

Original article

National survey on the management of rhinopathies in asthma patients by French pulmonologists in everyday practice

Background: Epidemiological and pathophysiologic studies have shown that allergic rhinitis and asthma often occur in combination. The internationally developed ARIA position paper (Allergic Rhinitis and its Impact on Asthma) recently offered recommendations on allergic rhinitis. As part of this new report and prior to its diffusion, we investigated the management of rhinopathies in asthma patients by pulmonologists in their everyday practice.

Methods: From March to June 2000, 477 (48%) French pulmonologists in office-based practice participated in the survey. They were asked to include their first five asthmatic adult patients. In addition to descriptive statistics, univariate and multivariate analyzes were performed.

Results: We studied 1623 patients with varying severity of asthma (sex ratio 0.9; median age 35 years). The pulmonologists reported rhinopathy in 76.6% of these, with a chronic course in 91%. Among the patients, 67.1% reported rhinopathy. The diagnosis was allergic rhinitis in 66.2% of participants and nasal polyposis in 10.1%. Examination of the nasal cavities was performed by the pulmonologists themselves in 56.2% of patients. Imaging of the sinuses was performed radiographically in 55.3% of enrolled patients and/or by computed tomography in 17.2%. Referral to an ENT specialist occurred for 21.6% of patients, being more common for patients with rhinitis that failed to respond to medical therapy (although some pulmonologists referred their patients routinely).

Conclusions: The high prevalence of rhinopathies in asthma patients requires that these conditions are recognized and managed by pulmonologists. Thus, our findings support one of the central messages contained in the new ARIA guidelines—asthma patients should be investigated routinely for rhinitis and other rhinopathies.

P. Demoly,¹ L. Crampette,²
J.-P. Daures³

¹Maladies Respiratoires, INSERM U454–IFR3, Hôpital Arnaud de Villeneuve, University of Montpellier; ²Service d'ORL, Hôpital Gui de Chauliac, University of Montpellier; ³Institut Universitaire de Recherche Clinique de Montpellier, University of Montpellier, Montpellier, France

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Pascal Demoly
Maladies Respiratoires
INSERM U454–IFR3
Hôpital Arnaud de Villeneuve
University Hospital of Montpellier
34295 Montpellier Cedex 5
France

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Allergic rhinitis is often accompanied by inflammation of other segments of the upper or lower respiratory tracts, particularly with asthma. The concept that rhinitis should be treated to prevent its complications, or to reduce severity, has gained ground little by little, although there is no definitive and direct proof (1). Epidemiological (2, 3), pathophysiologic (4), and clinical (5) studies have found incontrovertible evidence that rhinopathies in general and rhinitis in particular are linked with asthma. The nose has even been described as “the part of the lungs which is accessible to the fingers”. The respiratory mucosa and pathophysiology are similar in rhinopathies and asthma; patient-related factors are comparable; and the basis of treatment is similar, particularly the central role of local glucocorticoid therapy (1).

The World Health Organization is circulating new recommendations on allergic rhinitis developed during the ARIA (Allergic Rhinitis and its Impact on Asthma) workshop (1). We felt that before the wide distribution of

these recommendations, a study of relations between asthma and rhinopathy in everyday pulmonology practice was timely. Indeed, the ARIA recommendations give special attention to rhinitis in combination with asthma and state that rhinitis should be looked for routinely in asthma patients.

The management of rhinopathies in asthma patients seen in everyday practice is very poorly known about. Although some studies have contributed to describe the medical management of one or the other of these two conditions (6–9), no large studies involving direct patient participation have been conducted to evaluate management practices of pulmonologists. How many asthma patients have rhinitis? What are the most prominent symptoms? What is the impact on everyday life? What investigations were performed? Is a nasal examination performed routinely?

The present cross-sectional epidemiological survey of the management of rhinopathies in asthma patients seen by pulmonologists in France provides answers to many of

these questions, with the goal of better meeting patients' expectations.

Material and methods

Objectives of the survey

The survey was conducted before the publication of the ARIA document (1) in a vast population of asthma patients seen in office-practice by pulmonologists. The main objectives of the work were:

1. to confirm reported links between rhinopathy and asthma
2. to evaluate the impact of rhinopathy on quality of life parameters (sleep and daily activities) in patients with asthma
3. to evaluate via this survey of everyday practice in French pulmonologists the section of the ARIA report on allergic rhinitis that recommends investigating all asthma patients for rhinopathy (Is this already followed? What investigations are used?)
4. To study relations between pulmonologists and ENT specialists (Do the former refer their patients to the latter, and vice versa? In what circumstances?).

Structure of the questionnaires

The questionnaires completed by the physicians and the patients were designed by the authors. They were strictly anonymous. Each questionnaire contained 70 items in four sections. The items covered all the parameters emphasized by the experts of the ARIA consensus panel.

The patients' questionnaire specified:

1. The social and demographic characteristics of the patients' age, sex, site of residence, and occupation.
2. The reason for the visit on the day of questionnaire completion; the characteristics of the asthma and its management; duration; whether the disease was allergic or not; triggers; smoking history; severity according to the patient; and overall assessment of medications for asthma.
3. Presence of "nasal problems" and type, frequency, and severity of symptoms; whether ocular symptoms were present also; whether specific treatment was used; overall assessment of medications for rhinopathy. The description of symptoms related to the rhinopathy was used to categorize the rhinitis according to the new classification scheme developed by ARIA (1) (scale based on the intensity of symptoms and on their impact on quality of life).
4. Details of any investigations performed previously to evaluate the rhinopathy.

The pulmonologists' questionnaire specified:

1. A number of characteristics of the asthma including duration and severity according to the Global Initiative for Asthma classification scheme (GINA) (10).
2. The presence of rhinitis, conjunctivitis, and sinusitis.
3. Findings from examination of the nose by the pulmonologist, if performed.
4. Interactions with ENT specialists.
5. Whether computed tomography (CT) of the sinuses was done.

Collection of the questionnaires

Each pulmonologist who agreed to participate in the study was to obtain completed questionnaires from the first five consecutive adult

patients with asthma coming for scheduled nonemergent office visits between March 20 and June 30, 2000.

Statistical analysis

The completed questionnaires were sent to the University Clinical Research Institute of Montpellier (EA2415), where they were processed and analyzed using the BMDP program (version 1993).

The descriptive study involved calculating the means and standard deviations of normally distributed quantitative variables and the median with the interquartile range of non-normally distributed quantitative variables. Most variables were nominal or ordinal qualitative variables, for which percentages were calculated. Comparisons of qualitative variables were performed using the chi-square test or the Fisher test, as appropriate. When data on qualitative variables were available from both the patient and the physician, we calculated the kappa coefficient with its 95% confidence interval, tested this coefficient against the zero value, and performed a MacNemar symmetry test. For between-group comparisons of quantitative or ordinal qualitative variables, we used the Kruskal-Wallis test because the assumptions required for analysis of variance were not met. All *P* values lower than 0.05 were considered statistically significant. Explanatory factors were sought using multivariable analysis with a stepwise logistic regression model. Estimated odds ratios (OR) were adjusted on the study factors. The threshold for inclusion and for removal of a variable was 0.2. Validity of the model was checked using the maximum likelihood method and the Hosmer-Lemeshow test. Ninety-five per cent confidence intervals (95% CI) were calculated.

Results

Description of the pulmonologists

Among the office-based pulmonologists canvassed for this national survey, 477 (48%) accepted to participate. Participation was voluntary. The participating pulmonologists were evenly distributed throughout France. Time since board certification was 17 years (range 13–22). The mean number of patients included by each pulmonologist was 3.4, rather than the 5 scheduled in the protocol.

Patient characteristics

Of the 1623 asthma patients included in the study, 47.3% were men. Median age was 35 years (range 21–50). Patients were active, and most (62.4%) lived in houses. Occupations were as follows: executives 44.2%; production workers 18.2%; skilled manual workers 9%; and unemployed 20.1%. Smoking was reported by 17.7% of patients (11.3 per day; range 5–15).

Characteristics of the asthma

According to the pulmonologists, in this population, the asthma was intermittent in 23.5% of patients, mild persistent in 29.7%, moderate persistent in 31.3%, and severe persistent in 15.5%. This evaluation of disease

Table 1. Severity of asthma and presence of rhinopathy and conjunctivitis according to pulmonologists and patients. Note the significant discrepancies with the patients in this study tending to overestimate asthma severity and the presence of conjunctivitis, and to underestimate the presence of a rhinopathy (Mac Nemar test $P < 0.001$)

According to	Asthma severity				Presence of	
	Intermittent	Persistent			Rhinopathy	Conjunctivitis
		Mild	Moderate	Severe		
Pulmonologists	23.5%	29.7%	31.3%	15.5%	76.6%	31.2%
Patients	29.5%		49.6%	20.9%	67.1%	56.8%

severity differed significantly from that done by the patients themselves, some of whom underestimated (3.6%) or overestimated (8.9%) the severity of their asthma (Table 1). Thus, the MacNemar test was highly significant (0.43; 95% CI 0.39–0.47; $P < 0.0001$), more patients (3.6%) were classified as having severe disease by the pulmonologists and mild or moderate disease by the patients; conversely, more patients (8.9%) were classified as having severe disease by the patients and mild or moderate disease by the pulmonologists (See Table 1). Thus, patients were more likely than pulmonologists to report severe disease. Mean asthma duration was 10 years (range 5–20).

The opinions of patients about the effectiveness of their antiasthma treatment varied widely: 47.8% stated that effectiveness was good or very good; 52.3% that it was fair or poor.

Among the patients, 78.7% felt that their asthma was allergic. The offending allergens were (given in decreasing order of frequency) house-dust mites (62.3%), pollens (57%), house dust (46%), animals (29.9%). Patients usually received this information from their physician (86.8%). More than half the patients felt that infections (57.7%) and physical activity (52.6%) were the main triggers of their asthma attacks.

Presence of rhinopathy

According to the pulmonologists, 76.6% of the patients had a rhinopathy and 31.2% had conjunctivitis. The rhinopathy was usually chronic (91%) and was symptomatic on the day of the visit in 57.4%. The diagnosis made by the pulmonologist was allergic rhinitis in most cases (66.2%), nonallergic rhinosinusitis in 17.5% of cases, and nasal polyposis in 10.1%. Among the patients, 67.1% reported a rhinopathy, with a median disease duration of 10 years (range 5–20). Again, significant discrepancies were found between the responses of the pulmonologists and those of the patients. The MacNemar test was significant (0.53; 95% CI 0.48–0.57; $P < 0.0001$). Some patients (14.2%) underestimated the presence of rhinopathy and others overestimated (4.8%) (Table 1). Thus, pulmonologists were more likely than patients to report a rhinopathy. Patients with a rhinopathy diagnosed by the pulmonologist were no different from other patients in terms of age, asthma duration,

asthma severity, or discomfort during daily activities. However, asthma with rhinopathy had a greater negative impact on sleep than asthma alone (no sleep disturbances in 16.2% of people with and 28.3% without rhinopathy, and frequent sleep disturbances in 35.1% of people with and 23.5% without rhinopathy; $P < 0.0001$; OR 2.49; 95% CI: 1.73–3.57). Patients with rhinopathy were more likely to have conjunctivitis (60.3% as compared to 46.5% of patients without rhinopathy; $P < 0.0001$; OR 1.56; 95% CI: 1.21–2.01).

Among the patients, 77.8% felt there was a relation between the two diseases; 40.6% stated that the rhinopathy antedated the asthma, 32.2% that the two diseases started simultaneously, and 19.7% that the rhinopathy postdated the asthma (7.5% of patients were unable to answer).

In the overall population of asthmatic patients, symptoms “apart from colds and influenza during the last 12 months” were (in order of decreasing frequency): sneezing (88.8%), nasal obstruction or stuffiness (79.3%), anterior rhinorrhoea (65%), posterior rhinorrhoea (46.1%), headache (40.7%), yellow–green nasal discharge (31%), anosmia (25.7%), taste loss (16%), and nose-bleeds (14.6%). Among the patients, 66.4% had at least two of the three following symptoms: sneezing, rhinorrhoea (anterior or posterior), and nasal obstruction. In over half the asthmatic patients with rhinopathy (56.8%), the symptoms of rhinopathy were accompanied by evidence of conjunctivitis (usually overestimated by the patients) (Table 1).

These symptoms were more often occasional (73.7%) than permanent; they usually occurred at any time during the day (57.1%) or year (38.8%), although some patients (61.2%) reported a marked seasonal pattern, usually with exacerbation in the spring (32.4%) rather than in winter (14.9%), autumn (9.1%), or summer (4.8%).

Regarding the specific circumstances of onset: 37.5% of patients were unable to indicate any; 32.5% incriminated sudden changes in temperature; 15.4% suggested physical exertion; and 14.6% other factors.

Among the patients included in the survey, 16.4% had a history of sinonasal surgery and 62.5% were taking treatment for their rhinopathy at the time of the survey. Of the latter, 68.2% took their treatment very regularly or regularly. Although only 36.1% felt the treatment was effective, few (7.7%) were concerned about potential side effects.

Impact on sleep and/or daily activities

Among the patients, 52.0% reported frequent impairment of sleep (39.6%) and/or daily activities (37.8%); 25.4% reported both types of impairment. Because these impairments may be related either to the asthma or to the rhinopathy, finer analysis of the criteria for asthma and for rhinopathy was done for patients with and without alterations in these two quality-of-life parameters.

The patients who reported impairment of sleep and/or daily activities showed no differences with the other patients regarding age or asthma duration. However, their asthma was more severe and was more often triggered by exertion and laughter (suggesting bronchial hyperreactivity). These impairments were more common in patients who had a rhinopathy according to the pulmonologist, particularly those whose symptoms were continuous, predominated in the evening, were triggered by temperature changes, were more bothersome

in the summer, included nasal obstruction (OR 1.64; 95% CI: 1.21–2.22) and anosmia (OR 1.72; 95% CI: 1.24–2.38), were accompanied with conjunctivitis, and occurred in patients with a history of ENT procedures, particularly surgery (OR 1.55; 95% CI: 1.03–2.31)—even in those with good compliance to their treatments (Table 2).

Investigations for the rhinopathy

The pulmonologists performed a nasal examination in 56.2% of patients. They ordered sinus CT scans in only 7.9% of patients overall and in 43.2% of patients with rhinitis refractory to medical treatment. However, in 17.6% of patients, CT scans were ordered as a routine investigation. CT was more likely to be ordered in patients with impairment of sleep and/or daily activities (11.3% vs 5.8%, $P = 0.0003$) and in those who were referred to an ENT surgeon (30% vs 1.7%, $P < 0.0001$). Among the patients who reported “nasal problems”,

Table 2. Comparisons of variables that might explain impairments of sleep and/or daily activities. All the study parameters that were significant in univariate analysis were entered into a logistic regression model

Variable		Yes (%)	No (%)	<i>P</i>	Odds ration	95% Confidence interval
Asthma severity	Mild intermittent	19.5	27.1	0.02	NS	
	Mild persistent	28.4	33.1			
	Moderate persistent	33.9	27.5			
	Severe persistent	18.2	12.3			
Asthma triggers	Infections	59.4	56.6	NS		
	Exertion	56.0	49.6			
	Laughter	23.7	16.4			
Rhinopathy according to the pulmonologists	Total	78.9	69.6	0.0001	NS	1.03–1.88
	Allergic rhinitis	57.2	49.3	0.003	1.39	
	Sinusitis	19.2	10.4	<0.0001	NS	
	Nasal polyposis	13.4	6.0	<0.0001	NS	
Rhinopathy severity	Mild	22.3	37.7	<0.0001	–	1.15–2.43
	Moderate	50.8	47.9		1.67	
	Severe	26.9	14.5		2.59	
Chronology of rhinitis symptoms during year	Occasional	65.2	82.6	<0.0001	–	1.35–2.66
	Permanent	26.1	12.4		1.89	
Chronology of rhinitis symptoms during day	More severe in morning	29.0	35.2	0.01	0.76	0.57–1.02
	More severe in evening	14.6	9.2	0.002	1.64	1.07–2.52
Seasonal nature of rhinitis symptoms	More severe in spring	41.8	34.1	0.003	NS	1.18–4.12
	More severe in summer	8.4	2.8	<0.0001	2.20	
Rhinopathy triggers	Temperature changes	40.8	30.0	<0.0001	1.54	1.16–2.03
	Exertion	21.0	11.9	<0.0001	NS	1.03–2.31
Sinus surgery		20.4	11.5	<0.0001	1.55	
Rhinopathy symptoms and other symptoms	Nasal obstruction	76.1	58.6	<0.0001	1.64	1.21–2.22
	Posterior rhinorrhoea	45.4	32.9	<0.0001	NS	1.02–1.94
	Purulent nasal discharge	32.3	20.7	<0.0001	1.40	
	Taste loss	18.6	8.8	<0.0001	NS	
	Anosmia	28.7	14.5	<0.0001	1.72	1.24–2.38
	Epistaxis	14.9	9.8	0.004	NS	1.30–2.27
	Headaches	42.2	26.7	<0.0001	NS	
	Conjunctivitis	64.6	48.5	<0.0001	1.72	
Compliance with treatment	Good*	72.3	62.9	0.008	NS	
	Poor†	27.7	37.0			

* Compliance with treatment was considered good when patients reported taking their treatment very regularly, or regularly.

† Compliance with treatment was considered poor when they reported taking treatment from time to time, or never.

NS = not significant.

55.3% had previously undergone sinus radiographs and 17.2% sinus CT scans.

Relations between pulmonologists and ENT surgeons

In the study population, the pulmonologists referred 21.6% of patients to an ENT surgeon. ENT referral was more common in patients whose rhinitis was refractory to medical treatment (42%) and in those with impairments of sleep and/or daily activities (28.8% *vs* 18.9%, $P < 0.0001$), taste loss (37.9% *vs* 19.4%, $P < 0.0001$), or anosmia (38.9% *vs* 17.5%, $P < 0.0001$). ENT referral was rarely routine (32.8%). Conversely, over half the patients (55%) reported that they had already seen an ENT surgeon.

In this population, only 1.7% of patients were referred to the pulmonologist by an ENT surgeon. Most patients came of their own accord (48.4%) or were referred by a primary-care practitioner (39.6%) or another specialist (10.3%).

Discussion

The survey reported here is a large study of the practices of French pulmonologists regarding the diagnosis and management of rhinopathy in patients with asthma. The results are interesting as few data about the management of rhinopathies in pulmonology practice have been published to date. The survey was conducted in the overall population of office-based pulmonologists (the participants were evenly distributed throughout France) and included over 1600 patients who had asthma and sought medical advice in the spring of 2000. The results reflect the French situation, which might be different in another country.

The distribution of disease severity was different from that reported in population-based studies (9). In the study conducted recently by the CREDES in France, 55% of asthma patients were GINA 1 (as compared to 23.3% in our study), 31% were GINA 2 (29.7% in our study), 9% were GINA 3 (31.3% in our study), and 5% were GINA 4 (15.7% in our study). This is explained by the fact that patients who seek pneumologist advice usually have more severe disease and are not representative of the general population. In contrast, the percentage of smokers among the asthma patients was identical (23% as compared to 17.7% in our work), as was the sex distribution (48% of males *vs* 47.3%). Our survey provides further support that physicians and patients differ in their evaluation of disease severity (with asthma severity being more often overestimated than underestimated by the patients) and of the presence of another condition (with rhinopathy being more often underdiagnosed than overdiagnosed by the patients). The fact that in this study the patients were seeking medical advice for asthma explains why they underestimated the presence of rhinopathy. However, most published studies have

reported that patients underestimated the severity of their asthma but often failed to seek medical advice because they were less sensitive to their symptoms, even when they seemed to be at risk for severe acute asthma (11). Clearly, patients with this profile were not included in the present study, whose participants were recruited in pulmonologists' offices.

Regarding the asthma/rhinopathy combination, epidemiological, pathophysiologic, and clinical studies have found incontrovertible evidence that these two diseases are closely linked. Thus, the nose has been described as the part of the lungs that can be felt with the fingers. These data support the concept that the upper and lower respiratory tracts form a single unit, and it has been suggested that they should be designated by the same term (12). Our survey adds to the large body of evidence supporting this link, with 75% of the asthma patients receiving a diagnosis of rhinopathy from their pulmonologists. A strong point of our study is that it recorded all types of rhinopathy, rather than only nonallergic rhinosinusitis (17.5%), nasal polyposis (10.1%), or allergic rhinitis (66.2%). These prevalences are in keeping with those reported in earlier studies (13). Thus, a review article reported that 75% of patients with extrinsic asthma had persistent rhinitis, as compared to 40% of patients with intrinsic asthma (14). The only available data (13, 14) on nasal polyposis in patients with asthma come from the AIANE (Aspirin Induced Asthma Network) registry of asthma and sensitivity to aspirin (13), where 60.4% of the 500 included patients had sinonasal polyposis. In our study, the information was obtained from the pulmonologists, and no endoscopic investigations were required to establish or refute the ENT diagnosis. Furthermore, rhinopathy and asthma share a number of triggers (1) including allergens, viruses, and aspirin for some clinical patterns. These triggers cause both nasal and bronchial inflammation. For instance, patients who are sensitive to a given pollen experience symptoms of both hay fever and asthma during the corresponding pollen season.

Regarding pathophysiology, the inflammatory infiltrate in asthma is strictly identical to that seen in rhinitis (4), with eosinophils, lymphocytes, and mononuclear cells. These associations and similarities indicate that investigations and treatment for asthma are in order in all patients with rhinitis, and for rhinitis in all patients with asthma, and this is one of the strong messages emerging from the new ARIA workshop report (1).

Another strong point of our study is that it collected data on the management of rhinopathy in the asthma patients: a nasal examination was performed by the pulmonologists in 56.2% of patients, a sinus radiograph had been taken previously in 55.3%, sinus CT scan was ordered in 17.2%, and the advice of an ENT surgeon was sought in 21.6% (55% had previously seen an ENT surgeon and 16.4% had a history of ENT surgery). Appropriately, pulmonologists were more likely to

request these investigations and referrals for patients with rhinitis refractory to medical treatment, loss of taste, anosmia, or impairments of sleep and/or daily activities. Thus, looking for rhinopathy in asthma patients is important because the two disorders often occur in combination. However, the modalities of this search vary and, for instance, examination of the nose by anterior rhinoscopy, using a speculum and mirror is easy to perform by any physician and should be routine.

Regarding impairments of sleep and/or daily activities, a striking finding from our study is that the presence of rhinitis contributed more to these impairments than did the severity of the asthma. Furthermore, the prevalence of these impairments was lower than the 80% prevalence reported in patients with seasonal allergic rhinitis (6). However, these last patients were seeking medical advice for their rhinitis, and it is well known that alterations in quality of life are the main reason for visits by patients with rhinitis. In our study, in contrast, the patients were seeking advice for their asthma, outside the emergency setting. Thus, it is not surprising that "only" 39.6% of our patients reported rhinitis-related sleep impairment, 37.8% rhinitis-related impairment of daily activities, and 52% either of these impairments. None of the characteristics of asthma evaluated in our multivariate analysis were associated with impairments of sleep and/or daily

activities. Although we did not measure lung function in our patients, we asked the pulmonologists to score asthma severity, which is known to be dependent on the severity of bronchial obstruction measured by spirometry (10). The alterations in these quality-of-life parameters were mainly dependent on the characteristics of the rhinopathy, a finding that further emphasizes the need to look for rhinitis.

Appropriate treatment of allergic rhinitis by local glucocorticoid therapy (5) decreases the symptoms of asthma and the bronchial hyperreactivity. Clinicians who manage asthma patients are well aware that control of the rhinitis symptoms is essential to achieving control of the asthma. Nearly two-thirds of our patients (62.5%) were taking medications for their nasal problems. Our finding that pulmonologists described the rhinitis symptoms as more severe than did the patients indicates that they were alert to the crucial importance of rhinitis for asthma patients.

In conclusion, this survey of practices of French pulmonologists regarding the management of rhinopathies in patients with asthma provides additional insights into the impact on quality of life and establishes that there is a high level of compliance with recommendations issued by international workshop reports, including ARIA recommendations.

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