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MANAGEMENT OF ALLERGIC RHINITIS AND ITS IMPACT ON ASTHMA

POCKET GUIDE



A Pocket Guide for Physicians and Nurses

2001

BASED ON THE ALLERGIC RHINITIS AND ITS IMPACT ON ASTHMA WORKSHOP REPORT
In collaboration with the World Health Organisation

ARIA

ALLERGIC RHINITIS AND ITS IMPACT ON ASTHMA INITIATIVE

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ADAPTING GUIDELINES FOR LOCAL USE

Local resources and cultural preferences determine how guidelines are used in each community and must be considered as you:

- estimate the prevalence and costs of allergic rhinitis
- make prescribing decisions based on drug affordability and availability

ADAPTING GUIDELINES FOR USE IN LOW INCOME COUNTRIES

- ❑ In developing countries, the management of rhinitis is based on medication affordability and availability.
- ❑ The rationale for treatment choice in developing countries is based upon:
 - level of efficacy
 - low drug cost affordable for the majority of patients
 - inclusion in the WHO essential list of drugs. (Only chlorpheniramine and beclomethasone are listed.)
 - it is hoped that new drugs will shortly be included on this list
- ❑ Immunotherapy is not usually recommended in developing countries for the following reasons:
 - many allergens in developing countries are not well identified
 - specialists must prescribe desensitisation
- ❑ **Stepwise treatment proposed:**
 - **Mild intermittent rhinitis:** oral H1-antihistamines.
 - **Moderate-Severe intermittent rhinitis:** Intranasal beclomethasone (300-400µg daily). If needed, after a week of treatment, oral H1-antihistamines and/or a short term course of oral corticosteroids will be added.
 - **Mild persistent rhinitis:** Treatment with oral H1-antihistamines or a low dose (100-200 µg) of intranasal beclomethasone will be sufficient.
 - **Moderate-Severe persistent rhinitis:** Intranasal beclomethasone (300-400 µg daily). If symptoms are severe, add oral H1-antihistamines and/or a short course of oral corticosteroids at the beginning of the treatment.
- ❑ **Asthma management** for developing countries is included in the IUATLD Asthma Guide. The affordability of inhaled steroids is usually low in developing countries. If the patient can afford to be treated for both manifestations of the disease, it is recommended to add the treatment of allergic rhinitis to the asthma management plan.

PREFACE

- ❑ Allergic rhinitis is **clinically defined** as a symptomatic disorder of the nose, induced after allergen exposure, by an IgE-mediated inflammation of the nasal membranes.
- ❑ Allergic rhinitis represents **a global health problem**. It is a common disease worldwide affecting at least 10 to 25 % of the population and its prevalence is increasing. Although allergic rhinitis is not usually a severe disease, it alters the social life of patients and affects school performance and work productivity. Moreover, the costs incurred by rhinitis are substantial.
- ❑ **Asthma and rhinitis** are common co-morbidities, suggesting the concept of "one airway, one disease".
- ❑ New knowledge about the mechanisms underlying allergic inflammation of the airways has resulted in better therapeutic strategies. New routes of administration, dosages, and schedules have also been studied and validated.
- ❑ Guidelines for the diagnosis and treatment of allergic rhinitis have already been published. However, they have not been evidence-based with a formal assessment of the evidence for recommendations, and have not considered the recommendations in terms of patient co-morbidities.
- ❑ The Allergic Rhinitis and its Impact on Asthma (ARIA) initiative has been developed in collaboration with the World Health Organisation (WHO). This document is intended to be a state-of-the-art pocket guide for the specialist as well as for the general practitioner. It aims:
 - to update clinicians' knowledge of allergic rhinitis
 - to highlight the impact of allergic rhinitis on asthma
 - to provide an evidence-based approach to diagnosis
 - to provide an evidence-based approach to treatment
 - to provide a stepwise approach to the management of the disease.

RECOMMENDATIONS

1. Classification of allergic rhinitis as a major chronic respiratory disease due to its:
 - prevalence
 - impact on quality of life
 - impact on work/school performance and productivity
 - economic burden
 - links with asthma
 - association with sinusitis and other co-morbidities such as conjunctivitis.
2. Along with other known risk factors, allergic rhinitis should be considered as a risk factor for asthma.
3. A new subdivision of allergic rhinitis has been made:
 - intermittent
 - persistent
4. The severity of allergic rhinitis is classified as "mild" or "moderate/severe" depending on the severity of symptoms and quality of life outcomes.
5. Depending on the subdivision and severity of allergic rhinitis, a stepwise therapeutic approach is outlined.
6. The treatment of allergic rhinitis should combine:
 - allergen avoidance (when possible)
 - pharmacotherapy
 - immunotherapy
7. Environmental and social factors should be optimised to allow the patient to lead a normal life.
8. Patients with persistent allergic rhinitis should be evaluated for asthma by history, by chest examination, and if possible, by the assessment of airflow obstruction before and after a bronchodilator.
9. Patients with asthma should be appropriately evaluated (history and physical examination) for rhinitis.
10. A combined strategy should ideally be used to treat coexistent upper and lower airway diseases in terms of efficacy and safety.
11. In developing countries, a specific strategy may be needed depending on available treatments and interventions, and their cost.

SPECIAL CONSIDERATIONS

Pregnancy

- ❑ Rhinitis is often a problem during pregnancy since nasal obstruction may be aggravated by the pregnancy itself.
- ❑ Caution must be taken when administering any medication during pregnancy, as most medications cross the placenta.
- ❑ For most drugs, limited studies have been completed, and only on small groups with no long-term analysis.

Ageing

- ❑ With ageing, various physiological changes occur in the connective tissue and vasculature of the nose which may predispose or contribute to chronic rhinitis.
- ❑ Allergy is a less common cause of persistent rhinitis in subjects over 65 years of age.
 - atrophic rhinitis is common and difficult to control
 - rhinorrhea can be controlled with anticholinergics
 - some drugs (reserpine, guanethidine, phentolamine, methyldopa, prazosin, chlorpromazine or ACE inhibitors) can cause rhinitis
- ❑ Some drugs may induce specific side effects in elderly patients
 - decongestants and drugs with anticholinergic activity may cause urinary retention in patients with prostatic hypertrophy
 - sedative drugs may have greater side effects

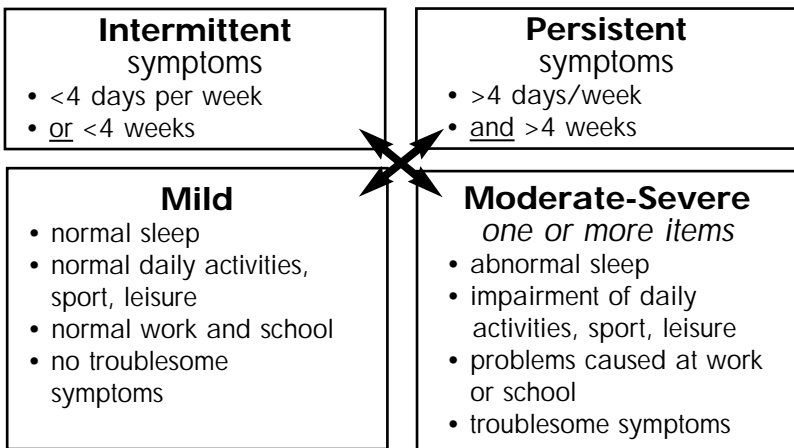
PAEDIATRIC ASPECTS

- ❑ Allergic rhinitis is part of the "allergic march" during childhood. Intermittent allergic rhinitis is unusual before two years of age. Allergic rhinitis is most prevalent during school age years.
- ❑ Allergy tests can be done at any age and may yield important information.
- ❑ The principles of treatment for children are the same as for adults, but special care has to be taken to avoid the side effects typical in this age group.
- ❑ Doses of medication have to be adjusted and special considerations followed. Few medications have been tested in children under the age of two years.
- ❑ In children, symptoms of allergic rhinitis can impair cognitive functioning and school performance, which can be further impaired by the use of sedating oral H1-antihistamines.
- ❑ Oral and intramuscular glucocorticosteroids should be avoided in the treatment of rhinitis in young children.
- ❑ Intranasal glucocorticosteroids are an effective treatment for allergic rhinitis. However, their possible effect on growth for some, but not all, intranasal glucocorticosteroids is of concern. It has been shown that the recommended doses of intranasal mometasone and fluticasone did not affect growth in children with allergic rhinoconjunctivitis.
- ❑ Disodium cromoglycate is commonly used to treat allergic rhinoconjunctivitis in children because of the safety of the drug.

CLASSIFICATION OF ALLERGIC RHINITIS

- ❑ **Allergic rhinitis** is clinically defined as a symptomatic disorder of the nose induced by an IgE-mediated inflammation after allergen exposure of the membranes of the nose.
- ❑ **Symptoms** of allergic rhinitis include:
 - rhinorrhea
 - nasal obstruction
 - nasal itching
 - sneezingwhich are reversible spontaneously or with treatment.
- ❑ Allergic rhinitis was previously subdivided, based on time of exposure, into seasonal, perennial, and occupational. This subdivision is not entirely satisfactory.
- ❑ The new classification of allergic rhinitis:
 - uses symptoms and quality of life parameters
 - is based on duration, and is subdivided into "intermittent" or "persistent" disease
 - is based on severity, and is subdivided into "mild" or "moderate-severe", depending on symptoms and quality of life

Figure 1: Classification of allergic rhinitis



TRIGGERS OF ALLERGIC RHINITIS

Allergens

- ❑ **Aeroallergens** are often involved in allergic rhinitis.
 - The increase in domestic allergens is partly responsible for the increase in the prevalence of rhinitis, asthma, and allergies.
 - The allergens present in the home are principally mites, domestic animals, insects or are derived from plant origin.
 - Common outdoor allergens include pollens and moulds.
- ❑ **Occupational rhinitis** is less well documented than occupational asthma, but nasal and bronchial symptoms often co-exist in the same patient.
- ❑ **Latex allergy** has become an increasing concern to patients and health professionals. Health professionals should be aware of this problem and develop strategies for treatment and prevention.

Pollutants

- ❑ Epidemiological evidence suggests that pollutants exacerbate rhinitis.
- ❑ The mechanisms by which pollutants cause or exacerbate rhinitis are now better understood.
- ❑ **Indoor air pollution** is of great importance since subjects in industrialised countries spend over 80% of their time indoors. Indoor pollution includes domestic allergens and indoor gas pollutants, among which **tobacco smoke** is the major source.
- ❑ In many countries, **urban-type pollution** is primarily of automobile origin and the principal atmospheric pollutants include ozone, oxides of nitrogen and sulphur dioxide. These may be involved in the aggravation of nasal symptoms in patients with either allergic rhinitis, or, in non-allergic subjects.
- ❑ Diesel exhaust may enhance the formation of IgE and allergic inflammation.

Aspirin

Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) commonly induce rhinitis and asthma.

Treatment of concomitant rhinitis and asthma

- ❑ **The treatment of asthma should follow the GINA guidelines.**
- ❑ Some of the drugs are effective in the treatment of both rhinitis and asthma (e.g. glucocorticosteroids and antileukotrienes).
- ❑ However, others are only effective in the treatment of either rhinitis or asthma (e.g. α - and β -adrenergic agonists, respectively).
- ❑ Some drugs are more effective in rhinitis than in asthma (e.g. H1-antihistamines).
- ❑ Optimal management of rhinitis may improve coexisting asthma.
- ❑ Drugs administered by oral route may affect both nasal and bronchial symptoms.
- ❑ The safety of intranasal glucocorticosteroids is well established. However, large doses of inhaled (intra-bronchial) glucocorticosteroids can induce side effects. One of the problems of dual administration is the possibility of additive side effects.
- ❑ It has been proposed that the prevention or early treatment of allergic rhinitis may help to prevent the occurrence of asthma or the severity of bronchial symptoms but, more data are needed.

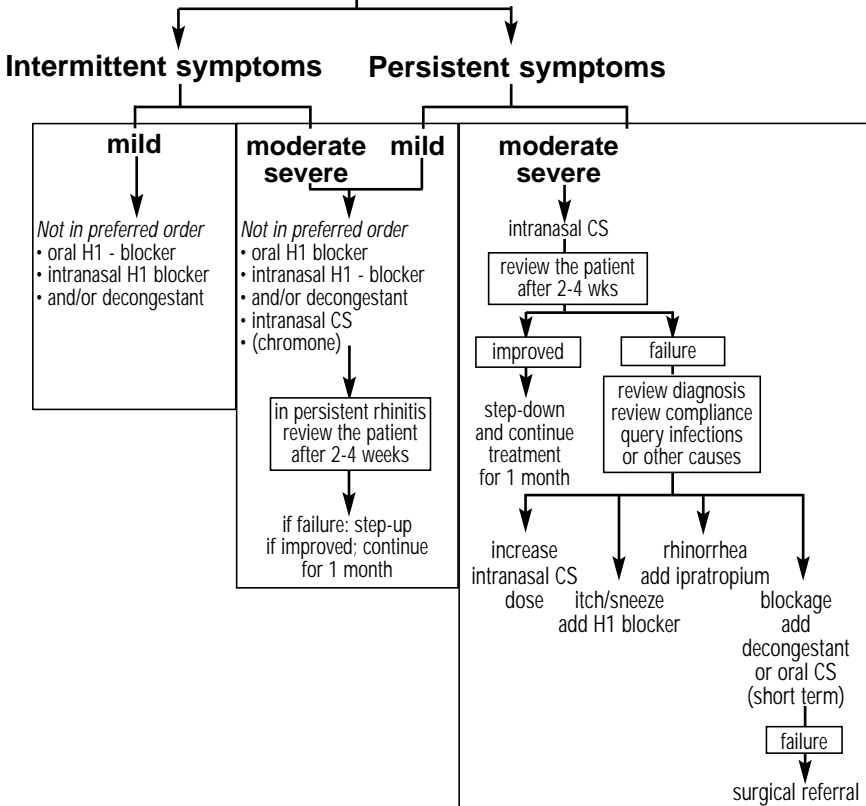
TREAT IN A STEPWISE APPROACH

(adolescents and adults)

Diagnosis of allergic rhinitis

(history ± skin prick tests or serum specific IgE)

Allergen avoidance



If conjunctivitis add:

- oral H1-blocker
- or intraocular H1 blocker
- or intraocular chromone
- (or saline)

consider specific immunotherapy

In case of improvement: step down. In case of worsening: step up.

MECHANISMS OF ALLERGIC RHINITIS

- ❑ Allergy is classically considered to result from an IgE-mediated response associated with nasal inflammation.
- ❑ Allergic rhinitis is characterised by an inflammatory infiltrate made up of different cells. This cellular response includes:
 - chemotaxis, selective recruitment and trans-endothelial migration of cells
 - release of cytokines and chemokines
 - activation and differentiation of various cell types including eosinophils, T-cells, mast cells and epithelial cells
 - prolongation of their survival
 - release of mediators by these activated cells. Among these, histamine and cysteinyl-leukotrienes (CystLT) are the major mediators
 - communication with the immune system and the bone marrow
- ❑ Non-specific nasal hyperreactivity is an important feature of allergic rhinitis. It is defined as an increased nasal response to normal stimuli resulting in sneezing, nasal congestion and/or secretion.
- ❑ Intermittent rhinitis can be mimicked by nasal challenge with pollen allergens and it has been shown that an inflammatory response occurs during the late-phase reaction.
- ❑ In persistent allergic rhinitis, allergic triggers interact with an ongoing inflammatory reaction. Symptoms are due to this complex interaction.
- ❑ "Minimal persistent inflammation" is a new and important concept. In patients with persistent allergic rhinitis, allergen exposure varies throughout the year and there are periods in which there is little exposure. Even though symptom free, these patients, still present with inflammation of the nose.
- ❑ The understanding of the mechanisms of disease generation provides a framework for rational therapy in this disorder based on the complex inflammatory reaction rather than on the symptoms alone.

CO-MORBIDITIES

Allergic inflammation does not limit itself to the nasal airway. Multiple co-morbidities have been associated with rhinitis.

Asthma

- ❑ The nasal and bronchial mucosa have many similarities.
- ❑ Epidemiological studies have consistently shown that asthma and rhinitis often co-exist in the same patients.
 - Most patients with allergic and non-allergic asthma have rhinitis
 - Many patients with rhinitis have asthma
 - Allergic rhinitis is associated with and also constitutes a risk factor for asthma
 - Many patients with allergic rhinitis have increased non-specific bronchial hyperreactivity
- ❑ Pathophysiological studies suggest that a strong relationship exists between rhinitis and asthma. Although differences exist between rhinitis and asthma, upper and lower airways are considered to be affected by a common, and probably, evolving inflammatory process, which may be sustained and amplified by interconnected mechanisms.
- ❑ Allergic diseases may be systemic. Bronchial challenge leads to nasal inflammation and nasal challenge leads to bronchial inflammation.
- ❑ When considering a diagnosis of rhinitis or asthma, an evaluation of both the lower and upper airways should be made.

Other co-morbidities

- ❑ These include sinusitis and conjunctivitis.
- ❑ The associations between allergic rhinitis, nasal polyposis and otitis media are less well understood.

CONSIDER IMMUNOTHERAPY

- ❑ Specific immunotherapy is effective when optimally administered.
- ❑ Standardised therapeutic vaccines are favoured when available.
- ❑ Subcutaneous immunotherapy raises contrasting efficacy and safety issues. Thus, the use of optimal doses of vaccines labelled either in biological units or in mass of major allergens has been proposed. Doses of 5 to 20 µg of the major allergen are optimal doses for most allergen vaccines.
- ❑ Subcutaneous immunotherapy alters the natural course of allergic diseases.
- ❑ Subcutaneous immunotherapy should be performed by trained personnel and patients should be monitored for 20 minutes after injection.

Subcutaneous specific immunotherapy is indicated

- ❑ In patients insufficiently controlled by conventional pharmacotherapy.
- ❑ In patients in whom oral H1-antihistamines and intranasal pharmacotherapy insufficiently control symptoms.
- ❑ In patients who do not wish to be on pharmacotherapy.
- ❑ In patients in whom pharmacotherapy produces undesirable side effects.
- ❑ In patients who do not want to receive long-term pharmacological treatment.

High dose nasal and sublingual-swallow specific immunotherapy

- ❑ May be used with doses at least 50 to 100 times greater than those used for subcutaneous immunotherapy.
- ❑ In patients who had side effects or refused subcutaneous immunotherapy.
- ❑ The indications follow those of subcutaneous injections.

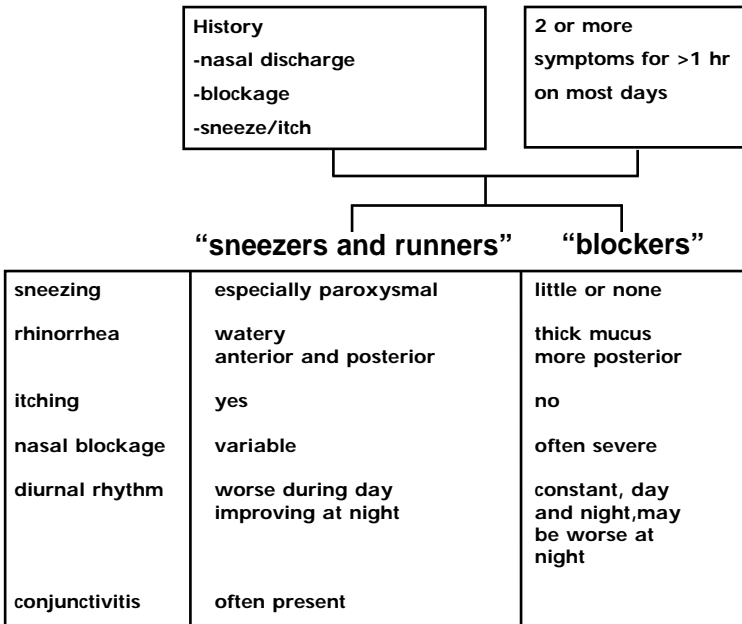
In children, specific immunotherapy is effective. However, it is not recommended to commence immunotherapy in children under 5 years of age.

Name and Also known as	Generic name	Mechanism of action	Side effects	Comments
Local chromones (Intranasal, intraocular)	Cromoglycate Nedocromil	- mechanism of action poorly known	- minor local side effects	- intraocular chromones are very effective - intranasal chromones are less effective and their effect is short lasting - overall excellent safety
Oral decongestants	Ephedrine Phenylephrine Pseudoephedrine <i>Others</i>	- sympathomimetic drug - relieve symptoms of nasal congestion	- hypertension - palpitations - restlessness - agitation - tremor - insomnia - headache - dry mucous membranes - urinary retention - exacerbation of glaucoma or thyrotoxicosis	- use oral decongestants with caution in patients with heart disease - Oral H1 - antihistamine-decongestant combination products may be more effective than either product alone but side effects are combined
Intranasal decongestants	Epinephrine Naphthazoline Oxymethazoline Phenylephrine Tetrahydrozoline Xylometazoline <i>Others</i>	- sympathomimetic drug - relieve symptoms of nasal congestion	- same side effects as oral decongestants but less intense - rhinitis medicamentosa (a rebound phenomenon occurring with prolonged use over 10 days)	- act more rapidly and more effectively than oral decongestants - limit duration of treatment to less than 10 days to avoid rhinitis medicamentosa
Intranasal anticholinergics	Ipratropium	- anticholinergic block almost exclusively rhinorrhea	- minor local side effects - almost no systemic anticholinergic activity	- effective in allergic and non-allergic patients with rhinorrhea
Anti-leukotrienes	Montelukast Pranlukast Zafirlukast	- block CystLT receptor	- well tolerated	- promising drugs used alone or in combination with oral H1-antihistamines but more data are needed to position these drugs

SYMPTOMS OF ALLERGIC RHINITIS

- ❑ Clinical history is essential for an accurate diagnosis of rhinitis, assessment of its severity, and likely response to treatment.
- ❑ In patients with mild intermittent allergic rhinitis, a nasal examination is optimal. All patients with persistent allergic rhinitis need a nasal examination. Anterior rhinoscopy, using a speculum and mirror, gives limited information. Nasal endoscopy, usually performed by specialists, is more useful.

Figure 2: Clinical assessment and classification of rhinitis



Lund, V. J., et al., International Consensus Report on the Diagnosis and Management of Rhinitis. International Rhinitis Management Working Group. *Allergy*, 1994; 49 (Suppl 19): 1-34.

DIAGNOSING ALLERGIC RHINITIS

□ **The diagnosis of allergic rhinitis** is based on:

- a typical history of allergic symptoms
- allergic symptoms are those of “sneezers and runners”. However, these symptoms are not necessarily of allergic origin
- diagnostic tests
 - *In vivo* and *in vitro* tests used to diagnose allergic diseases are directed towards the detection of free or cell-bound IgE. The diagnosis of allergy has been improved by allergen standardisation providing satisfactory diagnostic vaccines for most inhalant allergens.
 - **Immediate hypersensitivity skin tests** are widely used to demonstrate an IgE-mediated allergic reaction. These represent a major diagnostic tool in the field of allergy. If properly performed, they yield useful confirmatory evidence for the diagnosis of a specific allergy. As there are many complexities for their performance and interpretation, it is recommended that they should be carried out by trained health professionals.
 - **The measurement of allergen-specific IgE** in serum is of importance and is of similar value to skin tests.
 - **Nasal challenge tests** with allergens are used in research and, to a lesser extent, in clinical practice. They may be useful, especially in the diagnosis of occupational rhinitis.
- **Imaging** is not usually necessary.

□ **The diagnosis of asthma**

- Due to the transient nature of the disease, and the reversibility of the airflow obstruction (spontaneously or with treatment) the **diagnosis of concomitant asthma** may be difficult.
- Guidelines for recognising and diagnosing asthma have been published by the Global Initiative for Asthma (GINA) and are recommended by ARIA.
- Measurement of lung function and confirmation of the reversibility of airflow obstruction are essential steps in the diagnosis of asthma.

GLOSSARY OF RHINITIS MEDICATIONS

Name and Also known as	Generic name	Mechanism of action	Side effects	Comments
Oral H1-antihistamines	2nd generation Cetirizine Ebastine Fexofenadine Loratadine Mizolastine Acrivastine Azelastine New products Desloratadine Levocetirizine 1st generation Chlorpheniramine Clemastine Hydroxyzine Ketotifen Mequitazine Oxatomide <i>Others</i> Cardiotoxic Astemizole Terfenadine	<ul style="list-style-type: none"> - blockage of H1 receptor - some anti-allergic activity - new generation drugs can be used once daily - no development of tachyphylaxis 	2nd generation <ul style="list-style-type: none"> - no sedation for most drugs - no anti-cholinergic effect - no cardiotoxicity - acrivastine has sedative effects - oral azelastine may induce sedation and a bitter taste 1st generation <ul style="list-style-type: none"> - sedation is common - and/or anti-cholinergic effect 	<ul style="list-style-type: none"> - new generation oral H1- antihistamines are preferred for their favourable efficacy/safety ratio and pharmacokinetics - rapidly effective (less than 1 hr) on nasal and ocular symptoms - poorly effective on nasal congestion - cardiotoxic drugs should be avoided
Local H1-antihistamines (Intranasal, intraocular)	Azelastine Levocabastine	<ul style="list-style-type: none"> - blockage of H1 receptor - some anti-allergic activity for azelastine 	<ul style="list-style-type: none"> - minor local side effects - azelastine: bitter taste in some patients 	<ul style="list-style-type: none"> - rapidly effective (<30mins) on nasal or ocular symptoms
Intranasal corticosteroids	Beclomethasone Budesonide Flunisolide Fluticasone Mometasone Triamcinolone	<ul style="list-style-type: none"> - reduce nasal hyperreactivity - potently reduce nasal inflammation 	<ul style="list-style-type: none"> - minor local side effects - wide margin for systemic side effects - growth concerns with some molecules only (see <i>paediatric section p.20</i>) - in young children consider the combination of intranasal and inhaled drugs 	<ul style="list-style-type: none"> - the most effective pharmacological treatment of allergic rhinitis - effective on nasal congestion - effect on smell - effect observed after 6-12 hrs but maximal effect after a few days
Oral/IM corticosteroids	Dexamethasone Hydrocortisone Methylprednisolone Prednisolone Prednisone Triamcinolone Betamethasone Deflazacort	<ul style="list-style-type: none"> - potently reduce nasal inflammation - reduce nasal hyperreactivity 	<ul style="list-style-type: none"> - systemic side effects common in particular for IM drugs - depot injections may cause local tissue atrophy 	<ul style="list-style-type: none"> - when possible, intranasal corticosteroids should replace oral or IM drugs - however, a short course of oral corticosteroids may be needed with severe symptoms

PHARMACOLOGICAL MANAGEMENT OF ALLERGIC RHINITIS

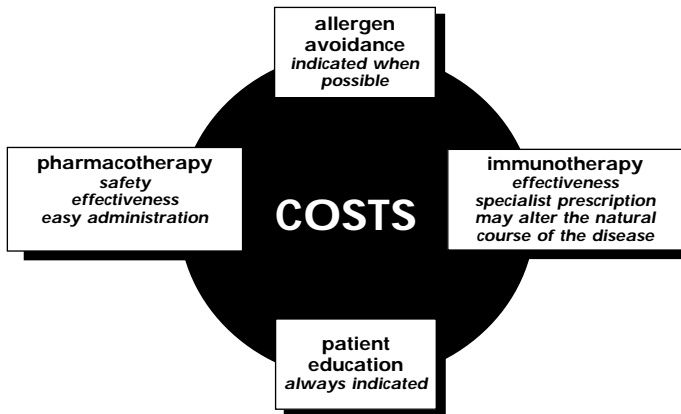
Effect of therapies on rhinitis symptoms					
	sneezing	rhinorrhea	nasal obstruction	nasal itch	eye symptoms
H1-antihistamines					
oral	++	++	+	+++	++
intranasal	++	++	+	++	0
intraocular	0	0	0	0	+++
Corticosteroids					
intranasal	+++	+++	+++	++	++
Chromones					
intranasal	+	+	+	+	0
intraocular	0	0	0	0	++
Decongestants					
intranasal	0	0	++++	0	0
oral	0	0	+	0	0
Anti-cholinergics	0	++	0	0	0
Anti-leukotrienes	0	+	++	0	++

Adapted from van Cauwenberge, P., et al., Consensus statement on the treatment of allergic rhinitis. European Academy of Allergology and Clinical Immunology. *Allergy*, 2000; 55(2): p.116-34.

MANAGEMENT

- ❑ The nasal and bronchial mucosa have many similarities.
- ❑ The management of allergic rhinitis includes:
 - **allergen avoidance:**
 - most allergen avoidance studies have dealt with asthma symptoms and very few have studied rhinitis symptoms. A single intervention may be insufficient to control symptoms of rhinitis or asthma
 - however, allergen avoidance, including house mites, should be an integral part of a management strategy
 - more data are needed to fully appreciate the value of allergen avoidance
 - **medications (pharmacological treatment)**
 - **specific immunotherapy**
 - **education**
 - **surgery** may be used as an adjunctive intervention in a few highly selected patients
- ❑ These recommendations provide a strategy that combines the treatment of both upper and lower airway disease in terms of efficacy and safety.
- ❑ Follow-up is required in patients with persistent rhinitis and severe intermittent rhinitis.

Figure 3: Therapeutic considerations



RECOMMENDATIONS ARE EVIDENCE-BASED

❑ **Recommendations are evidence-based**

Based on randomised-controlled trials (RCT) carried out on studies performed with the previous classification of rhinitis:

- seasonal (SAR)
- and perennial (PAR) allergic rhinitis

❑ **The strength of recommendation is:**

- A: recommendation based on RCT or meta-analysis
- D: recommendation based on the clinical experience of experts

Intervention	Seasonal		Perennial	
	adults	children	adults	children
oral H1-antihistamines	A	A	A	A
intranasal H1-antihistamines	A	A	A	A
intranasal corticosteroids	A	A	A	A
intranasal chromones	A	A	A	
anti-leukotrienes	A			
subcutaneous SIT	A	A	A	A
sublingual SIT	A	A	A	
nasal SIT	A	A	A	
allergen avoidance	D	D	D	D

SIT: specific immunotherapy

For sublingual and nasal SIT, the recommendation is only for very high dose treatment

SELECT MEDICATIONS

- ❑ Medications have no long-lasting effect following discontinuation. Therefore, in persistent disease, maintenance treatment is required.
- ❑ Tachyphylaxis does not usually occur with prolonged treatment.
- ❑ Medications used for rhinitis are most commonly administered either intranasally or orally.
- ❑ Some studies have compared the relative efficacy of these medications, of which, intranasal corticosteroids are the most effective. However, the choice of treatment also depends on many other criteria.
- ❑ The use of alternative therapy (e.g. homeopathy, herbalism, acupuncture) for the treatment of rhinitis is increasing. There is an urgent need for large, randomised and controlled clinical trials for alternative therapies of allergic diseases and rhinitis. Scientific and clinical evidence are lacking for these therapies.
- ❑ Intramuscular injection of glucocorticosteroids is not usually recommended due to the possible occurrence of systemic side effects.
- ❑ Intranasal injection of glucocorticosteroids is not usually recommended due to the possible occurrence of severe side effects.