

Retrospective survey of 1271 patients diagnosed as perennial rhinitis

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Summary

Data from 1271 patients with perennial rhinitis has been assessed. This condition predominantly affects children and young adults; 31.5% stated that symptoms first appeared before the age of 10 years, less than 10% were aged 50 years or more suggesting that the disease process may well disappear in later life.

The total sample size was equally divided between the sexes and the mean age for the sexes was similar. In terms of age distribution a sex difference was found in that the peak incidence for males occurred in the age group 10–19 years whereas for females it was in the third decade ($P < 0.001$).

The duration of the disease was, in most cases, between 2 and 9 years but it can extend to over 15 years and thus become subacute or chronic. The major symptom is blocking which could be due to either histological changes in the mucosa or immunological reactions.

Skin tests showed that 64% had a positive reaction to common allergens; however, nasal challenge tests were of little value in determining whether a patient could be classified as allergic. Eosinophils were noted in 66%. The value of skin tests and nasal smears is discussed.

Introduction

Perennial rhinitis is defined as an inflammatory condition of the nose which is often present throughout all seasons of the year; it is labelled 'allergic' if a specific causal allergen can be identified; if not, then the terms intrinsic rhinitis or vasomotor rhinitis are used.

The condition is undoubtedly common in all parts of the world but the exact incidence has not been clearly evaluated. Many ENT surgeons state that cases are commonly seen in the clinic (Lindsay Miller, 1971); some authors have stated that 10% of the population of Britain are affected (McAllen & Langman, 1969). In the USA a survey of allergic conditions of college freshmen was conducted in 1962 and 1963 (Hagy & Settignano, 1969); these authors found that the frequency of non-seasonal

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allergic rhinitis was 5.2%; these figures, however, only related to a narrow age group and cannot be considered representative of the total population.

There is no known data relating to the epidemiology of the disease which is somewhat surprising as it does appear to be relatively common. The purpose of this study is to elucidate some facts relating to various parameters of the disorder in the belief that a better understanding of the disease process might lead to a more accurate diagnosis and eventually to satisfactory treatment.

Materials and methods

Data has been collected from 1271 patients who were selected to take part in a clinical trial to assess the value of sodium cromoglycate therapy in the treatment of perennial rhinitis. The trials were conducted predominantly in Western Europe but also in Australia, South Africa and Israel; the patients were collected from a total of forty-two separate trials.

Patients were selected for the trials on the basis that they had at the time of entry clinical symptoms of perennial rhinitis and that these symptoms had been present for at least 1 year. Patients of all ages were admitted to the studies providing they were capable of administering the trial drug; generally the patients had failed to respond to previous therapy. The investigators completed an admission form and recorded data on a number of parameters such as age, sex, duration of disease, predominant symptoms, history of other atopic diseases and previous therapy. Investigations were carried out including skin reactivity to a range of common allergens, nasal provocation tests and examination of nasal smears for eosinophils.

No attempt has been made to draw conclusions regarding the incidence of the disease as patients were selected for study on the basis of existing clinical perennial rhinitis and were thus not a random sample. Nevertheless, the data which is available on a large group of patients is considered to be of value to assess some factors related to this disease.

Results

Age factor

The mean ages are presented in Table 1.

There was an equal distribution between the sexes and the mean ages for the two sexes were similar.

Males and females were separately stratified into age groups by decades (Fig. 1). The peak incidence in males was in the 10-19 years age group, whereas in females the peak occurred in the third decade. In the 0-19 years group there were 226 males (39.5%) and 167 females (28.3%); this difference between the sexes was significant ($P < 0.001$). Of all patients 9.2% were aged 50 or more at the time of entry into the trial.

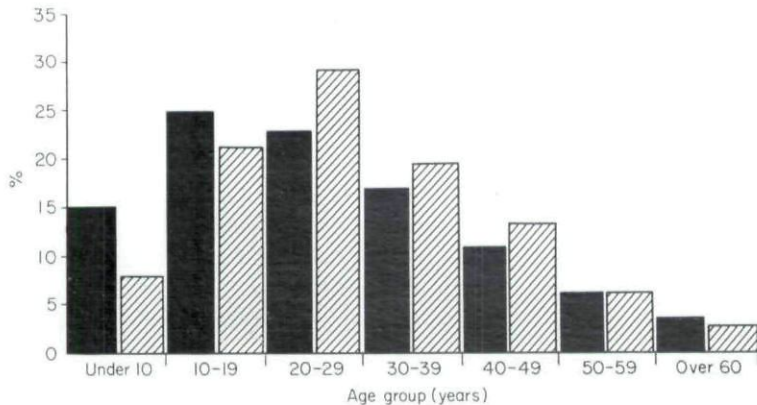
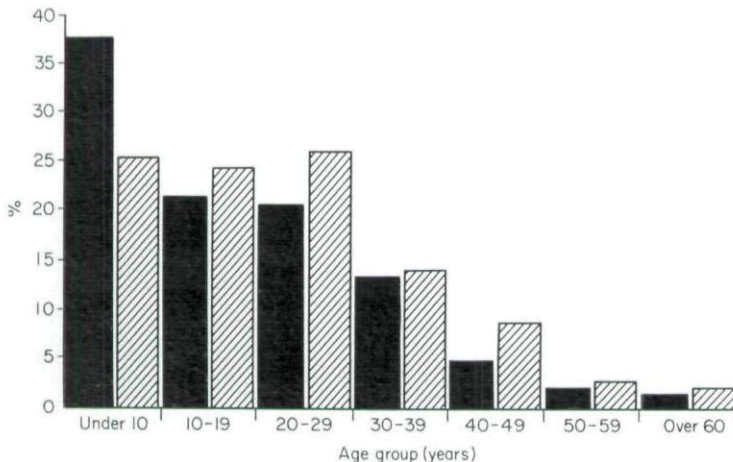
In a large survey of atopic children (Cullen, 1972) it has been shown that significantly more boys than girls suffered from asthma ($P < 0.001$) and hay fever ($P < 0.001$); no figures were quoted for perennial rhinitis. In this series no total sex difference could be demonstrated; there was, however, a significant sex difference in young patients. This survey amplifies the results reported by Cullen so that it is possible to state that in young patients significantly more males than females have allergic diseases of the respiratory tract.

Table 1. Age at entry to trial

Males	25.8 ± 15.7 years	(566)
Females	28.5 ± 14.2 years	(591)
Total	27.8 ± 15.0 years	(1265)*

Figures given are means ± s.e.

* Total numbers exceed combined numbers of males and females by 108 due to missing data on sex.

**Fig. 1.** Age groups. ■, Males; ▨, females.**Fig. 2.** Age of onset of perennial rhinitis. ■, Males; ▨, females.

The incidence of this disease declines with age so that clinically it would be reasonable to inform a patient that there is every chance that by the age of 50+ the disease will 'burn itself out'. One possible explanation for this fact could be a general decline of hormonal influence on the nasal mucosa. Atrophic rhinitis is not uncommon in females (Collins, 1966) and is often found in association with atrophic vaginitis; a possible cause is a decline in oestrogen as both conditions can be treated with local applications containing this hormone.

Age of onset

Having ascertained that the peak incidence of this disease was within the first 30 years, it was of interest to look at data concerning the age of onset (Fig. 2).

Of all patients 31.5% stated that symptoms first appeared before the age of 10. It is of clinical importance to realize that many children suffer from perennial rhinitis; such a child is often labelled 'catarrhal' and the symptoms are associated with a low-grade infection. The relationship between allergy and infection in children is difficult to establish as both lead to inflammation of the nasal mucosa and indeed both aetiological agents may be present. In a study of 100 children over a period of 3-5 years (Holzel, 1968) it was found that in seventy the 'triggering colds' were typical instances of allergic rhinitis and the author concludes that 'respiratory allergy in the toddler is rarely recognized, mostly misdiagnosed and almost universally mismanaged'.

Perennial rhinitis may present in a number of ways in the child, the common picture is that of a constant runny nose particularly during the winter months; frequently the child presents with mouth breathing due to chronic nasal catarrh. Less common, but equally important, is the child who has a chronic irritating night cough which may be due to a post-nasal drip. The child who presents with some hearing loss may be suffering from serous otitis media which is now considered to be an allergic disease, possibly due to an extension from the nose via the eustachian tube; and there are many children who present with vague ill health often complaining of lassitude, headaches and poor appetite, due to sinusitis, and loss of smell or taste, all resulting from perennial rhinitis.

In those in whom the age of onset occurred before the age of 10 there was a sex difference; 37.5% of the males were in this category but only 25.7% of females and this difference is significant ($P < 0.001$). The reason why this disease appears at an earlier age in boys than girls remains obscure.

Duration of disease

Having obtained data on age of entry to trials and age of onset of the disease it was a simple matter to calculate the duration of disease.

The majority of patients (60%) had symptoms for between 2 and 9 years and (32%) for more than 10 years. Perennial rhinitis must therefore be considered as a long-term disease, which over a period of time will produce some changes in nasal histology and thus interfere with the normal physiological processes in the nose.

In a double-blind study, the histology of the mucous membrane has been compared in healthy volunteers and patients (Mygind, Viner & Jackman, 1974); certain differences were noted which clearly indicated changes. Patients had significantly more

Table 2. Duration of disease

Years	Male	Female	Total
Under 2	30	58	88
2-4	170	167	337
5-9	155	163	318
10-14	93	77	170
Over 15	83	96	179
Total	531	561	1092

Table 3. Predominant symptoms—perennial rhinitis

	Yes	No
Sneezing	269 (28%)	692
Blocking	507 (53%)	454
Running	281 (29%)	680
Itching	64 (7%)	897
Eye itching	5 (0.5%)	956
Eye running	4 (0.4%)	957
Others	84 (19%)	877

pseudostratified columnar epithelium than volunteers, this is brought about by decreased air flow through the nose; a similar change has been noted after laryngectomy (Hilding & Hilding, 1970). A striking feature was a great increase in goblet cells in patients; the mean per high-power field was 4.1 compared to 0.95 in volunteers ($P < 0.01$). The other cellular feature noted was that patients had significantly more eosinophils, both superficial and deep, than volunteers. Such changes, particularly in goblet cells, will certainly affect the flow of air through the nose and this will probably be reduced by the thick mucous secretions of these cells.

Symptomatology

Before admission to the trial each patient was questioned as to which symptoms caused the greatest problem (Table 3).

The predominant symptom was nasal obstruction; sneezing and running were noted equally and itching was negligible. Unlike hay fever, predominance of eye symptoms rarely occurred. The fact that nasal obstruction is important can be related to immunological and histological factors. In a study of subjects sensitive to grass pollen (Taylor & Shivalkar, 1971), it was shown that after nasal challenge 37% had both an immediate and a late nasal reaction. Objectively, there was an increase in nasal airways resistance (NAR) which was evident for about 1 hr, the immediate reaction; at a time interval of about 4–6 hr after challenge some subjects had a further increase in NAR which was considered to be a 'late' reaction. During the immediate reaction the increase in NAR was accompanied by sneezing and nasal discharge, whilst during the late reaction patients complained of nasal obstruction. Generally the late reaction was more intense than the immediate one as shown by a more prolonged and greater rise in NAR.

Table 4. Skin test results

Allergen	Sensitive	Not sensitive
Vegetables	319 (30%)	745
Animals	578 (54%)	486
Moulds	138 (13%)	926
Others	64 (6%)	1000

Table 5. Comparison of skin tests between coastal and inland domicile

Allergen		Positive	Negative	
Animal	Coastal	258	166	$P < 0.01$
	Inland	308	293	
Moulds	Coastal	88	336	$P < 0.001$
	Inland	48	553	

If a patient experiences a dual reaction to a natural challenge then it is likely that in time the late reaction will predominate and thus the major symptom would be blocking.

The histological factor which is important in relation to blocking is the increase in goblet cells with the consequent production of a thick mucus. In the study of nasal histology (Mygind *et al.*, 1974) it was noted that in those patients whose predominant symptom was nasal obstruction the mean goblet cell count was 6.7 compared to 2.4 in those patients who complained of sneezing or nasal discharge, thus indicating that blockage may in part be due to goblet cells.

Taylor also found that a proportion of subjects (21%) had both an immediate and late skin reaction and biopsy of the late skin reaction showed perivascular infiltration with mononuclear cells and polymorphonuclear leucocytes, unfortunately biopsies of the late nasal reactions were not performed. However, in another study (Brain *et al.*, 1974) some patients' nasal biopsies showed a similar histological picture to the late skin reactions with perivascular infiltration of chronic inflammatory cells, and it is likely that these changes will result in some thickening of the submucosa again contributing to nasal obstruction.

Skin test results

A total of 1064 patients were skin tested with a range of common allergens; 681 (64%) had a positive result to one or more allergens and 363 (36%) had a negative result.

The allergens have been divided into four main categories (see Table 4).

Many patients exhibited multiple sensitivities; the majority were sensitive to allergens of an animal nature which includes house dust and mites. It was interesting to note that there appeared to be a difference with regard to skin test results between those patients residing in coastal regions and those inland.

The high incidence of animal and mould sensitivity in coastal regions is certainly related to the high humidity and general atmospheric conditions which are more suitable for the growth of moulds and mites.

Table 6. Nasal challenge tests

Allergen	Sensitive	Not sensitive
Vegetables	16 (4%)	413
Animal	101 (24%)	328
Moulds	23 (5%)	406
Others	5 (1%)	424

Table 7. Relationship between skin and nasal tests

		Skin test		Total
		Positive	Negative	
Nasal test	Positive	101	15	116
	Negative	146	161	307
Total		247	176	423

A condition described as 'climate asthma' has been investigated in South Africa (Ordman, 1970); the triggering factor was found to be the high allergenicity of *Dermatophagoides pteronyssinus* which is related to temperature and humidity in coastal regions. It is apparent that a condition 'climate rhinitis' can also exist in such areas.

Nasal challenge

It is known that a patient can have a positive skin test but be asymptomatic, conversely there are many patients who have symptoms of rhinitis but who have negative skin tests; in the latter group it has been suggested that a nasal challenge could be positive in a proportion of subjects. The results of such tests are shown in Table 6.

Only 24% had a positive result with animal allergens, a much lower proportion than those with a positive skin test to this allergen (54%), therefore the value of nasal challenge in routine investigations must be questioned.

A nasal challenge has certain disadvantages. The available area for applying the allergens is limited to the two nares; the procedure is time consuming for both patient and doctor; the interpretation of results is in most cases subjective, and thus open to wide interpretations; repeated nasal challenges may result in local hyposensitization (Taylor & Shivalkar, 1972). One must conclude, therefore, that a nasal test is of limited value in deciding whether a patient has a proven allergy or not.

The relationship between skin and nasal tests was examined. Of the patients 247 (58%) had a positive skin test and 116 (27%) a positive nasal test. If one assumes that either a positive skin test and/or a positive nasal test is justification for labelling the disease as allergic, then 262 (62%) can be so defined; this figure is almost the same as the percentage of patients with a positive skin test from a large sample size (64%).

Table 8. Relationship between skin tests and nasal eosinophils

		Skin test		Total
		Positive	Negative	
Eosinophilia	Positive	246	86	332
	Negative	62	118	180
Total		308	204	512

Nasal smears

It is a relatively simple procedure to obtain a nasal smear and then to stain and examine it for eosinophils. This procedure was performed in 535 patients and eosinophils were noted in 349 (65%).

A number of investigators have considered the relationship between eosinophils and allergic rhinitis. In an extensive investigation of wiped smears of nasal secretions (Bryan & Bryan, 1959) the significant cells found were goblet cells, eosinophils and mast cells; in children a nasal secretion eosinophilia was the rule in grass pollen rhinitis and were usually found in those sensitive to house dust, dogs or cats (Murray, 1970). In a histological study of the nasal mucosa (Mygind *et al.*, 1974) many eosinophils were present in both the epithelium and submucosa in patients and only a few in healthy volunteers ($P < 0.05$). The presence, therefore, of eosinophils in nasal secretions is taken as evidence of an allergic rhinitis.

The relationship between skin tests and nasal eosinophilia is worth considering. Sixty per cent had a positive skin test and 65% an eosinophilia; 77% had either a

Table 9.

	Yes	No
Steroids	42 (3.8%)	1070
Antihistamines	562 (50.2%)	550
Decongestants	204 (18.4%)	908
SCG	75 (6.71%)	1037
Surgery	30 (2.7%)	1082
Others	275 (24.8%)	837

positive skin test and/or a nasal eosinophilia. Thus if it is accepted that a positive skin test or eosinophils in the nasal secretion indicates an allergic rhinitis then it can be stated that nearly 80% of patients presenting with perennial rhinitis can be classified as allergic.

Previous therapy

It was interesting to note what form of therapy had been previously prescribed (see Table 9).

The fact that antihistamines had been widely prescribed indicates that many clinicians believe that symptoms are due to histamine release into the tissues. The use of decongestants is to be deprecated due to the rebound phenomenon, nevertheless these are prescribed to alleviate nasal congestion. Steroids in the form of tablets have not been widely used because of side effects and also because many patients are young and the disease is not generally considered to be life threatening. The use of other therapies is high and this includes antibiotics, gamma globulins and non-specific agents.

Conclusions

Perennial rhinitis is a common disease which predominantly affects young people for a number of years; it is often not diagnosed or misdiagnosed and consequently inadequately treated. Any patient who presents with nasal symptoms which persist for

any length of time, or with symptoms related to paranasal organs, must be considered as suffering from perennial rhinitis and fully investigated by history, skin testing and nasal smears. Unless this diagnosis is considered therapy will inevitably be unsatisfactory and the patient will suffer unnecessary discomfort.

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