Sinusitis and its management

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Sinusitis is one of the most common diagnoses in primary care. It causes substantial morbidity, often resulting in time off work, and is one of the commonest reasons why a general practitioner will prescribe antibiotics.[1]

Sources and selection criteria

We searched Medline for recent papers (1996-2006) using "sinusitis", "rhinosinusitis", "acute", "chronic", "diagnosis", and "management" as keywords. We also searched the Cochrane Database of systematic reviews using the keywords "sinusitis" and "rhinosinusitis". In addition, we used a personal archive of references relating to our clinical experience and updates written for *Clinical Evidence*.

Causes of sinusitis

Sinusitis is generally triggered by a viral upper respiratory tract infection, with only 2% of cases being complicated by bacterial sinusitis.[2] About 90% of patients in the United States are estimated to receive an antibiotic from their general practitioner, yet in most cases the condition resolves without antibiotics, even if it is bacterial in origin.[3] Most general practitioners rely on clinical findings to make the diagnosis. Signs and symptoms of acute bacterial sinusitis and those of a prolonged viral upper respiratory tract infection are closely similar, resulting in frequent misclassification of viral cases as bacterial sinusitis. Boxes 1 and 2 list common and rarer causes of rhinosinusitis.

Clinical diagnosis and pathophysiology

The term sinusitis refers to inflammation of the mucosal lining of the paranasal sinuses. However, as sinusitis is invariably accompanied by inflammation of the adjacent nasal mucosa, a more accurate term is rhinosinusitis.

The European Academy of Allergology and Clinical Immunology defines acute rhinosinusitis as, "Inflammation of the nose and the paranasal sinuses characterised by two or more of the following symptoms: blockage/congestion; discharge (anterior or postnasal drip); facial pain/pressure; reduction or loss of smell, lasting less than 12 weeks." Additional symptoms—such as toothache, pain on stooping, and fever or malaise—help make the clinical diagnosis (box 3).[4] The European Academy also suggests that worsening symptoms after five days or persistent symptoms beyond 10 days (but less than 12 weeks) indicate non-viral rhinosinusitis, whereas viral disease lasts less than 10 days.[4]

The definition of chronic rhinosinusitis is nasal congestion or blockage lasting more than 12 weeks and accompanied by one of the following three sets of symptoms: facial pain or pressure; discoloured nasal discharge or postnasal drip; or reduction or loss of smell (box 4).

SUMMARY POINTS

- Rhinosinusitis is a common primary care condition
- Most cases of acute rhinosinusitis resolve with symptomatic treatment with analgesics
- Chronic rhinosinusitis may, however, require referral to an ear, nose, and throat specialist for possible endoscopic sinus surgery if medical management fails
- Patients with acute facial pain or headache but no other nasal symptoms are highly unlikely to have rhinosinusitis
- Urgent referral is required if complications of rhinosinusitis are suspected—such as orbital sepsis or intracranial sepsis

Box 1 | Common causes of rhinosinusitis

- Viral infection
- Allergic and non-allergic rhinitis
- Anatomical variations
  - Abnormality of the osteomeatal complex
  - Septal deviation
  - Concha bullosa
  - Hypertrophic middle turbinates
- Cigarette smoking
- Diabetes mellitus
- Swimming, diving, high altitude climbing
- Dental infections and procedures

Box 2 | Rarer causes of rhinosinusitis

- Cystic fibrosis
- Neoplasia
- Mechanical ventilation
- Use of nasal tubes, such as nasogastric feeding tubes
- Samter's triad (aspirin sensitivity, rhinitis, asthma)
- Sarcoidosis
- Wegener's granulomatosis
- Immune deficiency
- Sinus surgery
- Immotile cilia syndrome

Box 3 | Symptoms of rhinosinusitis

- Nasal obstruction or congestion
- Hyposmia (reduced sense of smell)
- Facial pressure, pain, tenderness
- Rhinorrhoea (anterior or postnasal)
- Fever or malaise (acute infection)
- Toothache (upper teeth)

Box 4 | Timescale for rhinosinusitis

- Acute: <4 weeks
- Subacute: 4-12 weeks
- Chronic: >12 weeks
- Acute exacerbation: sudden worsening of chronic sinusitis with return to baseline after treatment

The precipitating factor in acute sinusitis seems to be blockage of the sinus ostium, typically the maxillary sinus ostium situated under the middle turbinate (fig 1). It is this obstruction with mucus retention and subsequent infection that produces the signs and symptoms characteristic of rhinosinusitis. Whereas viral upper respiratory tract infections trigger most cases, the rising prevalence of rhinosinusitis might relate to a similar rise in incidence of allergic rhinitis.[5] A small proportion of cases can arise as a result of dental root infection (odontogenic sinusitis). The bacteriology of acute rhinosinusitis differs from that of chronic rhinosinusitis (box 5).

Are other investigations required?

Additional investigations have been used to help with diagnosis. A raised erythrocyte sedimentation rate and C reactive protein have been found to be helpful,[6] and x ray examination of the sinuses, ultrasonography, computed tomography, sinus puncture, and culture of aspirate have also been described. None of these, however, is universally available in primary care, and heterogeneity in the literature makes it difficult to recommend an optimal investigation.[6]

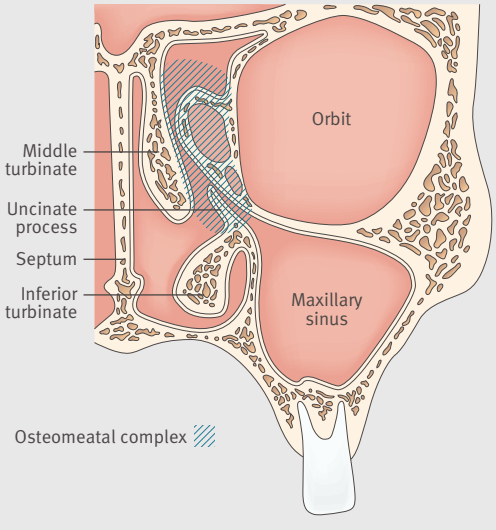

Fig 1 | Anatomy of the osteomeatal complex

What is the influence of allergy in rhinosinusitis?

In 2001 the ARIA (Allergic Rhinitis and its Impact on Asthma) Group published a document establishing the link between the upper and lower airways.[7] Evidence suggests that allergic inflammation affects the entire respiratory tract as a continuum, with a high proportion of asthmatic individuals having comorbid allergic rhinitis. The existence of a relation between rhinitis and asthma is supported by evidence that control of rhinitis improves asthma control[7]; this has led to phrases such as "one airway, one disease."

The incidence of rhinosinusitis is higher in patients with allergy (particularly those with IgE mediated allergic rhinitis (25% to 50%)) than in the general population, although a causal relation is difficult to show.[8-10] Studies have shown a higher prevalence of atopy in patients with chronic rhinosinusitis,[7 9] although this does not necessarily correspond with clinical allergy. Several radiological studies have shown an increase in mucosal abnormalities on computed tomography of sinuses in allergic patients.[10-12] Other studies, however, suggest that the incidence of infective rhinosinusitis does not rise during the hay fever season in pollen sensitive patients.[13] Patients with allergy and chronic rhinosinusitis respond less well to drug treatment,[9] and results of surgical intervention for chronic rhinosinusitis are poorer in patients with allergy than in patients without.[14 15]

How is sinusitis treated medically?

The vast majority of patients with acute rhinosinusitis will get better spontaneously without treatment; some, however, will develop chronic mucociliary clearance problems and resultant chronic rhinosinusitis. It is not possible to predict those who will progress to chronic disease.

Acute rhinosinusitis

The mainstay of treatment for acute rhinosinusitis is symptomatic relief with analgesics; little evidence supports the use of antihistamines, intranasal steroids, nasal douches, or decongestants.[16]

Some evidence supports the use of antibiotics, with a 3-5% difference in cure rate compared with placebo, especially in cases where symptoms are severe, persistent (>5 days),[17] or progressive. Evidence suggests benefit with amoxicillin or co-amoxiclav, as well as with cephalosporins or macrolides. Resolution rates for these drugs are reported to be similar, although cephalosporins and macrolides may have fewer adverse effects.[16] Recent evidence supports the use of a topical steroid spray in acute rhinosinusitis.[18]

Chronic rhinosinusitis

Medical treatment options for chronic rhinosinusitis should begin with topical nasal steroids along with aggressive treatment of any underlying cause or comorbid allergy. Oral steroids should be reserved for refractory cases, particularly when underlying allergy is present.[7] If oral steroids are required, caution should be taken in at-risk groups, including

Box 5 | Bacteriology of acute and chronic rhinosinusitis

Acute rhinosinusitis
Haemophilus influenzae, Streptococcus pneumoniae (rarely: anaerobes, Gram negative bacteria, *Staphylococcus aureus, Moraxella catarrhalis, Streptococcus pyogenes*)

Chronic rhinosinusitis
Anaerobes, Gram-negative bacteria, *S aureus* (rarely: fungal)

Box 6 | Sinister features that should prompt referral to specialist

- Unilateral signs (for example, unilateral polyp or mass)
- Bleeding
- Diplopia or proptosis
- Maxillary paraesthesia
- Orbital swelling or erythema
- Suspicion of intracranial or intraorbital complication
- Immunocompromised patient

patients with diabetes or active peptic ulceration. It is often useful to give an intermediate dose of steroid such as fluticasone nasules or betamethasone drops to bridge the gap between oral and topical steroid spray preparations. Once symptoms have resolved, it is essential to maintain improvement with long term (>3 months) intranasal steroid treatment in the form of an aqueous nasal spray.[4]

Oral antibiotics with anaerobic and Gram negative cover may be required, although the European Academy of Allergology and Clinical Immunology found limited evidence to support their use. They may be considered in patients who have failed to respond to initial intranasal steroid therapy or in those who have severe symptoms with evidence of persistent nasal sepsis. Symptom relief can be achieved in both acute and chronic rhinosinusitis with the use of topical saline douches and sprays.[4]

Failure to respond to a three month period of initial medical treatment should prompt referral to an ear, nose, and throat specialist. Additionally, prompt referral should be considered in cases where sinister or worrying features exist (box 6).

What is the role of surgery for rhinosinusitis?

Surgery for rhinosinusitis should be considered only after maximal drug treatment has failed or complications are suspected. Traditional open sinus procedures for chronic rhinosinusitis have been largely replaced by endoscopic techniques.[19] With a better understanding of normal mucociliary clearance pathways and anatomy of the osteomeatal complex (fig 1), endoscopic sinus surgery is now the mainstay of surgical treatment for chronic rhinosinusitis.

Endoscopic sinus surgery entails restoring sinus ventilation and drainage by careful removal of any soft tissue obstructing the natural drainage ostia in an attempt to restore mucociliary function.[20] After surgery, intranasal steroids, saline douching, and nasal toileting are important to help mucosal healing and avoid the formation of intranasal adhesions.

Surgery in acute rhinosinusitis is reserved for refractory or complicated cases and takes the form of sinus lavage to drain pus and decompress the affected sinus. This can be performed endoscopically or via external trephination and is combined with perioperative antibiotic cover and empirical use of saline douches and sprays.

What are the complications of rhinosinusitis?

The complications of sinusitis are due largely to the proximity of the paranasal sinuses to the anterior cranial fossa and orbit, as well as the venous drainage of the mid-facial structures into the intracranial venous sinuses.[21]

Up to 75% of orbital infections are attributable to sinonasal disease, with the ethmoid sinus the primary source.[22] Orbital complications include orbital cellulitis (fig 2), subperiosteal abscess, and intraorbital abscess, with the potential of blindness as a result of venous compression around the optic nerve. Orbital complications occur via direct transmission through the thin medial orbital wall (lamina papyracea) or by haematogenous route to the neighbouring orbital structures.

Frontal sinusitis may lead to osteomyelitis of the frontal bone (Pott's puffy tumour) and may also destroy the

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Fig 2 | Orbital cellulitis

ADDITIONAL EDUCATIONAL RESOURCES

Resources for healthcare professionals

- National Electronic Library for Health (www.nelh.nhs.uk/)—an online library for NHS staff, patients and the public
- Cochrane Library (www.thecochranelibrary.com)—contains high quality, independent evidence to inform healthcare decision making
- *BMJ Clinical Evidence* (www.clinicalevidence.org)—resource for informing treatment decisions and improving patient care
- Clinical Knowledge Summaries Service(www.prodigy.nhs.uk/)—up to date source of clinical knowledge on common conditions for healthcare professionals and patients
- GP notebook (www.gpnotebook.co.uk)—an online encyclopaedia of medicine

Resources for patients

- Patient UK (www.patient.co.uk)—free, up to date health information as provided by general practitioners to patients during consultations
- Facial Neuralgia Resources (www.facial-neuralgia.org)—a "patient to patient" resource for those with face pain caused by disorders of the cranial nerves
- ENT UK (www.entuk.org/patient_info)—medical information for patients on ear, nose, and throat disorders, conditions of the head and neck, and facial plastic and cosmetic surgery

posterior table of the sinus, leading to extradural and subdural empyema. Sinusitis may also lead to meningitis, intracranial abscess, and cavernous sinus thrombosis, the latter occurring via haematogenous spread through the superior ophthalmic veins or pterygoid venous plexus.

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The dizzy clinic and the dictionary (etymology and otology)

In the "dizzy clinic" it is essential to find out whether a patient has a sensation of motion (vertigo), a feeling of unsteadiness (dysequilibrium), or both. Patients often use the word vertigo incorrectly, and frequently admit that they've read about it on the internet.

The American Academy of Otolaryngology Head and Neck Surgery defines vertigo as "the sensation of motion when no motion is occurring relative to the earth's gravity, in contrast to motion intolerance, which is a feeling of dysequilibrium, spatial disorientation, or malaise during active or passive movement."[1]

However, vertigo is defined by the *Oxford Dictionary of English* as "a sensation of whirling and loss of balance, associated particularly with looking down from a great height, or caused by disease affecting the inner ear or the vestibular nerve; giddiness."[2] Interestingly, this offers "giddiness" as a synonym for vertigo. The two are perceived as different entities in the neuro-otological consultation, with giddiness having a somewhat looser implication, and potentially encompassing both vertigo and dysequilibrium.

The *Oxford Dictionary of English* defines giddy as "having a sensation of whirling and a tendency to fall over or stagger; dizzy," thereby introducing another synonym (dizzy), which might be considered even less specific in terms of neuro-otological symptomatology.

The origin of the word vertigo is in the Latin vertere, meaning to turn. Conversely, the word giddy is believed to be derived from the Old English word gidig, meaning insane or, literally, possessed by a god. To complicate matters further, the word dizzy is defined by the *Oxford Dictionary of English* as "having or involving a sensation of spinning around and losing one's balance" and has its origin in the Old English word dysig, meaning foolish and thought to be related to Low German dusig, meaning giddy, and old High German tusic, which translates as foolish or weak.

In view of the etymological data, there is little wonder that we often struggle to elicit a clear clinical history in the dizzy clinic. Although clinicians maintain a tendency to reserve the term vertigo for a sensation of spinning or movement, our patients may well be using terms as defined by the *Oxford Dictionary of English* and treating the words vertigo, giddiness, and dizziness as synonymous.

The *Oxford Dictionary of English* has created several controversies since it was first published in 1998. Its first editor claims that it is based on modern understanding of language. It apparently derives from a "corpus linguistics of contemporary used English," meaning that it is compiled on the basis of the way people actually use words, as opposed to the correct way to use them. The *Daily Telegraph* described it as a "dumbed down version of the [*Oxford English Dictionary*]," while a language researcher writing in the *Guardian* commented that "if we go on doing this, we shall create a ghetto class who can't write application letters and won't get jobs." The reality for clinicians is that this "dumbing down" of our language might be a barrier to accurate history taking in the clinical setting.

It reminds me of something my father used to tell me: "Just because everyone else is doing it, doesn't mean it's right." Perhaps he was correct after all.

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