Sinusitis, or rhinosinusitis (the preferred term), is a common condition encountered in general practice. It is technically defined as inflammation of the nose and paranasal sinuses characterised by at least two of the following symptoms: nasal obstruction or discharge (essential), facial pain or pressure and reduction or loss of smell.

Acute rhinosinusitis is defined as symptoms of rhinosinusitis lasting less than 12 weeks with complete resolution of symptoms between attacks. It is most commonly caused by viral infections such as rhinovirus, influenza virus and parainfluenza virus. However, if symptoms worsen over five days, or persist for longer than 10 days, the possibility of post-viral rhinosinusitis should be considered.

Acute bacterial rhinosinusitis should be considered if there is at least three of these symptoms:
- Discoloured discharge
- Severe local pain with unilateral predominance
- A fever above 38 degrees
- An elevated ESR/CRP and
- Deterioration of clinical condition after initial milder phase of illness.

Review of anatomy
The paranasal sinuses include the maxillary, ethmoid, sphenoid and frontal sinuses. The maxillary, frontal and anterior ethmoidal sinuses drain into the middle meatus, beneath the middle turbinate. The posterior ethmoidal sinuses drain into the superior meatus and the sphenoidal sinus drains into the sphenoethmoidal recess.

Pathophysiology of acute rhinosinusitis
Viral infections are the most common cause of acute rhinosinusitis. Viral infection of the upper respiratory tract causes inflammation of the mucosa of the nose and paranasal sinuses, leading to obstruction of the paranasal sinuses’ drainage pathways. Inflammatory changes also affect the consistency of the mucous, with an increase in viscosity, and cilia dysfunction, resulting in stasis and impaired clearance of mucous with the potential for bacterial colonisation.

In children, the presence of a foreign body in the nose should be considered as a possible cause for acute sinusitis, especially if symptoms are unilateral. The pathogens commonly involved in acute bacterial rhinosinusitis are Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis and Staphylococcus aureus.

Although it’s a commonly seen condition, acute rhinosinusitis can present some potentially serious complications. If symptoms worsen over five days, or persist for longer than 10 days, the possibility of post-viral rhinosinusitis should be considered.

Figure 1. Coronal CT of paranasal sinuses.

Acute bacterial rhinosinusitis is estimated to complicate viral upper respiratory infections in 0.5% to 2% of cases. Distinguishing between viral and bacterial rhinosinusitis clinically is difficult. Duration and progression of symptoms can be used as a guide to treatment.

Diagnosis and investigations
The diagnosis of acute sinusitis is based on history and clinical findings. Examination findings on anterior rhinoscopy may reveal mucosal redness, edema, or purulent secretions. Examination of the oral cavity should include a check of dental hygiene as a possible source of infection, as well as the presence of post-nasal discharge. A mucopurulent discharge may also be seen.

Examination of the oral cavity should include a check of dentition as a possible source of infection, as well as the presence of post-nasal discharge. There may be accompanying pain or pressure over the sinuses. There is no role for radiology in the diagnosis of acute sinusitis. If complications are suspected, a CT scan may be considered.
Therapy Update

Management

Treatment depends on the severity of the disease. Mild acute rhinosinusitis, which is usually viral, should be managed with symptomatic relief including oral analgesics, saline nasal sprays or nasal douches and topical decongestants.

In patients with acute bacterial rhinosinusitis, there is often a high rate of resolution without the use of antibiotics. In patients who experience worsening of symptoms after five days or persistent moderate symptoms for longer than 10 days, post-viral rhinosinusitis is considered and the addition of an intranasal steroid should be considered.

If acute bacterial rhinosinusitis is suspected and symptoms (such as local pain and fever) are severe, then antibiotics combined with topical steroids should be considered.

Systemic corticosteroids have been found to provide short-term symptomatic relief when combined with oral antibiotics. Therapeutic guidelines recommend the use of amoxicillin as a first-line antibiotic. If patients have a poor response to amoxicillin, then amoxicillin with clavulananate is recommended as a second-line antibiotic. Treatment should last for seven to 14 days depending on the patient's clinical response.

When to refer

If a patient is suspected to have severe acute rhinosinusitis including acute bacterial rhinosinusitis and fails to improve within 48 hours of initial management, then specialist referral is indicated. Also, any patient who presents with symptoms and signs of possible complications (see box, above) should be referred urgently for possible hospitalisation.

Complications of acute rhinosinusitis

The complications of acute rhinosinusitis can be classified as local, orbital or intracranial. Although less common in the era of antibiotics, it is important to be aware of these complications because of their significant morbidity and mortality. Concerns regarding any of the complications of acute rhinosinusitis should prompt urgent specialist referral.

Local complications

Local complications include oedema and subperiosteal abscess.

The frontal sinus is the most common sinus complicated by oedema. Symptoms of oedema include headaches, photophobia, swelling of the forehead, nasal discharge and fever. Pott's puffy tumour, a subperiosteal abscess of the frontal bone, is indicated.

Orbital complications

Orbital complications include periorbital (pre-septal) and orbital (post-septal) cellulitis, subperiosteal and orbital abscess and cavernous sinus thrombosis. Periorbital cellulitis is the most common complication of sinusitis in children. It involves the skin and tissue anterior to the orbit, presents with eyelid swelling, erythema, tenderness and fever.

Acute rhinosinusitis complications

Local

• Osteomyelitis
• Subperiosteal abscess/Pott's puffy tumour

Orbital

• Periorbital (pre-septal) cellulitis
• Orbital (post-septal) cellulitis
• Subperiosteal abscess
• Orbital abscess
• Cavernous sinus thrombosis

Intracranial

• Meningitis
• Epidual abscess
• Subdural abscess
• Intracerebral abscess
• Venous sinus thrombosis

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Symptoms that warrant referral or hospitalisation
- Periorbital oedema
- Proptosis
- Diplopia
- Ophthalmoplegia
- Reduced visual acuity severe unilateral or bilateral frontal headache
- Frontal swelling
- Signs of meningitis or focal neurological signs

Adapted from the European Position Paper on Rhinosinusitis and Nasal Polyps 2012.

In contrast, orbital cellulitis is an infectious process within the orbit, posterior to the orbital septum. Clinical presentation differs from periorbital cellulitis in that there are more ocular changes including proptosis, chemosis, orbital pain and, in severe cases, opthalmoplegia and visual impairment, along with more severe eyelid oedema.

Patients with orbital cellulitis are at risk of developing a subperiosteal abscess or orbital abscess. In a patient with orbital cellulitis who develops worsening proptosis or gaze restriction, the possibility of a subperiosteal abscess should be considered. Patients who have orbital abscesses are at risk of progression to irreversible blindness.

Intracranial complications
Infection may spread to the cavernous sinus from the venous system of the paranasal sinuses via the ophthalmic veins. The key indication for suspecting cavernous sinus involvement is the presence of cranial nerve neuroptathies along with the presence of contralateral ocular symptoms and signs. Facial anaesthesia in the distribution of the first and second branches of the trigeminal nerve along with lateral rectus palsy may accompany the ocular symptoms.

Other intracranial complications include meningitis, epidural abscess, subdural abscess, intracerebral abscess and venous sinus thrombosis. Any focal neurological signs should prompt hospital referral. Complications do not need to be isolated and often may occur synchronously (see figure 3).

Summary
Acute rhinosinusitis is often viral in origin and will generally resolve with symptomatic management.

The diagnosis is made clinically with symptoms of nasal obstruction or discharge, along with facial pain and altered sense of smell.

Severe unilateral symptoms, worsening of symptoms after five days or persistence of symptoms for greater than 10 days, suggests the possibility of post-viral acute rhinosinusitis or even acute bacterial rhinosinusitis and the use of intranasal steroids or antibiotics should be considered.

Any clinical deterioration or concern about signs of complication should be referred for specialist assessment and management.

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Figure 3. A 14-year-old boy with complications of acute bacterial rhinosinusitis. A: Right orbital cellulitis. B: Soft tissue swelling of the forehead due to a Pott’s puffy tumour. C: Pott’s puffy tumour, air is seen within the subperiosteal collection and there is surrounding soft tissue swelling. D: Epidural abscess overlying the right frontal lobe. E: Right subperiosteal orbital abscess. F: Bilateral opacification of the maxillary and ethmoidal sinuses.

More patients achieved remission if residual symptoms were addressed.