

The current management of rhinosinusitis

A SIMON CARNEY, MB ChB, BSc(Hons), FRCS, FRACS; PETER J WORMALD, MD, FRACS

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

Rhinosinusitis is a common condition that affects over 15% of the population. 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.¹

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.² 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.¹

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).³ Polyps form the severe end of the spectrum of presentation of chronic rhinosinusitis. It has been estimated that 16,3% of the adult population suffer from chronic rhinosinusitis.¹

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).¹

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.

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.⁴ Over-the-counter prepared saline is available but patients can make their own solution using the recipe in the box on page 20.

Antibiotics

The use of antibiotics for acute rhinosinusitis is controversial.² As most cases are viral, it is recommended that initial management should be symptomatic.⁵ Antibiotics should be considered if symptoms fail to respond and three of the following are present:

- consistent mucopurulent discharge after seven days

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Dr Carney is Senior Lecturer in ENT, Flinders University, and Consultant Surgeon, Flinders Medical Centre, Adelaide. Professor Wormald is Head of the ENT Academic Departments, Adelaide and Flinders Universities, Adelaide, Australia.

The current management of rhinosinusitis

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Many patients with chronic rhinosinusitis have an undiagnosed allergy to perennial aeroallergens.

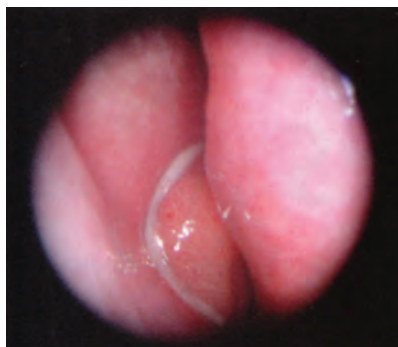


Figure 1. Nasendoscopic view of a patient with acute viral sinusitis. The mucopus is flowing out of the osteomeatal complex, a narrow cleft located under the middle turbinate.



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

- facial pain
- a poor response to decongestants
- tenderness over the sinuses
- nondental tenderness on tapping a tooth.

If antibiotics are used, amoxicillin is still considered first-line treatment (adult dose, 500mg three times daily for 10 to 14 days) with trimethoprim-sulphamethoxazole or cefaclor as alternatives for patients who are allergic to penicillin. Amoxicillin-clavulanate or cefaclor should be used as second-line choices if β -lactamase resistance is shown on culture and sensitivity testing.⁶

Referral of patients with atypical presentations

Specialist referral is necessary for patients with acute rhinosinusitis who exhibit complications such as orbital cellulites, diplopia, impaired visual acuity or severe headache

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 boiling 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

(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,⁷ 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. Amoxicillin-clavulanate is an alternative.

Nasal corticosteroids

Nasal corticosteroids (beclomethasone, budesonide, fluticasone, mometasone furoate) 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.¹

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.⁴ 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 a 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.⁸

In patients who have had chronic rhinosinusitis since

Between 85 and 90% of appropriately-selected patients will obtain satisfactory outcomes following endoscopic sinus surgery.

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



Figure 3. Orbital cellulites in a child following acute rhinosinusitis. If a periorbital abscess develops, vision can be lost within a matter of hours.

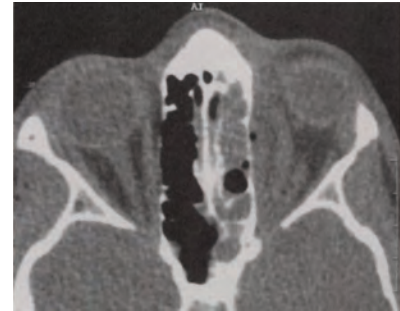


Figure 4. Axial CT scan showing a left subperiosteal abscess within the orbit.

with 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 0,5mg/kg a day for 10 days). Patients should be counselled about potential side-effects, and courses of longer than 10 days should be avoided.

Functional endoscopic sinus surgery

Functional endoscopic sinus surgery (FESS) allows for the removal of thickened mucus and

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The current management of rhinosinusitis
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Most cases of acute rhinosinusitis are viral and will settle without the need for antibiotics.

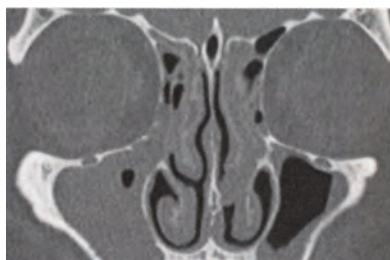


Figure 5. Coronal CT scan showing the classic signs of chronic rhinosinusitis. This patient needs urgent admission to hospital and aggressive treatment with parenteral antibiotics and possible surgical decompression.



Figure 6. A 2,8mm nasendoscope. This instrument is used to assess the middle meatus and correlate clinical and CT findings in patients with chronic rhinosinusitis.

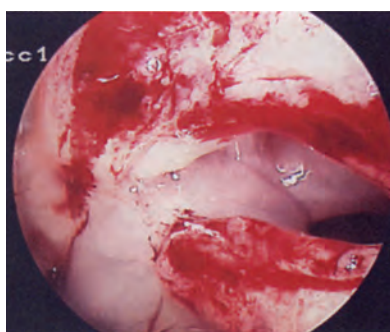


Figure 7. An intraoperative view of functional endoscopic sinus surgery showing the minimally invasive techniques used to decompress the left maxillary sinus ostium. Note the pus draining from the opened ostium.

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.¹⁰ 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 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). ■

References are available on request.

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.

QUESTIONS FOR CPD ARTICLE NUMBER TWO

CPD: 1 point

The current management of rhinosinusitis

Instructions

1. Before you fill out the computer answer form, mark your answers in the box on this page. This provides you with your own record.
2. The answer form is bound into this journal. Cut it out carefully.
3. Read the instructions on the answer form and follow them carefully.
4. Your answers for the January issue must reach MODERN MEDICINE, PO Box 2271, Clareinch 7740, by April 30, 2006.
5. You must score at least 60% in order to be awarded the assigned CPD points.

Answer true or false to parts (a) to (e) of the following

Part 1. Lily, who is aged 35 years and allergic to penicillin, presents with a two-week history of acute rhinosinusitis. She gives a history of a similar episode two months previously. In relation to Lily's presentation:

- a. Lily is likely to benefit from a vasoconstrictor nasal spray.
- b. Local vasoconstrictors must be used for at least three weeks to maintain mucociliary clearance.
- c. Lily should be advised to use a saline nasal spray up to ten times per day.
- d. Lily's previous episode justifies treatment with a broad spectrum antibiotic.
- e. If antibiotics are indicated, Lily could be treated with trimethoprim-sulphamethoxazole or cefaclor.

Part 2. Are the following statements true or false in relation to acute rhinosinusitis?

- a. Acute rhinosinusitis is defined as an inflammation of the nose and sinuses lasting for less than three weeks.
- b. Acute rhinosinusitis is usually due to a mixed anaerobic bacterial infection.
- c. Acute rhinosinusitis usually follows an upper respiratory tract infection.
- d. If untreated, acute rhinosinusitis always evolves into chronic rhinosinusitis.
- e. Chronic rhinosinusitis can be diagnosed if symptoms continue for more than three months.

Part 3. Geoff, who is aged 43 years and has longstanding asthma, presents with a two-year history of chronic bilateral maxillary sinus discomfort and post-nasal discharge. In Geoff's case:

- a. Geoff is likely to benefit from nasal corticosteroids.
- b. If started, regular nasal corticosteroid should be trialled for two to three months before medical treatment can be deemed to have failed.
- c. Geoff should be advised to use a nasal saline spray to stimulate mucociliary activity.
- d. Geoff's rhinosinusitis may be due, in part, to an allergy to house-dust mite.
- e. Geoff's sensitivity of allergens can be assessed by serological testing (radioallergosorbent tests).

Part 4. Are the following statements true or false in relation to the assessment and management of chronic sinusitis?

- a. Plain film radiography remains the gold standard for paranasal sinus imaging.
- b. The presence of polyposis is an unequivocal cause of chronic sinusitis irrespective of clinical signs.
- c. Isolated sinus opacification may occur in people without sinus disease.
- d. Chronic sinusitis should be assessed by rigid nasendoscopy.
- e. Nasal polyposis may respond to short courses of systemic corticosteroids.

CPD Article 2

	Part 1	Part 2	Part 3	Part 4
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See tear-out sheet for details.

Conduit artery function evaluation — is central blood pressure the key?

Explanations for the major differences in important outcomes such as death, coronary events, stroke and diabetes between the two treatment arms in the recently-published Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT¹) have been the subject of much heated debate. A landmark sub-study of this trial called CAFÉ² (Conduit Artery Function Evaluation), presented at the American Heart Association annual meeting in Dallas recently, may now provide an important new explanation for these differing outcomes. Despite non-significant differences in brachial systolic blood pressures throughout the study, CAFÉ showed that there were substantially and consistently lower central aortic blood pressures in the amlodipine ± Coversyl (perindopril) group compared to the atenolol ± bendro-flumethiazide-K group. This provides a plausible explanation for the improved clinical outcomes seen in patients treated with the amlodipine ± perindopril combination and adds fuel to the fiery debate currently raging on the appropriateness of beta blockers as an optimal treatment for uncomplicated hypertension.

'The results of this study are clear-cut, dramatic and potentially very important,' comments Bryan Williams, principal investigator of CAFÉ and Professor of Medicine at the University of Leicester in the UK. 'It may also explain why certain types of hypertension treatment might be more effective than others.'

Due to its accessibility, the brachial artery is typically used to measure blood pressure and up until now it has been assumed that the pressures in this artery accurately reflect pressures in the central circulation and left ventricular load. Although brachial blood pressure is an important predictor of cardiovascular structural damage, morbidity and mortality, central blood pressure is a much better indicator of aortic load and predictor of cardiac ischaemic events.

CAFÉ is the first prospective study to relate these different effects directly to cardiovascular outcomes in a large clinical outcome trial. CAFÉ found that in a group of 2 073 ASCOT patients, central aortic pulse pressure was significantly lower by 4.3mmHg ($p < 0.0001$) in the amlodipine ± perindopril group throughout the study, even though the brachial pulse pressure was similar in the two groups. Central pulse pressure was a significant determinant of cardiovascular events and renal impairment ($p < 0.05$).

'The CAFÉ study demonstrates that antihypertensive treatment with amlodipine ± perindopril has a greater effect on central blood pressure than older antihypertensives such as atenolol ± bendroflumethiazide and this may well explain their superior effects on outcome,' comments Professor John Cockcroft, Professor of Cardiology at the University Hospital, Cardiff. 'CAFÉ should also stimulate measurement of central blood pressure in further large intervention studies and perhaps in the future it will be central blood pressure reduction that counts.'

Previous studies have demonstrated that certain classes of blood pressure-lowering drugs may have profoundly different effects on the damage hypertension may cause to large arteries. Pulse wave morphology, and thus central haemodynamic parameters, are important markers of cardiovascular risk in these patients.³ The REASON study demonstrated that perindopril, in combination with the diuretic indapamide, reduced central systolic and pulse pressure to a greater degree than the beta-blocker atenolol.⁴ This was found to reflect a significant improvement of large artery function. Thus, in addition to its other beneficial effects, such as improved endothelial function, decreased inflammation and reduced cardiac remodelling (a major cause of heart failures in elderly patients), as demonstrated in the EUROPA^{5,6} and PREAMI⁷ studies, these beneficial vascular effects of perindopril at the level of large arteries may have contributed to the decrease in cardiovascular events seen in ASCOT.

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