

# Sinusitis



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## Background

Acute and chronic sinusitis are common primary care presentations. They are caused by mucosal inflammation, which inhibits mucociliary function of the nose and paranasal sinuses.

## Objective

This article provides an overview of acute and chronic sinusitis, and a guide to workup and management in a primary care setting. Complications and other indications for referral are discussed.

## Discussion

Sinusitis involves a wide spectrum of presentations, both acute and chronic. It is primarily a medical condition, and surgical management is reserved for complicated or refractory cases.

**S**inusitis is an inflammatory condition affecting the nose and paranasal sinuses. It is one of the most common primary care presentations in Australia, and 1.4 in every 100 general practice encounters were for acute or chronic sinusitis.<sup>1</sup> In 2011 and 2012, an estimated 1.9 million Australians had chronic rhinosinusitis.<sup>2</sup> It has been shown to have a greater impact on social functioning than chronic heart failure, angina or back pain.<sup>3</sup>

## Anatomy

The paranasal sinuses are paired and include the frontal, maxillary, ethmoid and sphenoid air cells. The frontal, maxillary and anterior ethmoid cells drain to the middle meatus. The posterior ethmoid and sphenoid cells drain to the superior meatus. The maxillary sinus is the largest air-filled sinus in the body, but its ostium is, on average, only 2.4 mm in diameter.<sup>4</sup>

The nose and paranasal sinuses are lined with a ciliated, pseudostratified columnar epithelium. A mucociliary blanket is formed by goblet cells that produce mucus, which traps noxious particles. The trapped particles are transported from the sinus to the nasopharynx by the action of cilia. Environmental and host factors lead to inflammation or anatomical/physiological alterations that disrupt mucociliary clearance. The target of medical and surgical treatment is to restore and assist mucociliary clearance.

## Acute rhinosinusitis

The spectrum of acute rhinosinusitis (ARS) includes the common cold (acute viral rhinosinusitis), post-viral ARS and acute bacterial rhinosinusitis. Post-viral ARS is defined by an increase of symptoms after five days, or persistence of symptoms after 10 days. Acute bacterial rhinosinusitis is discussed below. It is estimated that <2% of episodes of viral upper respiratory tract infections are complicated by bacterial transformation, yet primary care physicians prescribe antibiotics for >85% of presentations of sinusitis.<sup>5</sup>

## Clinical assessment

Acute rhinosinusitis presents with symptoms of nasal obstruction, discharge, changes in smell, facial pain/pressure and cough (in children). Facial pain often worsens on bending

forward and can radiate to the teeth. The diagnostic criteria are summarised in Box 1.

A thorough history must be taken to elicit the time course and symptoms of illness, particularly to exclude any complications of ARS. Examination of the nose includes looking for the presence of discharge (clear mucus or purulent material), polyposis, swelling and erythema. Oral examination may identify postnasal discharge and exclude dental disease as the cause of symptoms.

## Imaging

Clinical assessment is normally sufficient for diagnosis. Plain X-rays yield little information, and computed tomography (CT) scans of the nose and paranasal sinuses are not recommended routinely, especially in children. The use of CT scans should be reserved for cases where complications are suspected.

## Acute bacterial rhinosinusitis

Acute bacterial sinusitis (ABRS) is generally preceded by a viral or post-viral ARS. Symptoms suggestive of bacterial infection include discoloured discharge and severe localised pain, often with a unilateral predominance. History-taking may also elicit the classical pattern of 'double sickening', whereby the patient deteriorates after a period of mild illness.

## Management

Patients with acute viral rhinosinusitis should be treated with supportive therapies. These include regular analgesia, nasal saline irrigations and nasal decongestants. A Cochrane review<sup>6</sup> found a modest benefit with intranasal steroids, which may be used if symptoms persist. Treatment should be continued for 7–14 days. Patients should be advised of the need to re-present if any red flag symptoms should arise (Box 2).

Patient education regarding correct use of nasal saline irrigations is vital to ensure appropriate delivery and patient compliance. Patients should be told to boil water to ensure sterility and allow to cool so it is approximately at body temperature or 'warm' prior to use. The delivery system should be aimed at 45 degrees towards the outer eye.

Routine use of antibiotics to treat ARS in primary care does not prevent the development of complications.<sup>7</sup> A Cochrane review<sup>8</sup> found that 18 patients needed to be treated with antibiotics for one patient to have a shortened time to resolution, while one in eight patients had an adverse antibiotic effect. As such, antibiotics should not be routinely prescribed for acute rhinosinusitis.

Acute bacterial rhinosinusitis can be treated with antibiotics such as amoxicillin for five days.<sup>9</sup> Longer duration of antibiotic therapy does not increase rates of resolution.<sup>10</sup>

## Complications of ARS

Hansen et al<sup>11</sup> demonstrated an incidence of complications of three per million population per year, correlating to one in 12,000 episodes of ARS in children and one in 32,000 episodes in

adults. Orbital complications occur twice as often as intracranial complications; osseous complications are less common. Immediate referral to an ear, nose and throat (ENT) specialist should occur if complications are suspected, as they can cause significant morbidity and mortality if left untreated.

Orbital involvement presents with painful ophthalmoplegia, diplopia, proptosis and decreased visual acuity. Loss of green/red colour differentiation may be the first sign of decreased visual acuity, and Ishihara plates should be used.

### Box 1. Diagnostic criteria (from the *European Position Paper on Rhinosinusitis*)<sup>19</sup>

#### Adult acute rhinosinusitis

Sudden onset of two or more symptoms, one of which should be either nasal blockage/congestion/obstruction or nasal discharge (anteriorly or posteriorly), plus facial pain/pressure and/or reduction or loss of smell

#### Adult chronic rhinosinusitis

Presence of two or more symptoms persisting for more than 12 weeks, one of which should be either nasal blockage/congestion/obstruction or nasal discharge (anteriorly or posteriorly), plus facial pain/pressure and/or reduction or loss of smell

#### Paediatric acute rhinosinusitis

Sudden onset of two or more of nasal blockage/congestion/obstruction, discoloured nasal discharge or cough (day and night time)

#### Paediatric chronic rhinosinusitis

Presence of two or more symptoms persisting for more than 12 weeks, one of which should be either nasal blockage/congestion/obstruction or nasal discharge (anteriorly or posteriorly), plus facial pain/pressure and/or cough

#### Acute bacterial rhinosinusitis

At least three of:

- Discoloured, purulent nasal discharge
- Severe, localised pain
- Fever >38°C
- Elevated erythrocyte sedimentation rate/C-reactive protein
- Double sickening

### Box 2. Red flag symptoms

- Unilateral symptoms
- Bleeding
- Cacosmia (perceived malodorous smell)
- Signs of meningitis (neck stiffness, photophobia)
- Altered neurology
- Frontal swelling
- Any orbital involvement:
  - Diplopia
  - Decreased visual acuity
  - Painful ophthalmoplegia
  - Peri-orbital oedema and erythema
  - Globe displacement

## Chronic rhinosinusitis

Chronic rhinosinusitis (CRS) exists in two forms, which are differentiated by the presence of nasal polyposis – CRS with nasal polyposis (CRSwNP) and CRS without nasal polyposis (CRSsNP).

### Clinical assessment

Chronic rhinosinusitis is the persistence for more than 12 weeks of symptoms including nasal congestion, nasal discharge, facial pain/pressure and reduction of smell. The diagnostic criteria are summarised in Box 1. Assessment of a patient with CRS should follow the principles described for ARS. Anterior rhinoscopy to determine the presence or absence of polyps is especially important to guide treatment.

A history of any allergic symptoms should be explored, including sneezing, watery rhinorrhoea, nasal itch and itchy, watery eyes. Formal allergy testing can be performed if suspected, and referral to an allergist should be considered.

### Facial pain

It is important to note that diagnosis of sinusitis requires the presence of either nasal congestion or discharge. Facial pain is often misdiagnosed as sinusitis, but it is rarely a significant feature of chronic sinusitis. In a survey of CRSwNP, only 16% of patients reported moderate or severe facial pain.<sup>12</sup> It is important to consider other diagnoses when pain is the predominant feature, to avoid the patient going untreated while waiting for otolaryngologist review. Other causes of facial pain are summarised in Box 3.

### Primary care approach to CRS

Treatment of CRS should commence with a trial of topical steroids and nasal irrigation for at least eight weeks. Topical steroids can be delivered as a nasal spray or in conjunction with the nasal irrigation, through addition of diprosone OV cream or budesonide respules to the rinse once a day. Nasal saline irrigation should be conducted at least twice daily to mechanically lavage the contents of the sinuses.

If nasal polyposis is evident on examination, a burst of oral steroids can be used, in the form of oral prednisone. A Cochrane

review<sup>13</sup> found that a short course of oral steroids produces a significant reduction in polyp size and subsequent subjective improvement in sinonasal symptoms. Steroid regimes vary between otorhinolaryngologists. A trial of 25 mg mane for five days then 12.5 mg for five days should suffice. This should be used in conjunction with ongoing topical steroids and nasal irrigation to maintain polyp reduction. Inclusion of macrolide therapy for at least eight weeks has also been shown to enhance mucociliary function, reduce inflammatory cytokines, and may also reduce polyp size.<sup>14</sup>

Allergic rhinitis typically presents with recurrent episodes of sneezing, pruritis, rhinorrhea, nasal congestion and lacrimation. These symptoms occur after exposure to the allergen, which stimulates IgE-mediated mast cell degranulation. Allergens can often be clearly identified by history-taking; however, in the absence of clear precipitants, Radio-Allergo-sorbent Test (RAST) serology may be indicated.

Treatment consists of patient education regarding avoidance strategies, and oral antihistamines. Second-generation, non-sedating oral H1 antihistamines have a quick onset of action with a small side effect profile and can be safely used in children. Referral to an immunologist for desensitisation may be considered in the case of severe allergic symptoms uncontrolled by simple measures.

### Surgical management of CRS

In the event that appropriate medical therapy fails, patients should be referred to an otorhinolaryngologist for consideration of surgical management. The current surgical approach to CRS is functional endoscopic sinus surgery (FESS). FESS involves endoscopic removal of polyposis when present, and ventilation of sinus cells. Major complications are rare, but include damage to extraocular muscles, loss of vision, cerebrospinal fluid leak and meningitis.

It is important for patients to be aware that CRS is an inflammatory condition of the mucosa, and that as such, sinus surgery is not a cure for their condition; rather, it is an attempt to allow better symptom control. Ongoing use of topical steroids and nasal rinses are often required postoperatively to control mucosal inflammation. This is especially true for those patients with polyposis, with 60% requiring a further polypectomy within five years.<sup>15</sup>

### Asthma and CRS

Patients with CRS often also have asthma – up to 50% of patients have co-existing disease.<sup>16</sup> Medical and surgical treatment of CRS, with or without nasal polyposis, have been shown to improve control of asthma, by both subjective and objective measures.<sup>17</sup>

### Samter's triad

Samter's triad is defined by the presence of non-steroidal anti-inflammatory drug sensitivity, asthma, and CRSwNP.

Aspirin desensitisation has been shown to decrease polyp recurrence, the number of hospitalisations, and corticosteroid requirements in patients with co-existing CRSwNP.<sup>18</sup>

#### Box 3. Causes of facial pain

- Migraine
- Trigeminal neuralgia
- Cluster headache
- Paroxysmal hemicrania
- Atypical facial pain
- Tension headache
- Chronic oro-facial pain
- Dental infection
- Mid-facial segment pain
- Post-herpetic neuralgia

## Conclusion

Rhinosinusitis is a common primary care presentation and manifests in a variety of forms. Assessment and management of patients can usually be performed at a primary care level; referral for surgical management is required only for complicated disease or disease that is refractory to medical therapy. Imaging is not essential for diagnosis, but should be considered if the diagnosis is uncertain or complications are suspected. Given the large quality-of-life burden in patients with CRS, prompt diagnosis and effective management are important.

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