Asthma and Allergic Rhinitis

Asthma is characterized by variable respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough, and variable expiratory airflow limitation. It is usually associated with airway inflammation (GINA, 2021).

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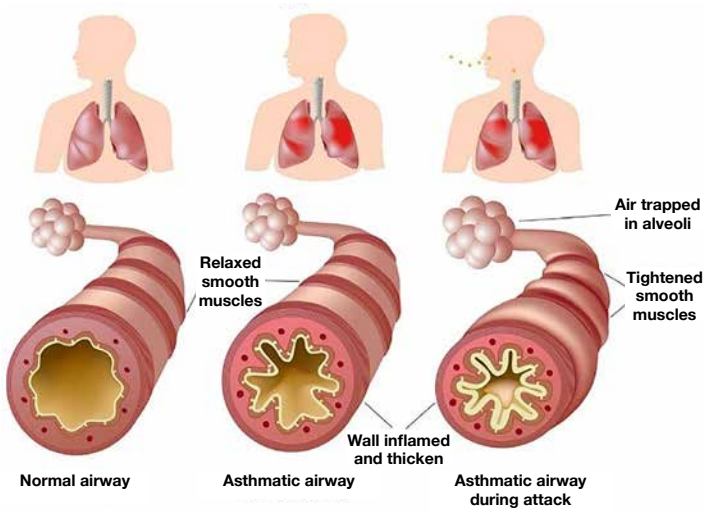
The exact cause of asthma remains unknown. Numerous triggers can cause symptoms, and these differ from person to person. As spring and summer emerges, this can be a challenging time as various pollen levels start to increase.

The clinical features of asthma (wheeze, cough, shortness of breath and chest tightness) result from changes in the airways as a result of abnormal sensitivity called bronchial hyper-reactivity. The muscle of the bronchial walls becomes hypertrophied causing occlusion of the airway resulting in constriction of the muscle causing bronchospasm. Secondly, in the mucosal, submucosa and smooth muscle layers of the bronchi and bronchioles, inflammatory cells infiltrate. Eosinophils, neutrophils, macrophages, mast cells and plasma cells are found in varying numbers. All these cells contain chemical mediators that produce the "asthmatic response". With the increase in secretions, plugging of the smaller airways result. Asthma is a condition where not only bronchospasm occurs but muscle constriction, mucosal swelling, and an increase in secretions in the lumen in the airways (Figure 1).

Figure 1: Pathology of asthma



Allergic Rhinitis

It is estimated that over 80% of people with asthma have allergic rhinitis (AR). AR is also a risk factor for asthma. 10-40% of people who have AR also have asthma. AR is more likely to develop initially with asthma developing later. Therefore, people with AR should be assessed for asthma due to the increased risk of developing asthma. Similarly, patients with persistent asthma should be assessed for AR.

Symptoms of Allergic Rhinitis

Typical symptoms of seasonal (Hayfever) and perennial allergic rhinitis are

- Sneezing
- Itchy, blocked, or runny nose
- Red, itchy, or watery eyes
- Itchy throat, inner ear, or mouth
- Postnasal drip (a drip of mucus from the back of the nose into the throat)
- Headaches
- Loss of concentration and generally feeling unwell
- Reduced sensation of taste and smell

Patients may experience all or some of the above. Symptoms may be confused with symptoms of COVID19.

The term "united airway disease" or "one airway disease" is opportune, as both rhinitis and asthma are chronic inflammatory diseases affecting both the upper and lower airways. Both conditions can be triggered by allergic or non-allergic triggers and present several phenotypes. Assessment and management of allergic rhinitis and asthma should be jointly carried out, leading to better control of both conditions.

Classification

In 2019, the classification of "seasonal" and "perennial" rhinitis was changed to "intermittent" and "perennial" rhinitis (ARIA, 2019). Intermittent rhinitis occurs less than 4 days per week or for less than 4 weeks. Persistent rhinitis lasts more than 4 days and longer than 4 weeks. Both intermittent and persistent AR can be mild or moderate/severe (see Figure 2).

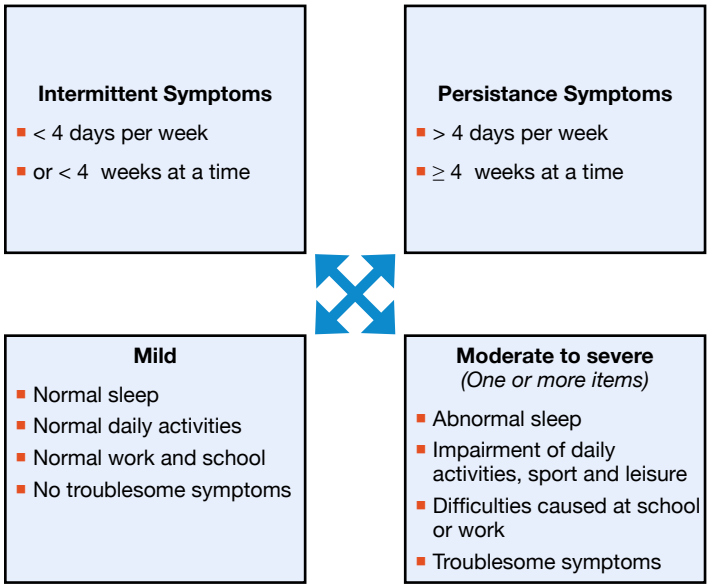


Figure 2: Classification of allergic rhinitis (ARIA, 2019)

Pharmacological interventions ARIA 2019

There are several treatment options available to the patient and a combination of these options may be required for optimal relief of symptoms. These are outlined in Table 1. Saline douching/ nasal irrigation should also be encouraged and is available either as a saline rinse or saline spray.

Saline rinsing involves high volume at a low pressure whereas saline spray is a low volume delivered at high pressure. The advantages of saline douching include:

- Direct cleansing
- Removal of mucous and inflammatory mediators
- Reduces bacterial burden
- Reduces mucus thickness
- Improves mucocillary function by increasing ciliary beat frequency

Smoking cessation should be encouraged at every opportunity. Smoking increases the likelihood of chronic nasal symptoms and may be associated with the development of nasal polyposis. Passive smoking, environmental exposure, e-cigarettes and vaping also increase the likelihood of chronic nasal symptoms and nasal polyposis.

Mild intermittent AR treatment options include oral and nasal decongestants which can be used as a rescue medication. These medications will reduce nasal congestion and should be used for no longer than 7 days and should be avoided in pregnancy and breastfeeding. Oral H1 antagonists block the physiological effects from mast cell-derived histamine. 2nd generation antihistamines are preferred due to their less sedating

Drug therapy options	Symptoms
Oral H1 antagonists	Sneezing, rhinorrhoea, nasal itch, eye symptoms
Intranasal HI antagonist	Sneezing, rhinorrhoea, nasal itch
Intraocular HI antagonist	Eye symptoms
Intraocular cromones	Eye symptoms
Intranasal Decongestants	Nasal blockage
Oral Decongestants	Nasal blockage
Leukotriene Receptor Antagonists (LTRA)	Rhinorrhoea, nasal blockage, eye symptoms
Intranasal Corticosteroids (INCS)	All symptoms
Oral Corticosteroids	All symptoms
Immunotherapy	All symptoms

Table 1: Pharmacological options of allergic rhinitis

effect and are available over the counter. Antihistamines are also available intranasally or intraocular. Intranasal corticosteroid (INCS) is the 1st line treatment for moderate/severe intermittent and persistent AR. These medications are used once or twice daily to each nostril and good technique is essential and should be checked at every opportunity. If the nasal cavity is very obstructed, a nasal spray may not be effective. Nasal drops may be more effective in this scenario. Nasal spray and nasal drop technique can be viewed on https://www.asthma.ie/about-asthma/resources/inhaler-technique-videos.

The efficacy of INCS is not improved when used with oral corticosteroids (OCS). Figure 4 provides a stepwise approach to the management of AR.

Sublingual Immunotherapy (SLIT)/ Allergen Immunotherapy (AIT) is now recommended by GINA (2021) as a treatment option for patients with asthma who are sensitised and have allergic rhinitis. Immunotherapy is also recommended by ARIA (2019) for patients with AR who do not achieve an optimal response from oral H1 or INCS therapies. These medications are not available on the GMS and can be prescribed by GPs.

Immunotherapy

Sublingual immunotherapy (SLIT)/ Allergen Immunotherapy (AIT) is recommended by GINA (2021) as a treatment option for patients who are sensitised and have allergic rhinitis. Immunotherapy is also recommended by ARIA (2019) for patients who have AR and who do not get an optimal response from oral H1 or INCS therapies. There are three SLIT/AIT products available in Ireland to treat allergy - grass pollen, tree pollen and house dust mite allergy. These are taken sublingually daily for three years.

Endonasal Phototherapy

Endonasal phototherapy has an immunosuppressive effect by inhibiting allergen-induced histamine released from mast cells. It also induces apoptosis in the T-lymphocytes and eosinophils. The procedure directs a combination of UV-B. UV-A and visible light into the nasal cavity. Endonasal phototherapy is generally well tolerated and effective and is a treatment option when pharmacological treatment is insufficient or contraindicated.

Surgical Intervention

It is considered that allergic rhinitis is a medical condition that requires medical intervention. However, if symptoms are unilateral or if there is a septal deviation, nasal polyps or tumour present, surgery should be considered. Patients will still need to have an AR plan in place post-surgical intervention.

Lifestyle Intervention

- Keep windows closed at night-time or when the pollen count is high.
- Monitor the pollen tracker on www.asthma.ie (from April to September) and minimize time spent outdoors when the pollen count is high.
- Apply Vaseline around nostrils when outdoors to trap pollen.
- Wear wraparound sunglasses to minimize levels of pollen irritating the eyes. Splash the eyes with cold water to help flush out pollen and soothe and cool the eyes.
- Shower, wash your hair and change clothes if you have been outdoors for an extended time.
- Exercise in the morning rather than the evening when there are higher rates of pollen falling.
- Avoid drying clothes outdoors and shake clothes outside before bringing them inside –, particularly bedclothes.
- Minimise contact with pets that have been outdoors and are likely to carry pollen.
- Put an Asthma Action Plan in place. An Asthma Action Plan contains all the information a person with asthma needs to keep their condition in control. Every person with asthma should be offered a plan. It should be reviewed frequently, and any time medication is changed. These can be downloaded for free from asthma.ie and should be filled out with the patient's healthcare professional.

Exam time…

Walker et al (2007) showed that allergic rhinitis can have a significant impact on exam performance and results with students dropping a grade in the state exams compared with their mock exams. Students should be advised to have their allergic rhinitis assessed and treatment started well in advance of sitting exams, usually around Easter time. Some other useful tips during exam time include:

- Use non-sedating anti-histamines
- Students should tell the adjudicator if their seasonal allergic rhinitis is bothering them.
- Splash the eyes with cold water before going into the exam room.
- Try not to sit near an open window.
- Keep a supply of tissues and effective, quick-acting treatments close at hand just in case.

Special Considerations in Allergic Rhinitis

Children under 4 years

Outdoor allergens are unusual in children under 2 years of age. Type 2 sub-endotype IL4/ IL-13 are associated with AR in children. IL-5 is associated with asthma. Treatment of children under 4 should focus on allergen avoidance and saline spray. Cetirizine is the oral H1 antagonist of choice. Cetirizine is licensed from 2 years, but good safety is reported from 6 months of age. For moderate/severe persistent AR, intranasal corticosteroids such as Fluticasone or Mometasone should be considered 1st line treatment. Long term follow-up studies suggest no growth retardation if used as a once-daily dose. Caution should be taken in children who are also using inhaled or topical corticosteroids for asthma or dermatitis. In children, with resistant symptoms and those with co-existing asthma, leukotriene receptor antagonists should be considered. Parents should be educated about possible side effects of sleep disturbance and mood disorders.

Pregnancy

AR affects 20% of pregnancies and women with pre-existing AR can experience an increase in symptoms. Medications should be avoided where possible and should be used if benefits to the mother are greater than the risk to the foetus. Medication should be avoided in the first trimester if possible. Topical administration of medication should be the first line where possible.

Conclusion

This article has explored the relationship between asthma and allergic rhinitis. Pharmacological and non-pharmacological interventions for the management of AR have been discussed. Special considerations in children and pregnancy have also been addressed. The impact of allergic rhinitis on health and well-being is significant, with many people experiencing impairment of daily activities, learning and cognitive function, as well as reduced productivity at work and school. Optimal control of symptoms through pharmacological and non-pharmacological treatment regimes in combination with education, self-management and empowerment is paramount to managing this distressing condition.

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