Symptoms, signs and investigations

Symptoms

It is vital to establish the precise complaint of the patient; thus, a full history is mandatory (Fig. 1).

Nasal obstruction
Nasal obstruction is probably the most common symptom, and may be due to anatomical abnormalities, disorders of the mucus membrane lining or stimulation of the autonomic nervous system (Table 1). An allergic aetiology is frequently volunteered by the patient where the symptoms manifest after contact with allergens such as grass pollen, feathers or animal furs. Viral infections, e.g. acute coryza and influenza, cause severe nasal obstruction but generally resolve rapidly over days. An overactivity of the parasympathetic as compared to the sympathetic nerve supply will cause dilatation of the vascular tree and hence engorgement. This is particularly noted by some patients in stress situations and with alterations in ambient temperature and humidity. Neoplasia produces a progressive obstruction and may cause ocular and dental problems due to contiguous spread.

Nasal discharge
The specific character of a nasal discharge is very helpful in deciding aetiology (Table 2). Many patients describe this symptom as 'catarrh'. However, if it produces a runny nose, the discharge should be described as rhinorrhoea and the term 'catarrh' (or postnasal drip) reserved for complaints of nasal discharge passing backwards into the nasopharynx. Epistaxis is defined as nasal haemorrhage and is most commonly due to spontaneous rupture of a blood vessel in the nasal mucous membrane. However, it is vital to exclude any bleeding disorders and neoplasms. If the discharge is offensive, it may indicate a bacterial infection, the presence of a foreign body or neoplasia.

Sneezing
Sneezing is a very frequent accompaniment of allergic and infective rhinitis. Commonly, patients with allergies to household dust and dust mite sneeze on awakening, as the bed mattress forms a huge reservoir of these allergens.

Facial pressure/pain
It is relatively uncommon to see facial pain due to a local cause such as nasal vestibulitis or herpes eruption. More frequently it is related to disease in the distribution of the trigeminal nerve, which supplies the sensory component to the face and the interior of the nose and paranasal sinus via the ophthalmic and maxillary nerves. Consequently, these anatomical sites require detailed examination in such cases (p. 51).

Otological
Any pathological process that disrupts the proper functioning of the Eustachian tube may give rise to aural symptoms. Nasal polyps, particularly of the antrochoanal variety, can physically block the pharyngeal end of the tube. Allergic diseases result in a similar problem by provoking oedema, and neoplasms may directly invade the Eustachian tube. The most frequent otological symptom is hearing loss caused by a middle ear effusion secondary to Eustachian tube dysfunction.

Disorders of smell
Anosmia, a total loss of sense of smell, is rare. Hyposmia, a reduced sense of smell, is more common. Cacosmia, which is an unpleasant smell detected mainly by others, may be caused by chronic nasal sepsis. Ozaena, a foul smell, is a common complaint in anaerobic infections seen in cases of atrophic rhinitis, but the presence of a foreign body and tumour must be excluded.

Halitosis
Poor dental hygiene and poor diet are the most common causes of halitosis. However, chronic sinusitis with purulent postnasal drip can also produce this symptom (p. 51).

Signs

A comprehensive approach to examination of the nose can only be acquired by practice. It is essential to examine both the exterior and interior of the nose, and also ancillary areas such as the ears and oropharynx.

External
Certain cosmetic deformities such as angulation of the bony nasal pyramid or a nasal hump may be obvious. A saddle deformity due to previous injury or infection is readily identified, and it is not unusual to find the septal...
cartilage dislocated into the nasal vestibule (Fig. 2).

Internal
A systematic examination is essential to adequately visualize all areas. The inferior turbinate is very prominent and often mistaken for a polyp. Common nasal polyps are white/grey in colour and painless on palpation. Mucopus in the middle meatus may indicate infection in the anterior group of sinuses.

The postnasal space or nasopharynx is a difficult region to view with a head light and mirror. However, modern flexible instruments and rigid endoscopes have eased the difficulties. Examination of the paranasal sinuses is limited to palpation. In an acute frontal sinusitis, there is localized tenderness in the floor of the sinus. Maxillary tumours may cause expansion of the malar and deformities of the teeth-bearing alveolus.

Investigations
Clinical investigations should not replace mandatory history taking and physical examination. Many of the investigations are performed mainly to confirm the diagnosis and rarely add much more information. Nevertheless, critical use and appraisal affords a useful adjunct to history and examination.

Allergy testing
The simplest variety of allergy test is a skin-prick performed on the volar aspect of the forearm. A wide variety of allergens are possible, but the common ones include pollens, animal dander, household dust and dust mite. Controls such as saline and histamine should be employed. A positive response produces a wheal and flare (in about 20 minutes) which can be graded. However, a negative response does not exclude allergy, and a positive response is not absolute proof that the specific allergen is causing symptoms (Fig. 3). The radioallergosorbent test (RAST) measures allergen-specific serum immunoglobulin E, but this technique is expensive and reserved for special cases.

Radiology
Plain views of the sinuses have limited value. CT scanning is the imaging of choice for the majority of nasal and sinus disease (Fig. 4). Soft tissue abnormalities and tumours usually require magnetic resonance imaging (MRI) (Fig. 5). MRI distinguishes retained secretions from soft tissue masses.

Mucociliary clearance
Mucociliary clearance can be assessed in cases of suspected ciliary motility disorder, e.g. Kartagener’s syndrome. A pellet of saccharin placed on the anterior end of the inferior turbinate should be tasted by the patient in about 20 minutes. Prolongation of this time occurs in some normals after nasal infections and in primary ciliary dyskinesia.

Miscellaneous
Rhinomanometry, which measures nasal air flow and resistance, is a highly specialized research tool. Nasal provocation tests are more accurate than skin tests, but are time consuming as only a single allergen can be tested at a time. Eosinophilia in nasal smears and blood is supportive of a diagnosis of allergic rhinitis.
The term ‘rhinitis’ implies an inflammatory response of the lining membrane of the nose and may be intermittent or persistent. It is important to understand that such an event can occur as a consequence of both primary allergic and non-allergic mechanisms (Fig. 1). In allergic rhinitis, specific allergens are responsible for a type 1 hypersensitivity reaction, and the symptom complex may be subclassified as being predominantly seasonal or perennial. Non-allergic pathologies include viral and bacterial infections (pp. 38, 50), as well as autonomic nervous system abnormalities which can result in vasomotor rhinitis.

### Allergic rhinitis

Between 10 and 20% of the population suffer to some degree from nasal manifestations of an antigen–antibody type 1 hypersensitivity reaction (Fig. 2). In seasonal allergic rhinitis (hay fever), the allergens are inhaled, e.g. grass, pollens, weeds and flowers. Animal dander, household dust, the dust mite and feathers are the principal allergens in perennial allergic rhinitis and have no seasonal variation. Rarely, ingested allergens are implicated in the perennial group, e.g. dairy products and wheat.

### Clinical features

The clinical features of allergic rhinitis include the classic triad of:

- nasal obstruction due to mucosal vasodilatation and oedema
- rhinorrhoea (runny nose) due to enhanced activity of glandular elements
- paroxysms of sneezing due to mucosal stimulation.

The symptom complex is produced by allergen binding to immunoglobulin E (IgE), which in turn is bound to mast cells. This causes degranulation of mast cells and the release of mediator substances such as histamine, leukotrienes and SRSA.

Many patients have associated evidence of atopy such as asthma, eczema, allergic dermatitis and drug allergies. Aspirin sensitivity is not infrequent. Taking a detailed clinical history may identify the allergens involved. Typically, the nasal mucosa has a boggy, oedematous appearance (Fig. 3); it is covered by a thin layer of watery secretion. Application of a vasoconstrictor produces marked mucosal shrinking with improvement in the nasal airway. Skin-prick tests should be interpreted only in relation to the history. Negative skin tests in the face of obvious allergens are not infrequent.

### Management

The simplest treatment is avoidance of known allergens. In perennial allergic rhinitis, the quantity of dust and dust mite may be reduced in the bedclothes by:

- changing a feather pillow to foam
- washing the bedclothes twice weekly, as the antigen is heat sensitive
- using commercial sprays that inhibit house dust mite
- using a dust proof cover over the mattress, duvet and pillows
- avoiding carpets and heavy drapes in the bedroom.

Suspected food allergens may be excluded from the diet or replaced with suitable alternatives. Removing animal dander by giving up a pet may be emotionally upsetting but necessary.

Desensitization injections may be offered. These work on the principle of producing a blocking IgG antibody that prevents antigen binding to IgE. Obviously, the treatment is only of value if specific allergens can be identified, and it is essential to commence the series of necessary injections well in advance of the exposure. Due to the risk of anaphylaxis, desensitization must be done in a controlled environment with adequate resuscitation available.
Drug therapy
Therapy involving the use of both topical and systemic drugs has been directed at either preventing mast cell degranulation or blocking the effect of released mediators.

Topical sodium cromoglycate stabilizes the mast cell membrane and prevents the release of chemical agents. It has provided effective relief of asthmatic symptoms but has been less successful in allergic rhinitis. Local decongestants can be either sympathomimetic agents or steroids. The former group includes ephedrine nose drops which provide dramatic shrinkage of nasal mucosa, but long-term use can lead to rhinitis medicamentosa. Locally-acting steroid nasal sprays, e.g. beclometasone, fluticasone, are highly effective against blockage and rhinorrhoea. Regular use in a ‘course’ is important. Topical antihistamines are an alternative.

Systemic drug therapy includes antihistamines which act by blocking the H_1 nasal mucosa receptors. Their major drawback is drowsiness. Modern derivatives are less able to cross the blood–brain barrier, hence reducing side-effects. If sedation occurs, medication can be taken at night.

Surgery
Surgical treatment (Fig. 4) is only infrequently indicated, as most patients’ symptoms are controlled by conservative therapy. Turbinate resection, cautery or outfracture may improve nasal obstruction, but rhinorrhoea and sneezing are unaffected by surgical manipulations.

Intrinsic rhinitis
(vasomotor rhinitis)
Intrinsic rhinitis is common (10–15% of the population). The symptoms are similar to allergic rhinitis with less sneezing, and the patient does not have positive allergy testing results. The pathophysiology involves an imbalance between the parasympathetic and sympathetic autonomic nerve supply of the nasal mucosa. The former predominates causing nasal obstruction due to increased vascularity. Enhanced mucosal secretion produces watery rhinorrhoea.

Patients may relate an attack of symptoms to changes in ambient humidity and temperature. Metabolic changes seen in pregnancy, puberty, the menopause and hyperthyroidism can cause the same nasal response. Certain drugs have also been implicated, particularly antihypertensives and the contraceptive pill.

Clinical features
The main clinical features include nasal obstruction, rhinorrhoea and sneezing as in allergic rhinitis. The nasal mucosa over the inferior turbinate is congested, swollen and red, occasionally completely blocking the airway. Some patients may complain that symptoms occur on exposure to sunlight, gaseous irritants such as tobacco or with ingestion of alcohol.

Management
In all but the mildest of cases, medical treatment in the form of local and systemic decongestants should be tried. Severe cases may require submucosal diathermy, laser treatment or radical turbinectomy to clear the nasal airway (Fig. 4).

Rhinitis Medicamentosa
Rhinitis medicamentosa is characterized by reactive vasodilatation of the nasal mucosa. It is a result of acquired sensitivity of the nasal lining to prolonged use of topical agents, particularly those containing sympathomimetic agents. Many ‘over the counter’ medicines fall into this category. The patient rapidly becomes addicted to the short periods of relief produced from the severe chronic nasal obstruction.

Management
Treatment should be prophylactic, i.e. certain preparations should only be employed as ‘short sharp’ therapies. Established rhinitis medicamentosa requires substitution of the offending drug by one containing a steroid, or by employing a systemic decongestant. In severe cases, the mucosal swelling becomes irreversible. Such cases require surgical treatment, usually turbinate resection (Fig. 4).
Nasal polyps and foreign bodies

Nasal polyps

The majority of nasal polyps are associated with intrinsic rhinitis and allergy (Table 1), although only about 25% of patients have positive skin-prick tests.

Nasal polyps are ‘bags’ of oedematous mucosa and most frequently arise from the ethmoid cells and prolapse into the nose via the middle meatus. They are nearly always bilateral. If allowed to grow they may present in the nasal vestibule (Fig. 1). The cardinal symptom is progressive nasal obstruction. Rhinorrhoea is frequent and occasionally a history of recurrent sinusitis due to ostial blockage is a feature. Otological symptoms and hyposmia may occur.

Chronic sinus infection can result in polypoid mucosal disease which, clinically, produces similar features to idiopathic nasal polyposis.

Clinical features

Examination reveals single or multiple pale, grey polypoid masses which are insensitive to palpation and do not bleed. Unilaterality and haemorrhage should arouse the suspicion of neoplasia. CT scans may reveal radio-opacity due to secondary infection, in the paranasal sinuses, particularly of the maxillary antrum.

Management

Large polyps are treated by pernasal removal. Small polyps can be managed by topical nasal steroids. Short-term systemic steroids are also occasionally administered. Recurrence rates may be reduced by long-term topical steroids, post-surgery. Any chronic sinus infection should be treated in conjunction with nasal polypectomy. Rarely, an ethmoidectomy may be required for frequent recurrences. Routine management strategies for the underlying allergy or asthma should also be instituted (pp. 34–35).

Antrochoanal polyp

The antrochoanal polyp is uncommon. It is usually unilateral and commences as oedematous lining in the maxillary sinus. This prolapses, usually via a posterior accessory ostium, into the nasal cavity and enlarges toward the posterior choana and nasopharynx. The patient, commonly a young adult, complains of unilateral nasal obstruction, which is worse on expiration due to the ball valve effect of the polyp in the posterior choana. If significantly large it may block both choanae and cause otological symptoms due to obstruction of the Eustachian tube (Fig. 2). Patients occasionally present so late that the polyp has enlarged behind the soft palate and hangs visibly in the oropharynx.

Treatment is surgical by pernasal excision with removal of the cystic antral portion endoscopically via an antrostomy. Recurrences may require a Caldwell–Luc approach to the antrum to remove the roots of the cyst.

Neoplastic polyps

Neoplastic polyps (p. 110) are invariably unilateral and cause progressive symptoms: nasal obstruction, epiphora (blocking of the vasolacrimal duct), epistaxis and foul smelling nasal discharge. They are frequently fleshy in appearance and bleed on palpation. Biopsy is mandatory.

Miscellaneous polyps

Nasal polyps are extremely rare in children. In this age group, careful consideration should be given to any evidence of cystic fibrosis, and a sweat test should be performed. Prolapse of the meninges (meningocele) or cerebrum (encephalocele) can occur through an anterior cranial fossa defect. This should be excluded radiologically prior to excision or biopsy.

Nasal foreign bodies

Young children (and on occasion, psychiatric cases) are the main patients who insert foreign bodies into the nose. The variety of foreign bodies is protean (Fig. 3), but readily available items such as foam rubber, peas and small stones are frequent. Inorganic objects may be in situ for long periods.

Table 1 Causes of nasal polyps

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<th>Infection</th>
<th>Rhinitis</th>
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<td>Sinusitis — chronic paranasal infection</td>
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<td>Nasal allergy, e.g. aspirin sensitivity, seasonal and perennial allergic rhinitis</td>
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<td>Idiopathic</td>
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before producing symptoms. However, organic objects, such as paper, wool and vegetable material, produce a brisk mucosal reaction and hence rapid onset of symptoms (Fig. 4).

Clinical features
The child is usually calm, although prior clumsy attempts at removal may have caused distress. Usually, the parents provide a sound history which an older child frequently denies. The cardinal sign is a unilateral nasal discharge which is foul smelling if the foreign body has been present for any length of time (Fig. 4). Excoriation of the nasal vestibular skin and upper lip may be present. The foreign body frequently impacts in the lower part of the nose and on occasions simply rests in the nasal vestibule. Unless there is a marked infection, visualization is usually possible in good light by elevating the nasal tip gently with the thumb.

Management
In a cooperative child, the foreign body may be either grasped by cupped forceps or flicked out with a blunt hooked probe. An adult may need to restrain a young child. The limbs are usually wrapped in a blanket and the head held steady (Fig. 5). A general anaesthetic will be required in all other instances, as inept attempts could push the object further back with the subsequent risk of inhalation or traumatic haemorrhage. In some instances it is safer to deliver the object via the nasopharynx. The other nostril must be examined to exclude a second foreign body.

Rhinolith
Rhinolith is the term applied to a large foreign body found in the nose of some adults. It is composed of deposits of calcium and magnesium on a nidus such as a piece of gauze or clotted blood. There is frequently a history of nasal packing for epistaxis many years previous (Fig. 6).

Clinical features and management
Nasal obstruction and discharge are the most common symptoms. The latter may be foul smelling and blood-stained due to the presence of infection and friable granulations. Examination reveals a mass that is hard to palpation. Plain radiology can confirm the diagnosis.

Rhinoliths should preferably be removed in one piece, but their sheer bulk may require piecemeal extraction.

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**Nasal polyps and foreign bodies**

- The majority of nasal polyps are usually bilateral, secondary to rhinitis, and painless.
- The prevalence of polyps increases with age.
- Beware of unilateral bleeding polyps. They may be neoplastic and should be biopsied.
- Nasal polyps are extremely rare in children.
- A foul smelling unilateral nasal discharge in a child requires exclusion of a nasal foreign body.
- Beware: foreign bodies can be inhaled.
- Resort to removal under general anaesthesia if the patient is uncooperative, or removal is difficult. The patient will thank you.