

# The current management of rhinosinusitis

**Most patients with acute or chronic rhinosinusitis respond well to appropriate medical management. However, surgery may be necessary in some cases.**

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Rhinosinusitis is a common condition that affects over 15% of Australians. This article discusses the management of both acute and chronic rhinosinusitis and highlights atypical presentations that may need urgent specialist referral.

### Acute versus chronic rhinosinusitis

Rhinosinusitis has been defined as inflammation of nasal and paranasal sinus mucosa. The term rhinosinusitis is preferred as clinical experience has taught us that the contiguous lining of the nose and sinuses are both affected in nasal disease and that one cannot be affected while the other is spared.<sup>1</sup>

### Acute rhinosinusitis

Acute rhinosinusitis is defined as an inflammation of the nose that has spread into the sinuses with a duration of between one day and three weeks. It usually follows an upper respiratory tract infection and presents with nasal obstruction, purulent rhinorrhoea, pyrexia and facial pain. Oedema of the mucosa obstructs the sinus ostia, leading to retention of secretions and secondary viral or bacterial infection.<sup>2</sup> Acute rhinosinusitis may either resolve or evolve into a subacute phase. It may become

chronic if the inflammation continues for more than three months. Symptoms of chronic rhinosinusitis include nasal obstruction, rhinorrhoea and facial pressure or fullness.<sup>1</sup>

Acute rhinosinusitis is usually due to viral infection (rhinovirus or coronavirus) although in 0.5% of cases, secondary infection with *Streptococcus pneumoniae*, *Haemophilus influenzae* or *Mycobacterium catarrhalis* can occur (Figure 1). If the infection is prolonged, anaerobic bacteria start to proliferate; in most cases of chronic rhinosinusitis mixed organisms will be cultured.

### Chronic rhinosinusitis

Chronic rhinosinusitis evolves following an acute infection. The inflammation may be exacerbated by conditions such as allergy, low grade immune deficiencies, impairment of mucociliary clearance or fungal colonisation of the sinuses. Nasal polyps form in response to chronic inflammation and are commonly seen in patients with aspirin sensitivity, cystic fibrosis or fungal colonisation (Figure 2).<sup>3</sup> Polyps form the severe end of the spectrum of presentation of chronic rhinosinusitis. It has been estimated that 16.3% of the adult population

## IN SUMMARY

- Most cases of acute rhinosinusitis are viral and will settle without the need for antibiotics.
- Uncomplicated chronic rhinosinusitis may require directed antibiotics and two to three months of nasal corticosteroids and saline douches before medical management can be said to have failed.
- In carefully selected patients, functional endoscopic sinus surgery will produce satisfactory outcomes in 85 to 90% of patients.
- If complications develop or the patient is immunocompromised, urgent referral to an otolaryngologist is mandatory.
- In the absence of facilities for CT scanning, plain sinus radiographs have a role in confirming the diagnosis.

continued



Figure 1. Nasendoscopic view of a patient with acute viral sinusitis. The mucopus is flowing out of the osteomeatal complex, a narrow cleft located under the middle turbinate.



Figure 2. Nasal polyposis in a patient with allergic fungal rhinosinusitis.

suffer from chronic rhinosinusitis.<sup>1</sup>

A diagnosis of chronic rhinosinusitis is made by confirming the presence for three months or longer of either two major symptoms (facial fullness, nasal obstruction, nasal discharge, hyposmia/anosmia), or one major symptom and two or more minor symptoms (headache, fever, halitosis, fatigue, dental pain, cough, ear pain or ear pressure).<sup>1</sup>

### Management of acute rhinosinusitis

There are few randomised studies comparing management options but common practice includes nasal decongestants, saline irrigation, antibiotics and referral of patients with atypical presentations.

### Balanced saline solution for nasal douching

- 0.5 teaspoon rock salt (not table salt)\*
- 0.5 teaspoon sugar
- 0.5 teaspoon sodium bicarbonate
- 1 litre boiled water

Mix the ingredients together in a clean 1-litre bottle and allow to cool. Transfer the solution into a clean nasal spray bottle as needed for use. The solution will keep in a fridge for up to a week.

\* The iodine in table salt is an irritant.

### Nasal decongestants

Preparations such as 0.05% oxymetazoline, used for up to five days, help to reduce tissue oedema and to reopen the natural sinus ostia. This allows the re-aeration and restoration of the mucociliary clearance pathways. The patient should stop using the spray after five days to avoid reflex nasal congestion and impairment of mucociliary clearance – a condition known as rhinitis medicamentosa.

### Saline irrigation

The regular use of a buffered nasal saline solution (up to 10 times per day) has been shown to improve symptom relief and outcomes.<sup>4</sup> Over the counter prepared saline (Fess, Narium Nasal Mist) is available but patients can make their own solution using the recipe in the box above.

### Antibiotics

The use of antibiotics for acute rhinosinusitis is controversial.<sup>2</sup> As most cases are viral, Australian therapeutic guidelines advise that initial management should be symptomatic.<sup>5</sup> Antibiotics should be considered if symptoms fail to respond and three of the following are present:

- consistent mucopurulent discharge after seven days
- facial pain
- a poor response to decongestants

- tenderness over the sinuses
- nondental tenderness on tapping a tooth.

If antibiotics are used, amoxycillin is still considered first line treatment (adult dose, 500 mg three times daily for 10 to 14 days), with trimethoprim–sulfamethoxazole or cefaclor as alternatives for patients who are allergic to penicillin. Amoxycillin–clavulanate or cefaclor should be used as second line choices if  $\beta$ -lactamase resistance is shown on culture and sensitivity testing.<sup>6</sup>

### Referral of patients with atypical presentations

Specialist referral is necessary for patients with acute rhinosinusitis who exhibit complications such as orbital cellulitis, diplopia, impaired visual acuity or severe headache (Figure 3). These patients require urgent radiological investigation (computed tomography) and, if indicated, surgical drainage of the sinuses and collection of pus from within the cranial or orbital cavities (Figure 4).

### Management of chronic rhinosinusitis

#### Antibiotics

Chronic rhinosinusitis is both an inflammatory and infective condition. The presence of mucopurulent discharge may be indicative of the presence of active infection. Antibiotics should ideally be given after directed culture and sensitivity tests, but this may not always be practicable. Many patients will respond to blind but appropriate antibiotic use and therefore most specialists recommend antibiotics before surgical intervention. The macrolide group of antibiotics have immunomodulatory properties that benefit patients with chronic respiratory diseases,<sup>7</sup> and this makes them attractive antibiotics to use for the treatment of chronic rhinosinusitis. As anaerobic bacteria are likely to be present, use of both a macrolide antibiotic and metronidazole should be considered for up to three weeks. Amoxycillin–clavulanate is an alternative.

## Nasal corticosteroids

Nasal corticosteroids (beclomethasone [Aldecin, Beconase Hayfever], budesonide [Budamax, Rhinocort], fluticasone [Beconase Allergy 24 Hour Fluticasone Aqueous Nasal Spray, Flixonase Nasule Drops], mometasone furoate [Nasonex Aqueous Nasal Spray]) are effective in reducing both allergic and nonallergic inflammation in the nasal cavity and can dramatically reduce the symptoms of chronic rhinosinusitis. Some of the benefits of nasal corticosteroids, such as thinning of the nasal mucosa and re-aeration of the paranasal sinuses, can take up to six weeks to occur. Recent guidelines recommend the use of a regular nasal corticosteroid for two to three months before medical treatment can be deemed to have failed.<sup>1</sup>

Mometasone furoate and fluticasone have greater potency and less systemic absorption than older nasal corticosteroids and should be considered for patients who are likely to require more than a short course of treatment.

## Nasal saline irrigation

As in acute rhinosinusitis, the regular use of a buffered nasal saline solution has been shown to improve outcomes in chronic rhinosinusitis.<sup>4</sup> Saline has been shown to stimulate mucociliary activity and can help with the mechanical removal of secretions and crusts. It may also thin down thick mucus and further improve mucociliary clearance.

## Serological investigations

Many patients with chronic rhinosinusitis have an undiagnosed allergy to perennial aeroallergens. Although house dust mite is a common allergen worldwide, allergy to fungal spores is especially prevalent in Australia due to the warm dry climate. Skin prick tests can be performed but it is usually easier to arrange serological testing (radioallergosorbent tests) for common aeroallergens, which can be performed in four batches of allergens. If one batch is

positive, more specific assays can be used to identify the exact allergen(s) to which the patient is sensitive.<sup>8</sup>

In patients who have had chronic rhinosinusitis since childhood, it is also worth testing the levels of immunoglobulin subclasses to exclude immunodeficiency. Rarely, mild cases of cystic fibrosis may present in early adulthood and will be diagnosed by a sweat test or DNA analysis.

## Radiological investigation

If a patient's symptoms are still present after two to three months of medical treatment, imaging should be performed. Computerised tomography (CT) has replaced plain film radiography as the gold standard for paranasal sinus imaging. Mucosal thickening, sinus opacification, polyposis and air-fluid levels are all



Figure 3. Orbital cellulitis in a child following acute rhinosinusitis. If a peri-orbital abscess develops, vision can be lost within a matter of hours.

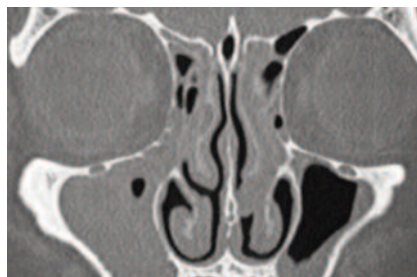


Figure 5. Coronal CT scan showing the classic signs of chronic rhinosinusitis. This patient needs urgent admission to hospital and aggressive treatment with parenteral antibiotics and possible surgical decompression.

signs suggestive of disease but clinical correlation is always required (Figure 5).<sup>9</sup> Isolated sinus opacification can still be considered as lying within the spectrum of normality and its presence needs to be correlated to the overall clinical picture.

The CT findings, along with findings on rigid nasendoscopy, will guide the surgeon as to whether surgical intervention will be of benefit and the extent of surgery that will be required (Figure 6).

## Systemic corticosteroids

In severe cases, especially when nasal polyps are present, systemic corticosteroids may help avoid surgery (usually prednisolone [Panafcort, Panafcortelone, Solone] 0.5 mg/kg a day for 10 days). Patients should be counselled about potential side effects, and courses of longer than 10 days should be avoided.



Figure 4. Axial CT scan showing a left subperiosteal abscess within the orbit.



Figure 6. A 2.8 mm nasendoscope. This instrument is used to assess the middle meatus and correlate clinical and CT findings in patients with chronic rhinosinusitis.

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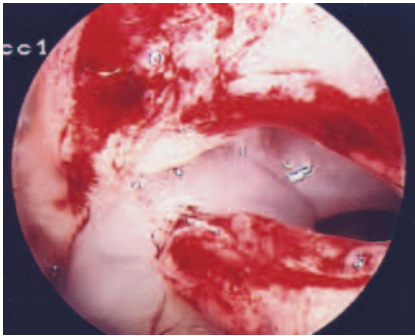


Figure 7. An intraoperative view of functional endoscopic sinus surgery showing the minimally invasive techniques used to decompress the left maxillary sinus ostium. Note the pus draining from the opened ostium.

### Functional endoscopic sinus surgery

Functional endoscopic sinus surgery (FESS) allows for the removal of thickened mucous and nasal polyps and enlargement or decompression of the sinus ostia (Figure 7).

Surgical opening of the natural sinus ostia restores the function of the sinuses by improving the mucociliary drainage and aeration of the sinuses. For minimal disease involving the maxillary sinus and anterior ethmoids, removal of the uncinate process may be all that is necessary to decompress the maxillary sinus ostium. Opening of the ethmoidal bulla will also improve the ventilation and drainage of this critical osteomeatal unit. If further surgery is required, it should be tailored to the extent of disease as seen on the CT scan. To preserve the natural mucociliary clearance pathways wherever possible, only the diseased sinus ostia are opened. More extensive surgery may include opening of the frontal recess and exposure of the frontal ostium, as well as anterior and posterior ethmoidectomy, with or without sphenoidotomy.

Postoperative management following

FESS includes the use of regular saline douches and topical nasal corticosteroids. In cases of severe nasal polyposis, it may also include short courses of systemic corticosteroids.

Between 85 and 90% of appropriately selected patients will obtain satisfactory outcomes following endoscopic sinus surgery.<sup>10</sup> As surgical techniques have evolved, major complications such as damage to the cribriform plate or orbit are now extremely rare. Minor complications such as adhesion formation and epistaxis occur in up to 10% of cases but can usually be treated in the office setting without the need for hospital admission.

### Referral of atypical cases

Patients who have unilateral nasal obstruction with pain and/or epistaxis should be referred to specialists because this must be regarded as a sinonasal malignancy

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until excluded by CT scanning and rigid nasendoscopy. This particularly applies to elderly patients. Also, immunocompromised patients with chronic rhinosinusitis need prompt specialist referral to exclude fungal disease, which can become invasive in this patient group and erode into the skull base resulting in a high mortality.

Proptosis, diplopia and numbness of the infraorbital nerve are all signs and symptoms that should alert the clinician to an atypical presentation of chronic rhinosinusitis. These may represent a malignancy or an expanding lesion such as a mucocoele that will require urgent attention.

## Conclusion

Most patients with acute or chronic rhinosinusitis will respond well to appropriate medical management. For patients with unresolving disease after two to three

months and who are compliant on their medication, a CT scan to assess the extent of disease should be performed and FESS drainage of the sinuses considered. In well selected patient groups, over 85% of individuals will obtain satisfactory outcomes from surgery (FESS). **MT**

## References

1. Benninger MS, Ferguson BJ, Hadley JA, et al. Adult chronic rhinosinusitis: definitions, diagnosis, epidemiology, and pathophysiology. *Otolaryngol Head Neck Surg* 2003; 129(3 Suppl): S1-S32.
2. Anon JB, Jacobs MR, Poole MD, et al. Antimicrobial treatment guidelines for acute bacterial rhinosinusitis. *Otolaryngol Head Neck Surg* 2004; 130(1 Suppl): 1-45.
3. Davis LJ, Kita H. Pathogenesis of chronic rhinosinusitis: role of airborne fungi and bacteria. *Immunol Allergy Clin North Am* 2004; 24: 59-73.
4. Papsin B, McTavish A. Saline nasal irrigation: its role as an adjunct treatment. *Can Fam Physician* 2003; 49: 168-173.
5. Therapeutic guidelines: antibiotic, version 12. Melbourne: Therapeutic Guidelines Limited, 2002.
6. Williams JW Jr, Aguilar C, Cornell J, et al. Antibiotics for acute maxillary sinusitis (Cochrane Review). In: *The Cochrane Library*, issue 3, 2004. Chichester: John Wiley .
7. Gotfried MH. Macrolides for the treatment of chronic sinusitis, asthma, and COPD. *Chest* 2004; 125(2 Suppl): 52S-60S.
8. Bertrand B, Eloy P, Rombeaux P. Allergy and sinusitis. *Acta Otorhinolaryngol Belg* 1997; 51: 227-237.
9. Jones NS. CT of the paranasal sinuses: a review of the correlation with clinical, surgical and histopathological findings. *Clin Otolaryngol* 2002; 27: 11-17.
10. Witterick IJ, Kolenda J. Surgical management of chronic rhinosinusitis. *Immunol Allergy Clin North Am* 2004; 24: 119-134.

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**DECLARATION OF INTEREST:** None.