January 30, 2012.

Accepted for publication February 14, 2012.

ABSTRACT

Background: The proportion of patients visiting general practitioners (GPs), otorhinolaryngologists (ORLs), and allergologists (ALRGs) for nasal complaints is unknown but important in estimating the number of subjects with nasal symptoms bothersome enough to warrant physician consultations and assessing nasal pathological conditions' burden on a national health care system.

Objective: The Symptoms of Nasal Inconvenience Fact Finding (SNIFF) survey was developed to (1) assess incidence of physician visits attributable to nasal complaints; (2) characterize patients' nasal conditions; and (3) outline differences across physician categories.

Methods: The SNIFF survey was completed over 20 days by Bulgarian GPs, ORLs, and ALRGs whom patients consulted for nasal symptoms. Survey forms differentiated type and severity of patients' conditions according to Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines and ranked bothersome symptoms. Smell impairment, comorbidities, and prescription practices were documented.

Results: Sixty-nine physicians (30 GPs, 8 ORLs, 31 ALRGs) completed 1,685 surveys. The proportion of patients with nasal symptoms over the total patients seen was 15.7%: ALRGs, 18.0%; GPs, 14.6%; ORLs, 13.1%. Patients were classified as having intermittent (38.8%) or persistent (61.2%) rhinitis, with most having moderate/severe symptoms (94.4%). Congestion was the leading symptom in 59.1%. Smell was impaired in 69.8% of patients, asthma was present in 21.4%, and cough in 62.9%. ALRGs were more likely to diagnose and manage patients per ARIA guidelines than were ORLs or GPs.

Conclusion: The SNIFF survey results demonstrate congestion's role as a leading symptom motivating patients to seek medical advice. SNIFF also uncovered differences in practices among different categories of health care providers.

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Introduction

Nasal symptoms consistent with allergic and nonallergic rhinitis are estimated to affect 10% to 40% of the general population worldwide,¹ with allergic rhinitis alone accounting for about half of these.^{2,3} Although these symptoms are not life threatening, they contribute to substantial inconvenience and impairment of quality of life.⁴ Epidemiologic studies have identified allergic rhinitis as a risk factor for the development of asthma^{5,6} and for increased severity and use of health resources in existing asthma cases.⁷

The patient population visiting doctors' offices for advice regarding nasal symptoms suggestive of rhinitis is of particular interest, because it represents those patients who consider their complaints bothersome enough to warrant the time and expense involved in consulting a physician. However, many sufferers

who perceive their symptoms as not serious enough to consult a physician choose to neglect their symptoms or to self-medicate; these individuals remain unaccounted for in population-based surveys, leading to a likely underestimation of the true prevalence of rhinitis.³

Patients consult with physicians at different levels of specialization, including general practitioners (GPs), otorhinolaryngologists (ORLs), and allergologists (ALRGs). Access to these physician groups depends on the specifics of the health care system in a particular country. In Bulgaria, patients are entitled to visit their personal GP, who may further refer them to a specialist as part of their covered care. Patients also may choose to bypass their GP and visit specialists as private patients. However, the proportion of patients visiting GPs, ORLs, and ALRGs who do so for nasal complaints is unknown.

The diagnosis of rhinitis may appear to be fairly straightforward according to national and international guidelines, which contrasts with the degree of expertise needed to recognize specific (allergic and nonallergic) or unusual (atrophic, hormonal) types of rhinitis. The Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines document provides a comprehensive frame for classification of

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Disclosures: Authors have nothing to disclose.

Funding Sources: This study and editorial assistance for the article were supported by an unrestricted educational grant provided by MSD Bulgaria.

allergic rhinitis^{3,4} through which one can elaborate a sequence of questions to point to an individual diagnosis; however, a diagnosis arrived at in this manner may not always coincide with the subjective judgment of physicians who are unfamiliar with this document. Therefore, to determine the frequency of “nasal” visits, characterize and rank separate nasal symptoms, and explore the association of these symptoms with comorbidities, we planned and carried out the Symptoms of Nasal Inconvenience Fact Finding (SNIFF) study among physicians in Bulgaria treating patients for nasal symptoms. Another objective was to determine differences in the diagnostic and treatment practices of physicians in different specialties.

Methods

Project design

Physicians in different regions of Bulgaria listed in the National Health Insurance Registry were randomly invited to take part in the survey. Those who agreed received a personal code identifying them as a GP, ORL, or ALRG. Physicians received no compensation for their participation. While implementing their regular workups of patients, participating physicians completed a survey for every subject with nasal symptoms who visited their practice for a period of approximately 20 working days before the pollen season (during the month of March 2009). The study was designed to minimize expenses, because of budget limitations. The study was approved by the Ethics Committee of Alexander's University Hospital in Sofia, Bulgaria. This committee judged that patients did not need to provide written or oral informed consent, because no study-specific investigations or treatments were involved, and patient personal data were not identifiable.

Survey structure

Each physician recorded the number of patients seen after the previous patient with nasal symptoms, to allow calculation of the percentage of patients visiting the practice because of nasal symptoms. The count was started from 0 at the beginning of the first day of the survey, including all entries in the physician's log book preceding the first patient visiting for nasal symptoms. The number of patients without nasal symptoms seen after the last patient with nasal symptoms on the last day of the study was recorded for calculation of the total number of patients seen.

The survey included information about patients' demographic characteristics (sex and age) but did not include personal identity data. A set of entries was used to document which nasal symptoms patients had and rank symptoms according to the amount of discomfort they were causing. This allowed classification of patients as predominantly “blockers” (with congestion as their most prominent symptom) or “runners” (with rhinorrhea as their most prominent symptom). Although distinction between “blockers” and “runners” is not officially accepted in international or Bulgarian national guidelines, because of possible therapeutic implications on the choice of pharmacological treatment, this was a helpful way to evaluate the prevalence of nasal congestion as a bothersome symptom.

The ARIA document brought about an important shift in the classification of rhinitis from *seasonal* and *perennial* to *intermittent* and *persistent*, with a distinct difference between the old and new concepts.³ Respective entries into the survey form classified patients as having intermittent or persistent rhinitis according to the criteria of ARIA.

The ARIA document classifies rhinitis as *mild* or *moderate/severe* on the basis of impairment of nighttime sleep, leisure-time activities, and performance at school or work.³ The SNIFF survey evaluated the proportion of patients with these 2 different levels of severity, using entries reflecting the ARIA criteria.

Impairment of sense of smell was recorded as an important indicator of pathological changes taking place in the nasal cavity. Separate entries tackled hypersensitivity to pollens, tobacco smoking status, and associations with chronic cough and asthma.

On a separate page of the survey, physicians were asked to indicate their diagnosis from among a list of choices based on the ARIA classifications (they were not informed that the survey questions recorded the information necessary to diagnose patients according to ARIA criteria). This enabled us to assess the level of agreement between diagnoses made on the basis of the ARIA diagnostic key contained in the survey and those made subjectively by physicians on the basis of their expertise. The survey also provided for assessment of treatment practices, as physicians indicated their prescription decisions on a multiple-choice list.

Statistical analysis

Frequencies with number of cases and percentages were calculated for all dichotomous and ordinal variables. Descriptive statistics of continuous variables involved means and standard deviations as well as median values as a measure of normality of the distribution. Cross tabs with percentages for subgroups with alternative subtypes/severities/leading symptoms were calculated; significance was based on Pearson's χ^2 test. The Mann-Whitney *U* test was used to calculate differences in variable frequencies among the physician categories. Binary logistic regression for dichotomous variables of interest for the analysis was used to calculate odds ratios (ORs) with 95% confidence intervals (CIs). A 2-tailed *P* value $\leq .05$ was used as the cutoff for significance.

Results

Incidence of visits due to nasal pathology and demographics

Sixty-nine physicians (30 GPs, 8 ORLs, 31 ALRGs) completed 1,685 surveys. Accordingly, the mean number of patients with nasal symptoms per physician for the whole study period (20 days) was 24; the median number was also 24, with a range from 18 to 55 patients. The overall percentage of patients with nasal symptoms over the total number of patients seen was 15.7% (1,685/10,740): 14.6% (741/5,061) for GPs, 13.1% (207/1,576) for ORLs, and 18.0% (737/4,096) for ALRGs. ALRGs saw proportionally more patients with nasal symptoms than did GPs and ORLs, $P < .001$, whereas no significant difference was seen in the percentage of patients with nasal symptoms visiting GPs and ORLs.

Of the 1,685 surveyed patients, 890 (52.8%) were female, and 795 (47.2%) were male. Mean age was 32 years (median, 30 years; range, 4–88 years), with females significantly older than males (34.2 ± 19.4 vs 29.3 ± 18.8 years; $P < .001$). Children and adolescents (below the age of 18 years) constituted 472 patients: 198 girls and 274 boys (8.7 ± 4.4 vs 9.8 ± 4.6 years, $P = .008$). Approximately half of the patients (854; 51.0%) reported worsening of their symptoms during the pollen season. Interestingly, most patients included in the survey (1,038; 61.9%) were never smokers, and only 297 (20.4%) currently smoked.

Case classification according to ARIA criteria and most prominent symptom

Using a key for interpretation of physicians' entries into the survey forms, we classified the patients according to the ARIA guidelines as having intermittent and persistent rhinitis with 2 levels of severity: mild and moderate/severe (Table 1). Patients with persistent rhinitis were more likely to have a moderate/severe form of the disease (OR, 1.8; 95% CI, 1.2–2.7; $P = .007$).

Based on the leading symptom, we could distinguish between patients whose most prominent symptom was congestion (blockers = 991; 59.1%) or rhinorrhea (runners = 686; 40.9%). More blockers were seen among patients with persistent rhinitis (Table 2). Patients with persistent rhinitis were more likely to be blockers than runners (OR, 1.5; 95% CI, 1.2–1.8; $P < .001$).

Table 1

Patients in the SNIFF survey with nasal symptoms of rhinitis, classified according to form and severity

Rhinitis	Mild	Moderate/severe	Total
Intermittent	50	607	657 (39.0%)
Persistent	46	982	1,028 (61.0%)
Total	96 (5.7%)	1,589 (94.3%)	1,685 (100.0%)

Most patients visiting doctors' offices for nasal complaints had moderate/severe rhinitis; these patients were more likely than those with mild rhinitis to have persistent rhinitis ($P < .001$ by Pearson's χ^2 test).

More blockers (950; 60.0%) than runners (634; 40.0%) were found among patients with moderate/severe disease. The OR of a blocker to have moderate/severe rhinitis was 1.9 (95% CI, 1.2–2.9; $P = .003$).

Smell impairment

Sense of smell was impaired in 1,176 (69.8%) of 1,672 patients. Of these, 643 (55.0%) had persistent rhinitis vs 533 (45.0%) with intermittent rhinitis, and 1,088 (92.5%) had moderate/severe vs 88 (7.5%) with the mild form of the disease. More blockers were seen (649; 55.2%) than runners (527; 44.8%).

ARIA guidelines and routine diagnostic practices

We selected all of the cases checked by physicians as intermittent or persistent rhinitis and compared them with diagnoses of intermittent or persistent rhinitis made by checking patients' recorded symptoms against the criteria in the ARIA document. A mismatch was evident in 86 (15.1%) of 569 cases classified by the ARIA guidelines as intermittent and in 147 (13.8%) of 1,069 cases classified by the ARIA guidelines as persistent (Table 3).

Allergologists were less likely to make an erroneous diagnosis than were GPs or ORLs: the sum of the false-positive and false-negative diagnoses they made represented 27.8% of their diagnoses, which was significantly lower than the 35.3% made by ORLs ($P < .001$) and the 36.8% made by GPs ($P < .001$).

Prescription practices

One of the objectives of the SNIFF survey was to gain insight into physicians' prescription practices. Treatments prescribed during the survey visits are summarized in Table 4.

Using the Mann-Whitney test, ALRGs were found to prescribe significantly more intranasal corticosteroids (INSs) than did GPs and ORLs; ORLs prescribed significantly more oral antihistamines (OAHs) than did GPs and ALRGs; GPs prescribed significantly more OAHs + decongestants than did ORLs and ALRGs; ORLs prescribed significantly more INSs + decongestants than did GPs and ALRGs, and GPs prescribed these more than did ALRGs; and ALRGs were the exclusive providers of specific immunotherapy. No differences were seen in the "other" treatment modalities practiced by the 3 different physician categories.

Rhinitis types and comorbidities

Among patients included in the survey, 357 (21.4%) had asthma. Patients with asthma were more likely to have persistent rhinitis

Table 2

Classification of patients in SNIFF as blockers (most prominent symptom: congestion) or runners (most prominent symptom: rhinorrhea), according to leading nasal symptom

Rhinitis	Intermittent	Persistent	Total	P-value
Blockers	344	647	991 (59.1%)	<.001 ^a
Runners	306	380	686 (40.9%)	
Total	650	1,027	1,677 ^b (100.0%)	

^aPearson's χ^2 test.

^bEight patients did not indicate their most prominent symptom. Patients with nasal congestion as their most prominent symptom constituted the bulk of those seeking medical advice.

Table 3

Discrepancies between physicians' subjective diagnoses and diagnoses using the key for interpreting the questionnaire on the basis of ARIA guidelines

Rhinitis	ARIA diagnosis		
	Intermittent	Persistent	Total
Physicians' diagnosis			
Intermittent	483	147	630
Persistent	86	922	1,008
Total	569	1,069	1,638

Of patients identified as having "intermittent" rhinitis by ARIA criteria, 15.0% were misdiagnosed by physicians; of those having "persistent" rhinitis, 13.7% were misdiagnosed by physicians.

(OR, 2.7; 95% CI, 2.1–3.5; $P < .001$) and a moderate/severe nasal condition (OR, 3.0; 95% CI, 1.4 and 6.3; $P = .003$). The likelihood of a patient with asthma being a blocker was somewhat higher than that of being a runner (OR, 1.2; 95% CI, 0.9–1.5), but this difference did not reach statistical significance.

Nearly two thirds of patients (1,060; 62.9%) had cough as a regular, bothersome symptom. However, the presence of cough was significantly associated only with severity of rhinitis (OR for moderate/severe rhinitis, 2.3; 95% CI, 1.5–3.6; $P < .001$) and not with having persistent rhinitis (OR, 1.1; 95% CI, 0.9–1.3; $P > .1$) or with being a blocker (OR, 1.1; 95% CI, 0.9–1.3; $P > .1$).

Discussion

Unlike standard epidemiologic studies that target the general population by means of interviewer- or self-administered questionnaires,^{8–10} the SNIFF project was based in the real-life setting of physicians' outpatient practices. The collection of data followed a standardized pattern and was administered by physicians who had more or less specialized experience and training and were committed to rendering professional help to patients seeking their medical advice. The finding that of 100 patients visiting GPs and specialists, approximately 14 do so because of nasal symptoms provides an estimate of the burdens that nasal pathology in general and rhinitis in particular impose on the Bulgarian health care system.

Our findings support previous observations that differences exist among Bulgarian health care provider categories (GPs, ORLs, ALRGs) who treat patients with allergic rhinitis, and that treatment outcomes vary by provider.¹¹ Conceivably these differences are country specific, reflecting existing traditions and the relative weight of the separate specialties in respective educational systems. ALRGs lead the ranking for nasal visits in Bulgaria, which can be explained by awareness among patients and GPs regarding the role of allergies in rhinitis.

The SNIFF survey did not include any objective measurements. It reflected the real-life practice of initial assessment of patients with nasal symptoms on the basis of their clinical history.^{12,13} The SNIFF survey indicated that approximately half of patients had seasonal exacerbations of their symptoms, but it could not provide hard evidence based on skin-prick testing to differentiate between allergic and nonallergic rhinitis. The question remains whether this undermines the importance of the results of our survey. One can

Table 4

Frequency of drug prescription, by class

Drug class	Number of cases	%
INS	961	57.1
OAH	847	50.3
OAH + D	443	26.3
SIT	194	11.5
INS + D	162	9.6
Other	361	21.4

Abbreviations: D, decongestant; INS, intranasal corticosteroid; OAH, oral antihistamine; SIT, specific immunotherapy.

argue that looking at nasal symptoms as “just rhinitis” trivializes the condition and ignores a number of distinct forms of the disease. However, in most cases, initial management of patients with nasal symptoms is standard and based on assessment of severity of symptoms rather than on specific disease subtypes. In fact, the practice parameters published by the Joint Task Force of the American Academy of Allergy, Asthma & Immunology; the American College of Allergy, Asthma & Immunology; and the Joint Council of Allergy, Asthma and Immunology advocate that for patients with symptoms suggestive of rhinitis, a therapeutic trial should be recommended before performing any evaluation other than taking a history.¹⁴ Another argument in this direction is the revelation that as many as 87% of patients may have mixed rhinitis, a combination of 2 entities,^{15,16} despite the traditionally reported 3:1 ratio of allergic to nonallergic rhinitis. Certainly rhinitis comprises numerous subtypes and causes, and differentiating them can be a challenge for primary care practitioners; detailed investigation by specialists can potentially have important implications for optimal management, especially if initial treatment proves to be a disappointment.

That ALRGs were more successful than ORLs and GPs in applying the ARIA classification of rhinitis in their daily work is not surprising; the allergist community has been continually exposed to ARIA's messages over the past 10 years.³ This is also reflected in the drug-prescribing practices of the various categories of health care providers: in accordance with the profile of the surveyed population, in which blockers with persistent moderate/severe rhinitis were more numerous, ALRGs prescribed INSs most often, whereas ORLs and GPs were more likely to make use of decongestants. Nasal antihistamines were not listed as an individual category in our list of possible physician treatment choices; they were included as “other” drugs. The single registered antihistamine in Bulgaria is usually prescribed as rescue medication during the pollen season; however, our study was conducted before the onset of the spring pollen season. Not surprisingly, specific immunotherapy, both subcutaneous and sublingual, was prescribed exclusively by ALRGs. Overall, it is worthy of consideration that most of the experts who developed the ARIA guidelines were European, and the SNIFF data reflect the market specifics of the European Community. Practice parameters have recently been acknowledged as being distinctly different in the United States and Europe.^{14,17}

Because of the specifics of the SNIFF survey design, which focused solely on patients attending physicians' offices for nasal symptoms, it is not directly comparable to other published epidemiologic surveys and projects. However, although financial constraints did not allow the application of standard protocols, it does shed light on the epidemiology of the more severe forms of nasal suffering. This information may be useful for purposes of health care resource planning.

Because nasal congestion is recognized to be the most important symptom in terms of impact on quality of life,^{18,19} our initial idea for SNIFF was to get a first-time-ever insight into its prevalence among outpatients with nasal symptoms in Bulgaria. While working on the survey design, we realized that congestion should be weighed against the other classic nasal symptoms: rhinorrhea, itching, and sneezing. Therefore, we attempted to rank the separate symptoms in the patient population to determine whether and to what extent the symptom of congestion would play a leading role in our particular population. Indeed, congestion ranked first, especially in patients with persistent rhinitis and in proportion to the severity of the condition (Table 2). This is not surprising in light of the role of congestion in sleep impairment²⁰ and the fact that 1 of the criteria for severity in our survey was quality of nighttime sleep. Congestion also can be the leading sign of hyperplastic mucosa of the nasal cavity and sinuses or of nasal polyps, which should be

suspected especially when symptoms are accompanied by loss of smell and aspirin sensitivity.²¹

A finding that surprised us was the extent to which the sense of smell was impaired: more than two thirds of our patients showed this symptom, and most patients with impaired sense of smell had moderate to severe rhinitis. Although more patients with persistent rhinitis and congestion as their most prominent symptom considered their sense of smell abnormal, the percentage was not significantly different from that of patients with intermittent rhinitis or those whose most prominent symptom was rhinorrhea.

More than 20% of patients in the SNIFF survey had accompanying asthma, which is somewhat lower than the expected proportion.^{2,22} This could be because in the SNIFF population, nasal complaints were the dominant symptoms. As would be expected, patients with asthma were more likely to have persistent and moderate/severe rhinitis, but the likelihood of them being blockers was not significantly higher. As for cough, a recognized symptom of rhinitis through a “postnasal drip” mechanism,²³ it was more often prominent in the moderate/severe form of rhinitis but was not preferentially associated with persistent or intermittent rhinitis or with congestion or rhinorrhea as a most prominent symptom.

Using the SNIFF survey to structure a dialogue between physicians and patients could be a useful matrix to help physicians adhere to recognized recommendations with greatest therapeutic efficacy and safety. A positive experience with such an approach (using the checkbox type of diagnostic worksheet to take a relatively rapid history to help the subsequent diagnosis) was communicated in the consensus report of the Respiratory and Allergic Diseases Foundation.²⁴

In conclusion, the SNIFF survey assessed the composition of the patient population visiting physicians at different levels of specialization for nasal symptoms. It demonstrated the leading role of congestion as a symptom motivating patients to seek medical advice. It also uncovered differences in the diagnostic and drug-prescribing practices of different categories of health care providers against the background of international guidelines.

Acknowledgments

Editorial assistance to ensure correct scientific English suitable for publication was provided by Rob Coover, MPH, of AdelphiEden Health Communications, New York, NY. This assistance was funded by Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Whitehouse Station, NJ.

References

- [1] Lundbäck B. Epidemiology of rhinitis and asthma. *Clin Exp Allergy*. 1998; 28(suppl 2):3–10.
- [2] Bauchau V, Durham SR. Prevalence and rate of diagnosis of allergic rhinitis in Europe. *Eur Respir J*. 2004;24:758–764.
- [3] Bousquet J, van Cauwenberge P, Khaltaev N; Aria Workshop Group; World Health Organization. Allergic rhinitis and its impact on asthma. *J Allergy Clin Immunol*. 2001;108:S147–S334.
- [4] Bousquet J, Khaltaev N, Cruz AA, et al. Allergic rhinitis and its impact on asthma (ARIA) 2008 update. *Allergy*. 2008;63(suppl 8):8–160.
- [5] Leynaert B, Bousquet J, Neukirch C, Liard R, Neukirch F. Perennial rhinitis: an independent risk factor for asthma in nonatopic subjects: results from the European Community Respiratory Health Survey. *J Allergy Clin Immunol*. 1999; 104(2 pt 1):301–304.
- [6] Shaaban R, Zureik M, Soussan D, et al. Rhinitis and onset of asthma: a longitudinal population-based study. *Lancet*. 2008;372:1049–1057.
- [7] Price D, Zhang Q, Kocevar VS, Yin DD, Thomas M. Effect of a concomitant diagnosis of allergic rhinitis on asthma-related health care use by adults. *Clin Exp Allergy*. 2005;35:282–287.
- [8] Eriksson J, Ekerljung L, Pullerits T, et al. Prevalence of chronic nasal symptoms in west Sweden: risk factors and relation to self-reported allergic rhinitis and lower respiratory symptoms. *Int Arch Allergy Immunol*. 2011;154:155–163.
- [9] Bachert C, van Cauwenberge P, Olbrecht J, van Schoor J. Prevalence, classification and perception of allergic and nonallergic rhinitis in Belgium. *Allergy*. 2006;61:693–698.
- [10] Neffen H, Mello JF Jr, Sole D, et al. Nasal allergies in the Latin American population: results from the Allergies in Latin America survey. *Allergy Asthma Proc*. 2010;31 suppl 1:S9–S27.

- [11] Agency for Healthcare Research and Quality. Evidence Report/Technology Assessment No. 54. Management of Allergic and Nonallergic Rhinitis. AHRQ Pub. No. 02-E024, May 2002, ISSN 1530-440X.
- [12] Stewart MG. Identification and management of undiagnosed and undertreated allergic rhinitis in adults and children. *Clin Exp Allergy*. 2008;38:751–760.
- [13] Quan M, Casale TB, Blaiss MS. Should clinicians routinely determine rhinitis subtype on initial diagnosis and evaluation? A debate among experts. *Clin Cornerstone*. 2009;9:54–60.
- [14] Wallace DV, Dykewicz MS, Bernstein DI, et al. The diagnosis and management of rhinitis: an updated practice parameter. *J Allergy Clin Immunol*. 2008;122(suppl 2):S1–S84.
- [15] Settipane RA. Rhinitis: A dose of epidemiological reality. *Allergy Asthma Proc*. 2003;24:147–154.
- [16] Settipane RA, Lieberman P. Update on nonallergic rhinitis. *Ann Allergy Asthma Immunol*. 2001;86:494–508.
- [17] Spector S, Wallace D, Nicklas R, et al. Comments on Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines. *J Allergy Clin Immunol*. 2011;127:1641–1642.
- [18] Stewart M, Ferguson B, Fromer L. Epidemiology and burden of nasal congestion. *Int J Gen Med*. 2010;3:37–45.
- [19] Stull DE, Vernon MK, Canonica GW, Crespi S, Sandor D. Using the congestion quantifier seven-item test to assess change in patient symptoms and their impact. *Allergy Asthma Proc*. 2008;29:295–303.
- [20] Craig TJ, Sherkat A, Safaee S. Congestion and sleep impairment in allergic rhinitis. *Curr Allergy Asthma Rep*. 2010;10:113–121.
- [21] Fokkens W, Lund V, Mullol J. European Position Paper on Rhinosinusitis and Nasal Polyps group. European position paper on rhinosinusitis and nasal polyps 2007. *Rhinology*. Suppl. 2007;(20):1–136.
- [22] Cruz AA, Popov T, Pawankar R, et al. Common characteristics of upper and lower airways in rhinitis and asthma: ARIA update, in collaboration with GA²LEN. *Allergy*. 2007;62(suppl 84):1–41.
- [23] Macedo P, Saleh H, Torrego A, et al. Postnasal drip and chronic cough: an open interventional study. *Respir Med*. 2009;103:1700–1705.
- [24] Nassef M, Shapiro G, Casale TB. Identifying and managing rhinitis and its subtypes: allergic and nonallergic components—a consensus report and materials from the Respiratory and Allergic Disease Foundation. *Curr Med Res Opin*. 2006;22:2541–2548.