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Chronic rhinosinusitis

'It's my sinus doc!'

Background

Chronic rhinosinusitis (CRS) is a common condition in the community, with significant morbidity and financial implications.

Objective

This article outlines the diagnosis of adult CRS, the differential diagnoses, and appropriate investigations and management.

Discussion

Rhinosinusitis is now the preferred term rather than sinusitis as this reflects the underlying pathophysiology. Patients with CRS have symptoms of at least 12 weeks duration with supporting examination and/or computerised tomography findings. Computerised tomography sinus scans should be considered in patients not responding to medical treatment or when the diagnosis is unclear. What constitutes maximal medical therapy is controversial and varied, but should include nasal saline irrigations, nasal corticosteroids and a course of antibiotics. Surgical treatment is reserved for patients not responding to medical treatment.

■ **Rhinosinusitis is inflammation of the nose and the paranasal sinuses.¹ It can be loosely divided into two subsets:**

- **acute rhinosinusitis – symptoms less than 4 weeks in duration**
- **chronic rhinosinusitis – 12 weeks of consecutive symptoms.**

Chronic rhinosinusitis may or may not include the presence of nasal polyps.

Taskforces in both Europe¹ and the United States²⁻⁴ have been commissioned to aid in the appropriate terminology and definitions of this condition. The term 'sinusitis' has essentially now been replaced by the more correct term 'rhinosinusitis'. This is because sinusitis is often preceded by, and accompanied by, rhinitis.³

Aetiology

Chronic rhinosinusitis (CRS) is probably a heterogeneous condition with varying aetiologies. Some of the recognised factors are listed in Table 1.

Traditional bacterial organisms implicated include: *Streptococcus pneumoniae*, *Hemophilus influenza*, *Moraxella catarrhalis* and *Staphylococcus aureus*. However, greater emphasis is now being placed upon inflammation rather than infection *per se*.

Superantigens are potent inflammatory agents produced by *S. aureus* resulting in a potent inflammatory cascade.^{5,6} Bacterial biofilms consist of bacteria in a specialised protective polysaccharide gel and may explain why antibiotics are sometimes ineffective in CRS.⁷ Other theories focus on colonising fungi and abnormal eosinophilic responses.⁸

Anatomy/physiology

The maxillary, ethmoid and frontal sinuses drain into the narrow, critical region between the inferior turbinate and the middle turbinate. This critical area is called the 'middle meatus', or sometimes the 'ostiomeatal complex region' (OMC). The sphenoid sinuses drain more posteriorly. Various bacteria colonise the nose such as *S. aureus*, while the sinuses are considered sterile.



Symptoms

The symptoms of CRS are varied, and include the following:

- facial pressure, pain, congestion and/or fullness
- nasal obstruction or blockage
- nasal discharge or postnasal drip
- other symptoms such as hyposmia/anosmia, headaches, halitosis, fatigue, dental pain, cough and ear pressure.

Traditionally, obstructed sinuses are thought to have referred pain to certain regions. This is a reasonable assumption but not foolproof.⁹

Referred pain sites include:

- maxillary sinus – cheek/dental pain
- ethmoid sinus – pain between the eyes
- frontal sinus – forehead pain
- sphenoid sinus – vertex pain.

Examination/signs

Examination of the nose can be achieved in various ways by:

- using an otoscope (cheapest)
- using a headlight with magnification (more expensive) (*Figure 1*)
- using specialised endoscopes (*Figure 1*). This enables a more detailed evaluation of the posterior aspect of the nose and requires specialised ear, nose and throat (ENT) referral (*Table 2*).

Findings may include the following:

- inflammation – mucopurulent discharge or oedema/swelling of the middle meatus (*Figure 2*)
- nasal polyps (*Figure 3*).

Before nasal examination, the nose should be decongested. This can be achieved by using oxymetazoline or phenylephrine/lignocaine spray.

Investigations

CT scan

Generally, a computerised tomography (CT) scan of the sinuses (*Figure 4*) should be requested when:

- the diagnosis is uncertain
- the patient is not responding as expected to medical treatment
- surgery is planned (as per ENT specialist).

A plain sinus X-ray is no longer considered satisfactory as it is far inferior to the information obtained from a CT scan. Magnetic resonance imaging (MRI) is rarely required in CRS.

Swab result

A swab may be taken when patients are not responding to medical therapy and to further guide appropriate selection of an antibiotic. It is important that the swab is of mucopus visualised on nasal examination. A swab simply placed in the nose is of limited use due to bacteria already colonising the nose.

Allergy/immunology assessment

Concomitant allergic disorders are more frequent than immunological disorders in patients with CRS. Blood tests (radio-allergosorbent testing [RAST]) or skin prick tests may be indicated.¹⁰ (See the article 'Allergic

Table 1. Aetiology of chronic rhinosinusitis

- Bacterial infection (+/- in association with URTI)
- Rhinitis – allergic, nonallergic (eg. smoking)
- Anatomical factors
- Immunodeficiencies
- Ciliary disorders (eg. cystic fibrosis)
- Bacterial biofilms, Staphylococcal superantigens
- Fungi – eosinophilic response to colonising fungi
- Other metabolic derangements (eg. aspirin sensitivity)

Figure 1. Headlight with magnification and endoscopes utilised for nasal examination



Table 2. Indications for referral to an ENT specialist

- Failed medical therapy
- Unsure of diagnosis
- Unilateral symptoms
- Bleeding
- Crusting
- Orbital symptoms
- Severe frontal headache
- Frontal swelling

rhinitis – practical management strategies' by Hu, Katelaris and Kemp in the April 2008 issue of *AFP*.) Immunology assessment may also be indicated in patients with features suggesting an immunodeficiency.

Diagnosis

The updated consensus for the diagnosis of CRS is listed in *Table 3*.¹

Differential diagnoses

Neuralgic pain

This includes migraine, cluster headaches and tension headaches. Patients typically present with facial pain/headache, and have minimal other symptoms to suggest CRS. Examination findings of CRS are absent, and the CT scan is within normal limits.

Noninvasive fungal sinusitis

- Fungal ball/mycetoma – the CT scan shows typical 'double densities' within the involved sinus, which is considered pathognomonic for the disease.¹¹ Surgery is indicated to remove the fungal ball. Antifungal agents are not required.

- Allergic fungal rhinosinusitis (AFRS) – fungal hyphae in thick allergic type mucin are demonstrated pathologically and patients are atopic to fungi. The classification of AFRS as a distinct entity separate from CRS is controversial.¹² The use of antifungal agents is also controversial.

Figure 2. Endoscopic view of right nasal cavity (after decongestant) showing mucopus streaming from right middle meatus

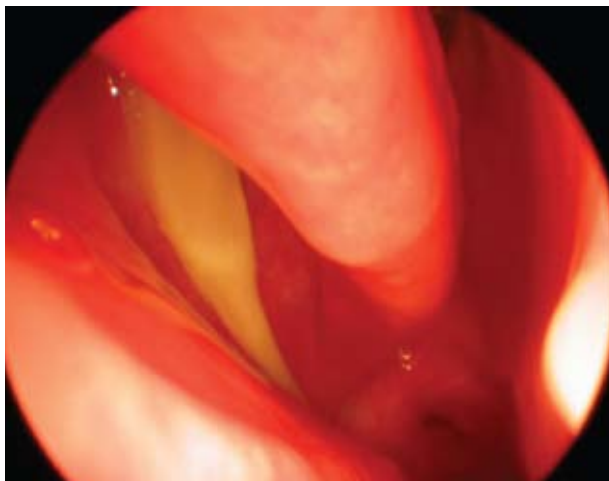


Table 3. Diagnosis of chronic rhinosinusitis¹

- Symptoms present for at least 12 consecutive weeks
- At least two of the following symptoms:
 - anterior and/or posterior mucopurulent drainage
 - nasal obstruction
 - facial pain/pressure/fullness
- The presence of inflammation on examination of a decongested nose (discoloured mucus or oedema in the middle meatus) and/or CT scan showing evidence of rhinosinusitis

Figure 3. Endoscopic view of nasal polyps



Tumours

Patients may present with atypical features including unilateral symptoms or signs, bleeding and abnormal CT scans.

Management

The mainstay of medical management in CRS consists of:^{1,13,14}

- nasal saline irrigations
- intranasal corticosteroids
- oral antibiotics
- treatment of concomitant conditions (eg. allergic rhinitis).
- CT sinus scanning and/or referral to an ENT specialist when the patient is not responding to medical therapy.

Nasal saline douching

This is a simple, cheap and underutilised modality. Various techniques may be employed from a simple spray to a rinsing/douching bottle. Many patients find a douching bottle to be effective, although it does require some degree of coordination. The saline probably does not need to be sterile and patients can mix their own solution by combining 1/2 to 1 teaspoon of salt in 1 cup of water.¹⁵

Topical intranasal corticosteroid sprays

Topical steroid sprays are recommended in CRS^{1,14} and concomitant allergic rhinitis.¹⁶ They are considered safe (lowest dose necessary should be used).¹⁷ Using the opposite hand for the opposite nostril helps direct the spray toward the middle meatus. The head tilted slightly forward is sufficient, and whether the patient inhales or not is not paramount. Patients need to be advised that they may have a delay in onset of action of 2 weeks. The most important factor is patient compliance. A minimum trial for at least 1 month is reasonable.

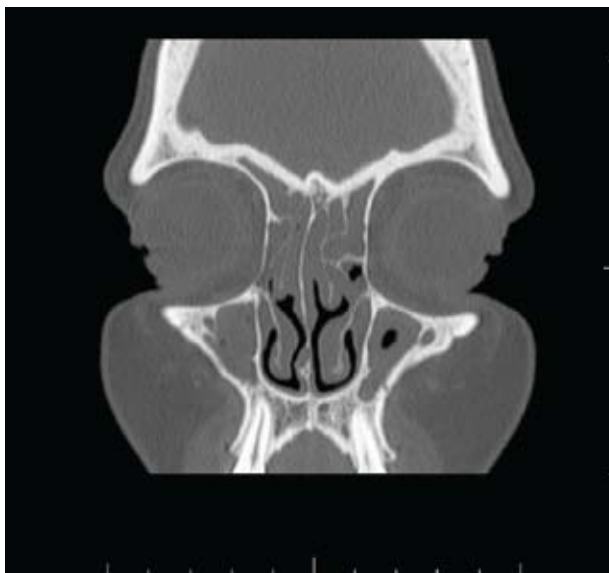
Oral antibiotics

Oral antibiotics are frequently used in patients with CRS. However, randomised control trials showing the effectiveness in CRS are limited. The choice of antibiotic is best guided by anticipated micro-organisms in the absence of meaningful culture/swab results. Antibiotics should be given as a continuous course. Macrolides are thought to have both an antibacterial effect as well as an anti-inflammatory effect so their use is appealing.¹⁸ The appropriate duration of treatment is debatable and can be anywhere from 3–6 weeks¹⁹ to 3 months.¹

Other treatment options

Numerous other modalities exist, all with varying benefit. These include decongestant sprays (prolonged use causes rhinitis medicamentosa and so should be avoided), decongestant tablets, mucolytics, antihistamines (sprays and tablets), and sprays (eg. anticholinergics). Avoidance of smoking is important. Other modalities include adding various agents to topical saline douches such as xylitol²⁰ and mupirocin.²¹ Treatment of allergic rhinitis includes allergen avoidance and immunotherapy – best done with an allergist

Figure 4. CT scan of sinuses showing opacified maxillary and ethmoid sinuses



– and is beyond the scope of this article. The handout on allergic rhinitis from the National Asthma Council of Australia is excellent.²²

Nasal polyps

A short course of prednisolone is typically employed in patients with nasal polyps.²³ Two to three bursts annually seems reasonable, although one needs to be mindful of potential long term complications such as osteoporosis. Sometimes antileukotrienes are also utilised.²⁴ Samter's triad consists of nasal polyposis, asthma and aspirin sensitivity.

Surgery

Surgery in CRS is reserved for patients who fail medical treatment. What constitutes 'failed medical treatment' is controversial.¹⁴ Functional endoscopic sinus surgery (FESS) involves the placement of minimally invasive endoscopes/instruments into the nose to open, drain and ventilate the sinuses while preserving normal sinus tissue. Evidence based surgery for CRS includes substantial level 4 evidence with supporting level 2 evidence that FESS is effective in improving symptoms and/or quality of life in patients with CRS.²⁵

Evolving techniques include the use of balloon catheters to dilate sinus openings.²⁶ Day surgery is now feasible due to the development of dissolving nasal packing and other minimally invasive techniques. Major complications occur in less than 1% of cases.¹ Revision surgery may be required, especially in patients with nasal polyposis.

Summary of important points

- Rhinosinusitis is the preferred term rather than sinusitis.
- Chronic rhinosinusitis consists of at least 12 weeks of symptoms.
- Medical therapy includes nasal saline douching, intranasal corticosteroids and oral antibiotics.
- Consider CT scans in patients not responding to medical treatment or when the diagnosis is unclear.

Conflict of interest: none declared.

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