

Allergy or the common cold – a topic still relevant

Agnieszka Lipiec^{1, 3}, Piotr Rapiejko^{2, 3}

¹ Department of the Prevention of Environmental Hazards, Allergology and Immunology, Medical University of Warsaw, Poland

² Clinic of Otolaryngology and Oncologic Laryngology at the Clinical Department of Cranio-Maxillofacial Surgery, Military Medical Institute, Warsaw, Poland Allergen Research Centre Ltd., Warsaw, Poland

Abstract:

Nasal discharge (runny nose), impaired nasal passage and sneezing are symptoms characterizing inflammation of the nasal mucosa. The article presents the characteristics of two disease entities for which the above symptoms are common: allergic rhinitis and common cold. Special attention is paid to features that allow for differential diagnosis. Current recommendations for the diagnostic and therapeutic management of these two diseases are discussed.

Key words: allergy, allergic rhinitis, common cold

Introduction

Nasal discharge (runny nose), impaired nasal passages and sneezing are symptoms characterizing inflammation of the nasal mucosa, which is a common problem in both adult and paediatric populations. It can have a different etiology, most often infectious or allergic (allergic rhinitis [ANN]). A separate clinical phenotype is a non-allergic, non-infectious rhinitis.

Allergic rhinitis

Allergic rhinitis, according to the ARIA document (Allergic Rhinitis and its Impact on Asthma), is defined as a clinically overt rhinitis that occurs after exposure to an allergen, as a result of IgE-mediated inflammation of the mucosa of this organ [1, 2]. Symptoms of AR are runny nose, nasal obstruction, itchy nose, sneezing, and itchy, red and watery eyes that resolve spontaneously or with treatment.

The largest Polish epidemiological study – ECAP (Epidemiology of Allergic Diseases in Poland) showed that the frequency of AR in the group of 6–7-year-old children is 23.6%, in the group of 13–14-year-old adolescents – 24.6%, and in the adult

population – 21.0% (the mean frequency of AR in the study population was 22.54%) [3].

The clinical picture of allergic rhinitis, its duration (intermittent vs persistent) and the degree of severity (mild, moderate, severe) depend, among others, on the type of allergen you are allergic to, as well as the time and degree of exposure to the allergen.

Exposure to a low concentration of house dust mite (*Dermatophagoides pteronyssinus*, *Dermatophagoides farinae*) allergens may induce symptoms of nasal oedema perceived as a slight obstruction of nasal patency, mainly at night (house dust mite allergens present in the bed), and exposure to a high concentration of mite allergen also causes bouts of sneezing, itching, and profuse nasal discharge (e.g. when cleaning dusty rooms). Similarly, exposure to high concentrations of pollen allergens at the peak of the pollen season (e.g. birch, grass) results in increased disease symptoms, and exposure to allergens of plant pollen usually reaching low concentrations in the air (e.g. goosefoots) determines the occurrence of less intense symptoms [4]. In addition, a patient with AR may have typical histamine-dependent symptoms: sneezing, runny nose, itching of the nose and eyes (sneezers), or

impaired nasal patency (blockers) [5]. This influences the treatment decisions.

Many patients with AR will also develop allergic symptoms in the lower respiratory tract in the form of paroxysmal cough or shortness of breath, because according to the concept of “one airway, one disease”, AR and asthma often coexist [1, 2].

Common cold

We define a common cold (viral inflammation of the nasopharynx and paranasal sinuses) as a set of clinical symptoms resulting from acute inflammation of the nasal mucosa, pharynx and paranasal sinuses in the course of viral infections [6, 7]. It is the third most frequently diagnosed illness during visits to a doctor's office. It is especially common in children.

In children attending nurseries, kindergartens or schools, the frequency of catching a cold is estimated at 6–10 times a year, and in the case of adults, on average 2–4 times a year, especially in the colder months [8, 9].

More than 200 types of viruses have been identified that may be the etiological factor of the common cold, with rhinoviruses being the most common in almost half of the cases. Coronaviruses (10–15%), parainfluenza viruses, RS virus, adeno- and enteroviruses may also be causative agents [6].

Replication of the virus after penetration into the epithelial cells of the respiratory tract leads to the development of a local inflammatory process, dilatation of blood vessels, increased secretion of the mucosa glands and damage to the epithelium.

Symptoms of the common cold usually appear on the 2nd day after exposure to the virus, and usually develop slowly. This disease often begins with a sore throat, followed by catarrhal symptoms: runny discharge from the nose, also running down the back of the throat, nasal obstruction resulting in a feeling of blockage, sneezing. Over time, the discharge may become thick and difficult to remove. Blockage of the nose leads to mouth breathing, obstruction of the paranasal sinuses develops, and sometimes a loss of smell.

It is not uncommon to experience a cough, most often mild, initially dry, with a tendency to become moist. Coughing lasts longer in a small percentage of patients.

The clinical picture also includes: weakness, a feeling of general discomfort, and sometimes – for a short period – a slight fever. Often the common cold does not include fever. There may also be osteoarticular pain and headaches.

Features differentiating allergic rhinitis and common cold

The duration of disease symptoms varies. While a cold is a self-limiting disease (after the greatest exacerbation of symptoms on the 2nd or 3rd day, it resolves spontaneously, most often within 7–14 days), intermittent AR can last up to 4 weeks, and persistent AR – over 4 weeks, with periodic exacerbations.

In the case of allergies, symptoms appear over the years, which we can identify on the basis of an interview. Symptoms of pollen allergy appear annually, along with the pollen season of allergenic plants. The presence of pollen from early-pollinating trees in February–March coincides with the increased incidence of the common cold. The autumn and winter period is also conducive to catching a cold. It is also the time when allergy symptoms intensify as a result of increased contact with indoor allergens: house dust mites and allergens of companion animals. Moreover, a patient with AR may suffer from a comorbid common cold [10].

Viral infection of the upper respiratory tract and inhalation allergy share many symptoms, but certain features help differentiate them. A sore throat, common in colds, is only occasional in case of allergies and is mild in nature. Viral infection is sometimes accompanied by muscle aches and joint pain that are absent in AR. Increased body temperature (37–38°C) and general malaise are an important indicator, although not decisive. As a rule, allergies are not accompanied by an increase in body temperature. The common cold is rarely the cause of conjunctivitis (e.g. in adenovirus infection), which is a typical manifestation of allergy. The nature of the nasal discharge may be a clue; characteristic for AR and the early phase of infection it is a watery discharge which becomes thick in the second (post-viral) phase of infection and occurs in chronic rhinitis and paranasal sinuses.

It should be remembered that the purulent nature of the discharge is not necessarily due to the presence of bacteria.

Impairment of the sense of smell is often caused by the difficulty of the contact of fragrances with the olfactory nerve endings, which may occur, among others in the case of impaired nasal patency in the upper and middle nasal passages. This may be related to the impairment of smell, which sometimes occurs in both of these conditions, is transient and limited to the acute phase of the disease.

Occasionally a cold may need to be differentiated from the flu. However, the symptoms of flu are much more severe and it does not develop gradually.

It starts suddenly, with a high fever, chills, and pain in the muscles, joints and head.

We must differentiate between the above-mentioned disease entities with symptoms of the prodromal period of many infectious diseases (e.g. measles, smallpox, mumps, whooping cough).

Currently, during the COVID-19 pandemic, SARS-CoV-2 infection also requires consideration in the differential diagnosis [11]. Table 1 presents aspects helpful in differentiating between AR, the common cold, flu and SARS-CoV-2 virus infection.

Diagnostic procedure

Diagnosing a common cold requires a patient interview and physical examination, with a typical

picture of changes in the nasopharynx. The diagnosis of AR is also based on a detailed interview, supported by physical examination. Tests confirming IgE-dependent allergy include skin prick tests with allergens and testing the level of specific IgE antibodies in the serum. The key task is to verify the consistency of the information obtained during the interview with the results of the above tests in order to confirm the clinical significance of sensitization to a given allergen. In the case of pollen allergens, you need up-to-date information on the concentration of allergenic plant pollen and fungal spores in the air, available on websites, media and applications for mobile devices. There is a possibility of a positive skin test in the absence of symptoms during contact with an allergen.

Tabela 1. Differential diagnosis between COVID-19, common cold, flu and allergies (based on [11]).

SYMPTOMS	CORONAVIRUS	COMMON COLD	FLU	ALLERGIES
SYMPTOM DURATION	7–25 days	up to 14 days	7–14 days	few weeks
COUGH	often (usually dry)	often (mild)	often (usually dry)	rarely (usually dry, often in asthma)
SHORTNESS OF BREATH	sometimes	no*	no*	no*
SNEEZING	no	often	no	often
NASAL DISCHARGE	rarely	often	sometimes	often
NASAL BLOCKAGE	sometimes	often	sometimes	often
LOSS OF SMELL	sometimes	sometimes	sometimes	sometimes
WATERY EYES	no	no	no	often
SORE THROAT	sometimes	often	sometimes	sometimes (usually mild)
FEVER	often	short-term fever	often	no
FATIGUE	sometimes	sometimes	often	sometimes
HEADACHE	sometimes	rarely	often	sometimes (pain in the area of the paranasal sinuses)
MUSCLE PAIN	sometimes	often	often	no
DIARRHOEA	sometimes	no	sometimes (in children)	no

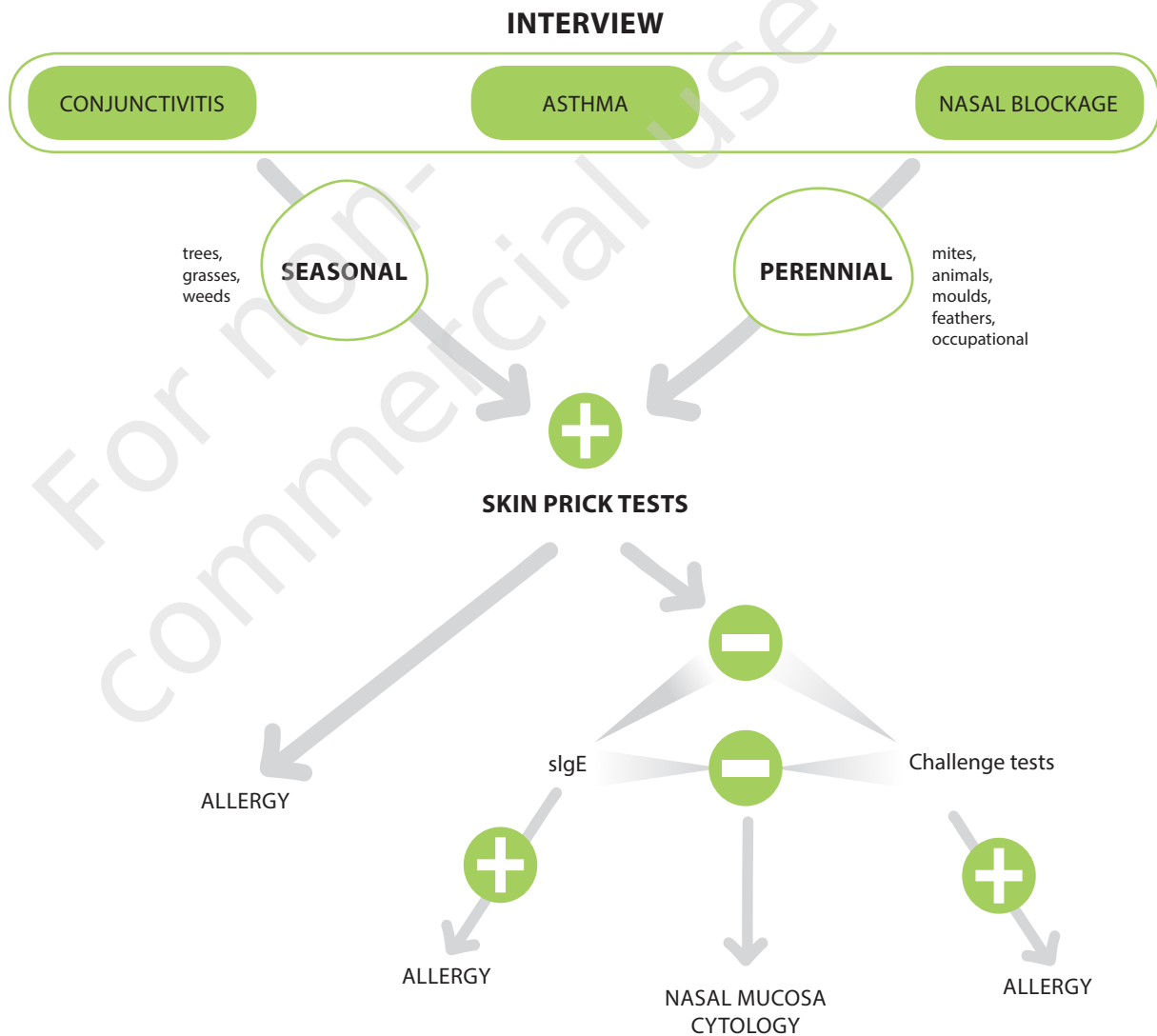
* IF ACCOMPANIED BY ASTHMA OR COPD, SHORTNESS OF BREATH MAY BE INTENSIFIED. WITH COVID-19, SHORTNESS OF BREATH CAN OCCUR WITHOUT SYMPTOMS OF ASTHMA OR COPD.

However, in 10–25% of patients with AR, both skin tests and sIgE tests may give negative results [12]. This is the case with local AR, where there is local presence of specific IgE antibodies in the nasal mucosa, in the absence of elevated levels of antibodies in the blood serum and skin [5]. The decisive test in such cases is the allergen challenge test. The diagnostic management of AR is presented in figure 1.

experts in the form of the ARIA, EPOS (European Position Paper on Rhinosinusitis and Nasal Polyps) and PoSLeNN (Polish Standards for the Treatment of Rhinitis) consensus [1, 2, 5, 7, 13].

The management of patients with AR includes: limiting contact with the allergen (if possible), patient education, specific allergen immunotherapy (conducted by an allergist specialist) and pharmacotherapy,

Figure 1. Diagnostic management of AR (based on [5]).



Additional tests may be useful in differentiating between AR and other infections, but remember that infection may go hand in hand with exacerbation of allergic disease.

Treatment

The guidelines for managing AR and acute infectious rhinitis and sinuses have been developed by

which is to be safe, effective and easy to apply [13, 14].

The choice of pharmacological treatment depends on the severity and type of AR symptoms. The main groups of drugs are second-generation antihistamines and intranasal glucocorticosteroids (INCS).

Antihistamines have a selective agonist effect on the H1 receptor. Thus, they prevent the binding of IgE antibodies to the receptor on the surface of the mast cell, thus inhibiting the release of histamine,

which is the main mediator of an immediate allergic reaction. They reduce histamine-dependent symptoms of the disease: runny nose, sneezing, itchy nose, and conjunctival symptoms [15].

In everyday practice, second-generation oral non-sedative antihistamines are mainly used. They do not have the side effects of the older generation drugs and are characterized by favourable pharmacokinetics. The best drugs that do not interact with cytochrome P450 are chosen.

The second main group of drugs used in the treatment of AR are INCS, drugs with a strong anti-inflammatory effect on the nasal mucosa. They work on all symptoms of AR, particularly effective in reducing nasal congestion. The principles of AR therapy are presented in figure 2.

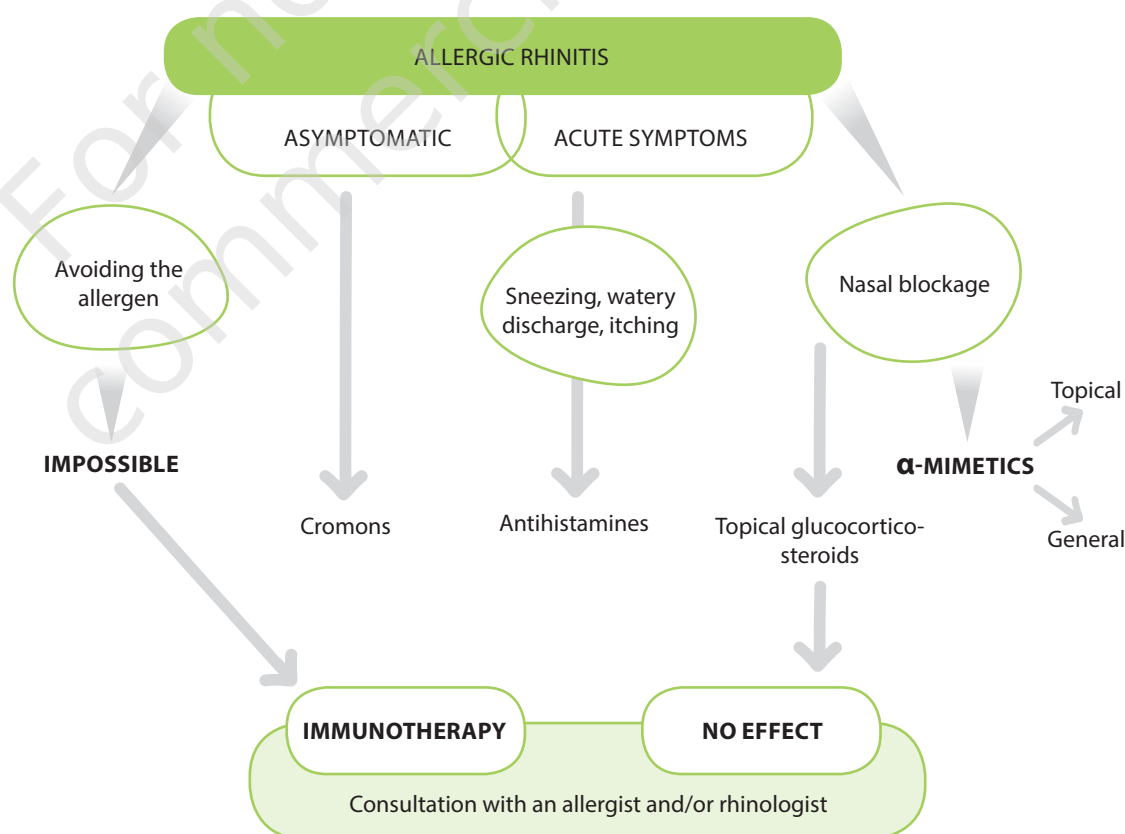
In the treatment of colds, we rely on symptomatic treatment aimed at alleviating symptoms. The recommendations in the EPOS document received a specific category of evidence.

A procedure, the effectiveness of which has the strength of the IA recommendation, means that there is evidence of the effectiveness of a given method of therapy based on a meta-analysis of randomized controlled trials [7, 16].

Nasal decongestants may have an impact on restoring nasal patency in adults suffering from a common cold (category IA) [7]. The recommendation with IA strength was given to non-steroidal anti-inflammatory drugs and paracetamol [7].

Some advantages of combining antihistamines, decongestants and analgesics in the treatment of colds

Figure 2. Diagram of the treatment of allergic rhinitis according to PoSLeNN – Polish Standards for the Treatment of Rhinitis (based on [5]).



It's best to start AR treatment several days before the onset of the first disease symptoms, which allows drugs to work preventively and, in many cases, may prevent symptoms from appearing. Thus, information on the current and forecast pollen concentration (www.alergen.info.pl) will be helpful for pollen allergies.

in adults and older children have been observed (evidence category IA) [7].

Short-term (1st and 2nd day of treatment) use of antihistamines has a beneficial effect in reducing the severity of symptoms in adults (evidence category IA), although this effect is not long-term [7].

Ipratropium bromide may be effective in reducing nasal discharge, but it has no effect on nasal blockage (evidence category IA) [7].

Zinc (in the form of acetate or gluconate) in a daily dose of at least 75 mg taken within 24 hours of the onset of symptoms significantly shortens the duration of a common cold (category IA) [7].

Recommended IB strength treatment included rinsing the nasal cavities with a saline solution. The beneficial effect of this method is visible primarily in children, and the authors of EPOS considered it to be one of the treatment options [7]. The use of probiotics, vitamin C, and certain herbal remedies may be considered.

Conclusion

Untreated AR, similarly to a common cold, can lead to complications that, if properly managed, can be prevented.

References

1. Bousquet J, Khaltaev N, Cruz AA et al. Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update (in collaboration with the World Health Organization, GA(2)LEN and Allergen). *Allergy*. 2008; 63(suppl 86): 8-160.
2. Brozek JL, Bousquet J, Baena-Cagnani CE et al. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines: 2010 revision. *Allergy Clin Immunol*. 2010; 126(3): 466-76.
3. Samoliński B, Sybilski AJ, Raciborski F et al. Prevalence of rhinitis in Polish population according to the ECAP (Epidemiology of Allergic Disorders in Poland) study. *Otolaryngol Pol*. 2009; 63(4): 324-30.
4. Rapiejko P, Stankiewicz W, Szczygielski K et al. Progowe stężenia pyłku roślin niezbędne do wywołania objawów uczuleń. *Otolaryngol Pol*. 2007; 61(4): 591-4.
5. Samoliński B, Arcimowicz M (ed). *Polskie Standardy Leczenia Nieżytów Nosa (PoSLeNN). Stanowisko Panelu Ekspertów PTA. Alergologia Polska*. 2013; S1: 1-167.
6. Kuchar E, Mrukowicz J, Gładysz A et al. Wybrane choroby wirusowe. In: *Interna Szczeklika: Podręcznik chorób wewnętrznych. Medycyna Praktyczna, Kraków* 2016: 2329-30.
7. Fokkens WJ, Lund VJ, Hopkins C et al. *European Position Paper on Rhinosinusitis and Nasal Polyps 2020. Rhinology*. 2020; suppl 29: 1-464.
8. <https://www.ncbi.nlm.nih.gov/books/NBK279543> (access: 23.05.2021).
9. Hsiao CJ, Cherry DK, Beatty PC et al. *National Ambulatory Medical Care Survey: 2007 summary. Natl Health Stat Report*. 2010; (27): 1-32.
10. <https://www.mayoclinic.org/diseases-conditions/common-cold/expert-answers/common-cold/faq-20057857> (access: 23.05.2021).
11. Samoliński B, Krzych-Falta E, Wojas O et al. COVID-19 – rekomendacje dla alergologów i laryngologów. *Alergoprofil*. 2020; 16(1): 3-7.
12. Rodon C, Campo P, Galindo L et al. Prevalence and clinical relevance of local allergic rhinitis. *Allergy*. 2012; 67: 1282-8.
13. Bousquet J, Bedbrook A, Czarlewski W et al. Guidance to 2018 good practice: ARIA digitally-enabled, integrated, person-centred care for rhinitis and asthma. *Clin Transl Allergy*. 2019; 9: 16.
14. Samoliński B, Rapiejko P, Lipiec A et al. *Metody ograniczania narażenia na alergen. In: Kruszewski J, Kowalski ML, Kulus M. Standardy w alergologii. PTA/Termedia, Poznań* 2019.
15. Górski P, Grzelewska-Rzymowska I, Kruszewski J (ed). *Leki przeciwhistaminowe. Zastosowanie w praktyce medycznej. Opracowanie Ekspertów Polskiego Towarzystwa Alergologicznego. 2nd ed.* 2005.
16. *Rekomendacje GRADE (Grading of Recommendations Assessment, Development and Evaluation)*. <http://www.grade-workinggroup.org> (access: 25.05.2021).

ORCID

A. Lipiec – ID – <http://orcid.org/0000-0003-3037-2326>

P. Rapiejko – ID – <http://orcid.org/0000-0003-3868-0294>

Authors' contributions:

A. Lipiec: 50%; P. Rapiejko: 50%.

Conflict of interests:

The authors declare that they have no competing interests.

Financial support:

Does not occur.

Ethics:

The contents presented in this paper are compatible with the rules the Declaration of Helsinki, EU directives and standardized requirements for medical journals.

Copyright: © Medical Education sp. z o.o. This is an Open Access article distributed under the terms of the Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). License (<https://creativecommons.org/licenses/by-nc/4.0/>), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, provided the original work is properly cited and states its license.

Correspondence

Agnieszka Lipiec, MD, PhD, D.H.Sc.

Department of the Prevention of Environmental Hazards, Allergology and Immunology, Medical University of Warsaw
02-097 Warszawa, ul. Banacha 1A
e-mail: alipiec@wum.edu.pl

For non-commercial use only