

Sinusitis

What are the sinuses?

The sinuses are a set of air filled spaces situated in the bones of the face and skull. There are four pairs of sinuses in total. Their precise role is poorly understood, although various theories exist as to their function, such as assisting in the control of temperature and humidity of the air reaching the lungs, modifying the tonal quality of voice production and lightening the weight of the skull.

The sinuses are tiny or in some cases nonexistent at birth. They gradually expand and grow throughout childhood and into young adulthood. Eventually they become air-filled cavities that are lined with exactly the same type of lining as that of the nose. The air gets into the sinuses through tiny openings into the nose.

What do the sinuses do?

When functioning normally, the nose and sinuses produce approximately a pint and a half of mucus secretions per day. This mucus passes through the nose and traps irritant particles breathed in such as dust, pollen, bacteria and other pollutants along the way. The mucus is gently swept towards the back of the nose and throat by millions of tiny hair-like structures called **cilia**, which line the nasal cavity. The mucus moves into the throat and is swallowed. Most people do not notice this mucus flow because it is an unconscious, normal bodily function which takes place gradually and continuously throughout the day.

Types of sinus infection:

The sinuses can get infected from time to time. Sinus infection occurs in two types:

Acute sinusitis gives rise to severe symptoms but is usually short-lived. Acute sinusitis usually occurs following a cold or upper respiratory infection. The patient will typically notice a profuse green-yellow nasal discharge which can last a week or more after the onset of the cold. This is often associated with severe pain around the cheeks, eyes and/or forehead, a blocked nose, as well as an occasional swelling and a high fever.

Chronic sinusitis is a form of sinusitis that continues for many weeks, usually in excess of 12 weeks. Chronic sinusitis may be triggered by an acute sinus infection which fails to resolve or as a result of an underlying allergy affecting the lining of the nose and sinuses. As the nose is almost always involved in the problem, the term **chronic rhinosinusitis** is now used as it more accurately describes the inflammatory and infective process than chronic

sinusitis. Common symptoms include nasal obstruction, headache, nasal discharge, low grade fever, reduced sense of smell, facial pain, lethargy and halitosis.

What causes sinusitis?

Acute or chronic rhinosinusitis occurs when the sinus openings into the nose become blocked. These blockages may be caused by infections, irritants, allergies, structural abnormalities or a combination of these. It is worth mentioning that pain in the face may well be due to other causes such as tension headache, migraine, neuralgia and jaw dysfunction. This means that if facial pain is the main symptom, rhinosinusitis is unlikely particularly in the absence of any of the other cardinal symptoms usually associated with this condition.

Upper respiratory tract Infections (the common cold or 'flu): Most adults will get colds and upper respiratory tract infections up to three times a year. Children get them more frequently! The common cold is typically caused by a virus although secondary bacterial infections often follow. When this happens, the mucus changes from clear to yellow or green, indicating that the sinus openings are becoming blocked and more and more inflamed and infected. As the infection takes hold, this further slows down or even stops the normal proper sinus drainage and the infection develops even further.

Irritants: This includes air pollution, diesel fumes, smoke, chemical irritants such as sprays containing pesticides, disinfectants and household detergents. If inhaled in sufficient quantities or in susceptible individuals, these irritants may cause swelling and blockage of the lining of the nose causing a narrowing of the drainage opening from the sinuses. This can once again lead to impairment of sinus drainage and subsequent infection.

Allergies: The types of allergies that are associated with rhinosinusitis are those that can be inhaled through the nose. The commonest aeroallergens include tree and grass pollen, house dust mite, types of airborne fungi, cat and dog allergens and feathers. If you are allergic to one or more of these allergens, even a tiny quantity inhaled into the nose can cause considerable inflammation of the inner lining of the nose and sinuses. Common symptoms of an allergic reaction include nasal stuffiness, runny nose (which is initially watery and may become thicker later on), sneezing and itchy watery eyes.

Structural problems: Occasionally structural problems within the nasal cavity can cause a narrowing, for example if there is a deviation of the nasal septum, excessive swelling of the inner nasal lining or the presence of nasal polyps (see separate information sheet). Some of these can be caused as a result of trauma while others may develop during the growth period. Occasionally the structural narrowing can be so severe that mucus builds up behind these areas of blockage giving rise to sinus infections.

Can my asthma get worse if I have rhinosinusitis?

Chronic rhinosinusitis is sometimes associated with asthma. Allergies are responsible for asthma in some patients and may also cause nasal stuffiness making the asthma more difficult to control. This is because the nose serves an important function of warming, humidifying and filtering the air that we breathe in, meaning that the lungs receive a high consistent quality of air. If the nose is unable to achieve these improvements in air quality, the lungs receive poorer quality, dry air full of irritants and allergens which make the asthma worse.

Interestingly, if the rhinosinusitis and/or allergy are adequately treated with an intranasal steroid spray, there is good evidence that asthma can improve without the need for any inhaled asthma treatments. This further proves the link between inflammation in the nose and sinuses and the presence of asthma.

Diagnosis and treatment of rhinosinusitis

Acute sinusitis is usually treated with antibiotics and nasal decongestants which reduce the swelling of the nasal lining. This may be assisted by steam inhalations and/or salt water douches to cleanse the nose.

Chronic rhinosinusitis often requires longer term treatment. Medical therapies include antibiotics when required, decongestants and other treatments to reduce the swelling of the inner lining which usually revolve around the use of intranasal steroid sprays or drops. Antihistamines will have a place in patients with an underlying allergy. In the vast majority of cases, chronic rhinosinusitis can be managed effectively with medical treatment.

Occasionally, symptoms will persist despite the ongoing use of medications. In such cases, it may be necessary to consider surgery. If this occurs, your GP will probably refer you to an ENT specialist who will assess your symptoms and examine your nose and sinuses with a nasal endoscope. You may require further investigations including allergy tests and possibly a CT scan of the sinuses, which will help your specialist decide if you need to proceed with surgery.

Sinus surgery

Surgery is normally only considered if medical treatment fails. When surgery is needed, there are a number of different options available depending on the severity of the sinus disease. Nowadays, the vast majority of sinus operations are performed entirely through the nose without the need for any external incisions.

The surgical options include functional endoscopic sinus surgery (FESS), sinus washouts (which are less commonly performed nowadays) and balloon sinuplasty, a non-invasive technique in which the sinus openings are dilated open with a balloon. Please see separate information sheets about these different options.

Allergic rhinitis

What is allergic rhinitis?

Allergic rhinitis is a major health problem which affects up to 20% of the general population. It is a condition in which there is inflammation of the inner lining of the nose ('rhinitis') which is caused by an allergy. The commonest type of allergy is usually to something that is breathed in. This is because one of the functions of the nose is to filter unwanted particles from the air, and if you are allergic to one of these particles, this will cause inflammation of the lining of the nose to an extent which is out of proportion to the amount of allergen inhaled. In other words, inhaling even a tiny amount of the agent to which you are allergic will cause a significant amount of inflammation.

What are the symptoms of allergic rhinitis?

When inflammation occurs within the nose, this causes a feeling of a blocked nose, sneezing, watery discharge from the nose and itchy eyes. Sometimes the nasal discharge can become thicker and more mucous-like, particularly if there is continued exposure to the allergen or if the sinuses become involved. In addition, some people experience wheezing and shortness of breath, which occurs when the allergen affects the lungs. This can happen in anyone, not only those with asthma. In fact, even if you do not currently have asthma, the risk of developing asthma if you already have allergic rhinitis is 3 times greater than for the general population.

What are the commonest allergens that cause allergic rhinitis?

The commonest air borne allergens that cause allergic rhinitis include pollens, of which grass and various tree varieties are the most prominent, house dust mite, cat and dog, feathers and various types of airborne fungi such as aspergillus or cladosporum (this is the black mould often seen in moist environments such as bathrooms). Other substances can also cause allergic rhinitis, including dairy products, alcohol, seafood and nuts.

How do I find out if I am allergic to something?

Most people usually have some idea whether they are allergic to something based on the history of a reaction on exposure to a particular substance. If you have your suspicions, you could try to avoid the item to which you think you are allergic and see whether your symptoms decrease with time.

There are tests which can be performed to confirm whether you are allergic to something. These involve either a skin prick allergy test or a blood test. Skin prick allergy tests involve placing a small amount of several common allergens onto the forearm and observing whether there is a reaction of the skin. Some hospitals or clinics do not recommend such a test in children or pregnant women,

and in such cases a blood test can be performed, which looks for the reaction of the immune system on exposure to a range of different agents.

What is the treatment for allergic rhinitis?

The mainstay of treatment involves allergy avoidance. This is often more difficult than it sounds as for this strategy to be effective, it is necessary to completely avoid all possible exposure to the allergen. It is not sufficient to merely reduce exposure to it as a reaction can be triggered with even the tiniest of exposures. Avoiding all instances of possible exposure may simply not be practical or possible. For example, a gardener unfortunate enough to have an allergy to tree pollen may never be able to avoid this allergen.

In terms of medical therapies, antihistamines are widely used for allergic rhinitis as they reduce symptoms of itching, sneezing and watery nasal discharge. Intranasal steroid sprays are also extremely effective as they diminish the inflammation of the lining of the nose, thereby relieving the feeling of nasal blockage. Sometimes, nasal decongestants need to be used for short term symptom relief. Salt water douches can also be helpful by clearing mucus from the nose and eliminating irritants and allergens from the nasal cavity, thereby allowing nasal steroid sprays to work more effectively.

Is there a role for surgery in allergic rhinitis?

Most people with allergic rhinitis are successfully managed with allergy avoidance and medical therapies. However there are certain situations in which surgery may have a role.

Indications for surgery in allergic rhinitis:

- Persistent symptoms resistant to medical treatment
- Anatomically large, swollen intranasal tissue (inferior turbinates)

Surgery in general involves resection or reduction of the inferior turbinates, which are structures within the nose which swell up in response to allergy or infection. Excessive and persistent exposure to an allergen can result in swelling to such a degree that causes a permanent enlargement of these turbinates. This results in nasal block which cannot always be reversed by medications alone.

- Resection: Total resection restores the intranasal airway but can be associated with problems with crusting and bleeding because of destruction of the highly specialised mucosal lining
- Reduction: This involves reduction of the mucosal surface only. Improvement in the nasal airway does occur but the benefits are generally short-lived and the procedure often needs to be repeated. Diathermy is the most commonly adopted technique
- Turbinoplasty: In this procedure, the outer part of the inferior turbinate is removed, leaving the inner mucosal lining intact which is crucial in restoring normal nasal physiology.

Advantages of the turbinoplasty technique include considerably less intra-operative bleeding, reduced likelihood of long-term crusting owing to preservation of the mucosa, and persistence of benefits in the long-term. This lower morbidity operation therefore offers the same advantages of both of the above alternative procedures without the associated disadvantages.

What are the other conditions that can be associated with allergic rhinitis?

Allergic rhinitis occurs as part of an immune system-mediated hypersensitivity reaction to a particular substance or allergen. There are other conditions that can occur in the body which are also caused by a similar hypersensitivity of the immune system to certain agents. For example, eczema is a condition of extreme sensitivity of the skin to certain topically applied substances. This results in itching, dryness and redness of the skin in a manner analogous to that of allergic rhinitis.

Asthma is a condition of the lower airways and lungs which is caused, as part of its underlying pathophysiology, by a hypersensitivity of the airways to certain triggers such as pollens, exposure to cold or smoke, or exercise. It is well established that patients with allergic rhinitis are 3 times more likely to develop asthma at some stage in their lives. Furthermore, patients with both asthma and allergic rhinitis find that their asthma symptoms are more severe and require more medications than in patients with asthma alone. What is interesting is that in patients with both conditions, treatment of the allergic rhinitis alone with topical intranasal steroid sprays results in a reduction in their asthma symptoms and a decrease in the amount of medications they need to take for their asthma. Given that asthma can be a life threatening condition, taking a nasal spray is a simple and potentially significant intervention.

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