

The management of rhinosinusitis in general practice

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Rhinosinusitis is a very common disease in general practice. Usually, patients present with acute symptoms, and an accurate diagnosis is made from the history and clinical examination without the need for laboratory and radiological investigations. When the duration of the symptoms does not exceed 10 days, a viral aetiology is most likely, treatment is targeted towards the relief of symptoms, antibiotics are not recommended, and most cases will resolve. However, if symptoms intensify after the 5th day, or extend beyond the 10th day, a secondary bacterial infection is indicated and the use of antibiotics justified. The recommended first line of antibiotic treatment is either amoxicillin or amoxicillin-clavulanate. Until patients are fully recovered, doctors need to remain vigilant because some may instead develop recurrent and chronic diseases or life-threatening complications. General practitioners (GPs) should be familiar with the early warning signs that herald the onset of detection of complications to ensure timely intervention.

Keywords: rhinosinusitis, nasal saline, corticosteroids, antibiotics, multidisciplinary approach

Rhinosinusitis is one of the most common conditions treated in general practice and the name is preferred to the older term “sinusitis” because sinus disease almost always occurs with rhinitis. In South Africa, general practitioners (GPs) are usually the first point of contact for patients with rhinosinusitis who seek medical attention. Patients of all ages present at various stages of the disease, ranging from mild and insidious to debilitating and potentially life-threatening, and GPs must make an accurate diagnosis, institute appropriate treatment, monitor the progress of the disease, and timeously recognise the need for a change of treatment or specialist referral.

The disease usually starts as an acute viral disease that causes inflammation of the nasal and sinus mucosa, reduced

mucoiliary clearance, and oedema which obstructs the sinus ostia. Stagnation of secretions and relative hypoxia in the paranasal sinuses create an enabling environment for secondary bacterial colonisation with aerobic and anaerobic bacteria and progression to acute bacterial sinusitis.¹

Patients present with a combination of symptoms and signs that are grouped into major (primary and secondary) and minor diagnostic factors (Table I). The secondary major criteria are only relevant when accompanied by at least one primary major. A clinical diagnosis of rhinosinusitis is made based on the presence of two or more major criteria, or one major criterion plus two or more minor criteria, or a purulent nasal discharge seen on examination.² With the diagnosis established, the

Table I: Symptoms and signs of rhinosinusitis

Major criteria		Minor criteria
Primary major	Nasal obstruction	Headache
	Nasal and/or postnasal purulence	Fever (other than acute rhinosinusitis)
	Hyposmia or anosmia	Halitosis
Secondary major	Facial congestion and/or fullness	General malaise and fatigue
	Facial pain and/or pressure	Dental pain
	Fever (in acute rhinosinusitis)	Cough
		Otalgia

Table II: Classification of rhinosinusitis

Classification	Characteristics
Acute rhinosinusitis	Rapid onset of disease and complete resolution within 4 weeks
Recurrent acute rhinosinusitis	Four or more episodes of acute disease in one year, each of which lasts at least 7 days and the time between episodes is disease-free
Subacute rhinosinusitis	The disease persists for more than 4 weeks but not beyond 12 weeks
Chronic rhinosinusitis	Insidious symptoms persist for over 12 weeks
Acute-on-chronic rhinosinusitis	Patients with chronic sinusitis experience acute exacerbation of symptoms

disease is classified into five categories according to the timing and severity of the disease (Table II), which serve as the basis for initial management decisions.¹

Most patients diagnosed with rhinosinusitis are treated successfully without the need for blood investigations (haematology, chemistry, and serology), bacterial cultures, radiological imaging, and nasopharyngeal endoscopy. Therefore, greater emphasis is placed on obtaining detailed patient history and performing a limited physical examination whilst reserving the option for further individualised assessment.

Acute viral rhinosinusitis

For most patients who present within 10 days of the onset of an isolated episode of rhinosinusitis, the most probable diagnosis at this stage is acute viral rhinosinusitis (AVRS) caused by the adenovirus, rhinovirus, influenza virus, parainfluenza virus, and respiratory syncytial virus, that are responsible for the common cold. The GP's overall impression is all that is required to initiate treatment without the need for further investigation.

AVRS symptoms are mainly caused by host inflammatory responses, therefore, treatment should be symptomatic aimed at reducing the inflammatory process in the sinuses and restoring normal sinus function.³ A rational regimen of drugs may include nasal saline and mucolytics to clear nasal secretions, topical and oral decongestants to reduce nasal oedema and relieve congestion, antipyretics, and nonsteroidal anti-inflammatory drugs (NSAIDs) for pain and fever (Table III). At this stage of the disease, antibiotics are of little or no benefit and should not be used.¹⁻³ Despite the knowledge that AVRS is the predominant form of rhinosinusitis in the early days of the disease, many GPs and specialists continue to prescribe antibiotics as part of their first line of treatment which is partly because of prescribing habits and pressure from the patients.

Acute bacterial rhinosinusitis

If symptoms and signs extend beyond the 10th day without improvement, even seem to increase in severity after the 5th day, then the reasonable assumption is that the patient has developed acute bacterial rhinosinusitis (ABRS).¹ Treatment of ABRS aims to control infection, reduce tissue oedema and reverse sinus ostial obstruction. To achieve this, the disease is best treated by adding antibiotics to the symptomatic treatment regimen. Amoxicillin with or without clavulanate is the first choice of antibiotic for most patients with ABRS. However, the guiding principle is that the choice of empiric treatment should be based on the most common organism known to occur in the local setting, also taking into account that patients with pansinusitis are more likely to have a mixture of both aerobic and anaerobic bacteria.

Among the most frequently occurring bacteria are aerobic bacteria that include *Staphylococcus aureus*, *Haemophilus influenzae*, *Streptococcus milleri*, β -haemolytic streptococci, and coagulase-negative staphylococci, and anaerobes which include species of *Peptostreptococci*, *Prevotella*, *Fusobacterium*, *Propionibacterium*, and *Bacteroides*.⁴ However, in patients who have received a course of antibiotics within the preceding six weeks, the choice of antibiotics should not be the same as the ones previously used. Where possible, culture specimens of nasal and sinus discharge should be used to give antibiotic therapy, however, secretions obtained from the anterior nares are not useful. Although more representative specimens are obtained directly from the maxillary sinus or by intranasal endoscopic-guided techniques, these are not usually possible in a general practice setting. Radiological investigations are not warranted in uncomplicated ABRS because they achieve no more than confirmation of what has already been determined clinically. However, if there are complications or suspicion of an alternative diagnosis, imaging is indicated, and the investigation of choice is the CT scan.^{5,6} Plain x-rays, although still in common use, are of limited value in the management of ABRS; due to differences in observer interpretation, there is a high rate of false-negative

Table III: Drugs used in the treatment of rhinosinusitis (adult doses)

Class	Drug	Dose
Antihistamines	Azelastine (Rhinolast)	1 spray/nostril 2 x daily
	Levocabastine (Sinumax Allergy Nasal Spray)	2 puffs/nostril 2 x daily
NSAIDs	Ibuprofen (Brufen)	200–400 mg PO 8 hourly
Decongestants	Phenylephrine (Adco-Naphensyl)	2–3 drops/nostril 4 hourly
	Oxymetazoline (Oxymist)	1–2 sprays/nostril 2 x daily
Mucolytics	N-Acetylcysteine (Solmucol)	200 mg PO 3 x daily
Corticosteroids	Prednisone (Meticorten)	5–60 mg PO daily
	Prednisolone (Prelone)	1–2 mg/kg PO daily
	Fluticasone (Flomist)	2 sprays/nostril daily
	Beclomethasone (Beclate)	2 sprays/nostril 2–4 x daily
Leukotriene inhibitors	Montelukast (Topraz)	10 mg PO nocte
Antibiotics	Amoxicillin	250–500 mg PO 8 hourly
	Amoxicillin-clavulanate potassium (Augmentin)	1 tab (250/125) PO 8 hourly
	Cefuroxime (Cefasyn)	250 mg 2 x daily
	Mupirocin ointment (Bactroban)	Apply 30 mg/nostril 2 x daily

reporting. Nevertheless, if plain x-rays are used, then a single occipitomental (Waters' view) may provide as much information as the alternative of a standard four-view series.⁶

Recurrent acute rhinosinusitis

Patients who have recurrent acute rhinosinusitis (RARS) episodes are treated medically for each episode of acute rhinosinusitis. In addition to treatment, the underlying causes of the recurrences must be investigated, and where a likely cause is established, it should be treated preferably when the acute phase has resolved. The underlying risk factors and causes for recurrent, subacute, and chronic disease are similar.^{5,7,8} The conditions include:

- Colonisation of the sinonasal mucosa by drug-resistant bacteria (e.g. methicillin-resistant *Staphylococcus aureus*) and non-invasive fungi (e.g. *Aspergillus fumigatus*)
- Sinonasal obstructive abnormalities, including hypertrophy of the turbinates, septal deviation, intranasal masses, and previous trauma or surgery
- Exposure to tobacco smoke and other environmental pollutants
- Metabolic disease (e.g. diabetes)
- Immunosuppression (e.g. HIV)
- Genetic disease (e.g. cystic fibrosis)

Therefore, proper management of all forms of recurrent and persistent sinusitis will require a multidisciplinary approach that includes the GP, otorhinolaryngologist, physician, pharmacist, and other practitioners as needed.

Medical treatment with intranasal steroids and saline rinse is effective in most patients with RARS. A subset of patients who do not respond will require further investigation with the possibility of surgical intervention. For these patients, non-contrast CT imaging of the paranasal sinuses and nasal cavity is indicated to reveal any underlying anatomical obstruction and help in surgical planning.⁵ However, because of the intermittent nature of the disease, CT scans can often show no evidence of disease. If surgery is to be performed, minimally invasive surgical techniques are the preferred approach. Some of the frequently used techniques that effectively relieve the symptoms and signs of RARS include functional endoscopic sinus surgery, balloon sinus dilation, turbinectomy, and septoplasty.⁹

Subacute rhinosinusitis

Subacute rhinosinusitis (SARS) is a low-grade continuation of an acute infection that lasts for more than four weeks but does not extend beyond 12 weeks. Although it is distinguished from chronic rhinosinusitis by its shorter duration, the aetiological factors, pathogenesis, and management are similar to chronic rhinosinusitis.⁷

Chronic rhinosinusitis

Nasal endoscopy and CT scan are typically used in addition to the diagnostic clinical criteria (Table I) and time course (Table II) to establish the diagnosis of chronic rhinosinusitis (CRS) and evaluate the severity of the disease. Evaluation is best performed when the patient is least symptomatic, and patients are assessed

for the severity of the disease, underlying anatomical causes, and changes caused by long-standing inflammation (e.g. nasal polyps, purulence, and oedema).^{2,8}

Treatment of CRS aims to reduce mucosal inflammation, control infection, and restore mucociliary clearance within the sinuses. At all stages of treatment, environmental control remains an important part of preventive management in patients for whom air-borne pollutants and allergens are implicated as significant predisposing factors. Medical treatment consists of nasal saline irrigation, intranasal corticosteroid sprays, and antihistamines. In addition, short courses of oral corticosteroids are administered to patients with nasal polyps because of their proven ability to reduce inflammation and provide temporary relief of nasal obstruction. This may facilitate subsequent administration of nasal medication and improve intraoperative surgical field conditions.⁸ Intranasal antibiotics are recommended when there is a purulent discharge. Initial empirical treatment should consider the possibility of *Staphylococcus aureus* and *Pseudomonas aeruginosa* and be adjusted according to clinical assessment and bacterial cultures.¹⁰

Referral for possible sinonasal surgery should be considered in patients who do not improve with preventive and medical management. The goal of surgery is to open the normal paranasal sinus drainage pathways by removing any inflammatory or structural obstruction. The preferred techniques use an endoscopic transnasal approach with preservation of normal structural anatomy and sinonasal mucosa.⁹ After surgery, long-term care continues with medical therapy, endoscopic surveillance, and management of relevant environmental and host factors that predispose to disease.

Acute-on-chronic rhinosinusitis

As the name suggests, acute-on-chronic rhinosinusitis (AoCRS) is an acute exacerbation of bacterial sinusitis in a patient with CRS. Objective signs like fever and purulent nasal discharge may occur, but often the diagnosis of AoCRS is patient-driven, described as a sudden worsening of symptoms with a return to baseline after treatment. Systemic (oral or parenteral) antibiotics are used as part of the treatment regimen for acute bacterial



Figure 1: Complicated bacterial sinusitis (periorbital oedema, proptosis, chemosis, and frontal subperiosteal abscess)

Table IV: Chandler's classification of orbital complications¹³

Stage	Description	Pathogenesis and clinical presentation
I	Preseptal cellulitis	Inflammatory oedema and venous congestion of the tissues of the eyelid anterior to the orbital
II	Postseptal/orbital cellulitis	Progression of disease to involve the globe and cause conjunctival oedema (chemosis)
III	Subperiosteal abscess	Collection of pus between bone and periosteum which causes protrusion of the globe of the eye (proptosis)
IV	Orbital abscess	Collection of pus in the orbital contents with the onset of paralysis of the muscles of the eye (ophthalmoplegia)
IV	Cavernous sinus thrombosis	Progression of inflammation intracranially by septic thrombophlebitis manifesting as fever, headache, cranial nerve palsies (III, IV, V, and VI), loss of corneal reflexes, ophthalmoplegia, upper facial hypaesthesia, papilloedema, and blindness

sinusitis. When the acute illness resolves, the patient returns to the baseline state, and treatment continues for CRS.^{8,10}

Complicated acute bacterial rhinosinusitis (CoABRS)

Complicated acute bacterial rhinosinusitis (CoABRS) is a potentially life-threatening complication of acute bacterial sinusitis that occurs when the infection spreads out of the sinuses through bone defects (erosion, previous trauma, or congenital) and through septic thrombophlebitis of communicating veins, to involve the eye (orbit), soft tissues of the face, adjacent bone, and cranial cavity (Figure 1). Therefore, the management of patients with complications requires a high index of suspicion, close surveillance of patients with rhinosinusitis, early detection of the onset of complications, urgent referral to a multidisciplinary team that includes a neurosurgeon, otorhinolaryngologist, and ophthalmologist.¹¹

Orbital complications (Table IV) usually originate from the ethmoid and maxillary sinuses, and are the most common complication of ABRs.¹²

The main extraorbital soft tissue complication is facial cellulitis, and bony complications include osteomyelitis of the sinus walls, frontal subperiosteal abscess (Potts puffy tumour), and frontal pyocoele.

Intracranial complications are usually secondary to ABRs of the frontal sinus and include meningitis, cerebritis, epidural and subdural empyema, cerebral (brain) abscess, and thrombosis of venous sinuses. Patients present with mood changes, reduced level of consciousness, meningeal signs (severe headache, persistent vomiting, and neck stiffness), and seizures. There is a high risk of morbidity and mortality if appropriate intervention is delayed, and patients who survive may continue to suffer from seizures, persistent weakness, aphasia, or cognitive impairment.¹⁴

Conclusion

GPs have the burden of responsibility to diagnose patients with sinusitis, initiate treatment, monitor progress, and timeously determine the need for professional advice or patient referral. Most patients who present with uncomplicated sinusitis can be correctly diagnosed from the history and clinical examination, and commenced on medical treatment, without the need to resort to laboratory and radiological investigations. Nevertheless, a high index of suspicion for the development of

complications, and a low threshold for consultation or referral should be maintained. The goal of treatment is to relieve the patient's symptoms and should be individualised. In the first week of illness, the cause of acute rhinosinusitis is likely to be viral and antibiotics should not be used. However, if prolonged or exacerbated symptoms suggest that symptomatic treatment alone is not effective, then secondary bacterial infection is the likely cause and antibiotic drugs are recommended. Patients with recurrent, subacute, chronic, and complicated sinusitis should be managed in consultation with a multidisciplinary team that includes medical and surgical specialists and investigated for environmental causes, underlying disease, and risk factors.

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References

1. Aring AM, Chan MM. Current concepts in adult acute rhinosinusitis. *Am Fam Physician*. 2016;94(2):97-105.
2. Meltzer EO, Hamilos DL. Rhinosinusitis diagnosis and management for the clinician: A synopsis of recent consensus guidelines. *Mayo Clin Proc*. 2011;86(5):427-43. <https://doi.org/10.4065/mcp.2010.0392>.
3. Ryan D. Management of acute rhinosinusitis in primary care: changing paradigms and the emerging role of intranasal corticosteroids. *Prim Care Resp J*. 2008;17(3):148-55. <https://doi.org/10.3132/pcrj.2008.00050>.
4. Olwoch IP. Microbiology of acute complicated bacterial sinusitis at the University of the Witwatersrand. *S Afr Med J*. 2010;100(8):529-33. <https://doi.org/10.7196/SAMJ.3907>.
5. Frerichs N, Brateanu A. Rhinosinusitis and the role of imaging. *CCJM*. 2020;87(8):485-92. <https://doi.org/10.3949/ccjm.87a.19092>.
6. Okuyemi KS, Tsue TT. Radiologic imaging in the management of sinusitis. *Am Fam Physician*. 2002;66(10):1882-7.
7. Osguthorpe DJ. Adult rhinosinusitis: diagnosis and management. *Am Fam Physician*. 2001;63(1):69-77.
8. Sedaghat AR. Chronic rhinosinusitis. *Am Fam Physician*. 2017;96(8):500-6.
9. Lin J, Kacker A. Management strategies for recurrent acute rhinosinusitis. *Laryngoscope Invest Otolaryngol*. 2019;4(4):379-82. <https://doi.org/10.1002/lio2.294>.
10. Kennedy JL, Borish L. Chronic rhinosinusitis and antibiotics: The good, the bad, and the ugly. *Am J Rhinol Allergy*. 2013;27(6):467-72. <https://doi.org/10.2500/ajra.2013.27.3960>.
11. Searyoh K, Lubbe D. Complications of rhinosinusitis. *S Afr Fam Pract*. 2018;60(5):17-20. <https://doi.org/10.4102/safp.v60i5.4915>.
12. Radovani P, Vasili D, Xhelili M, Dervishi J. Orbital complications of sinusitis. *Balkan Med J*. 2013;30(2):151-4. <https://doi.org/10.5152/balkanmedj.2013.8005>.
13. Chandler JR, Langenbrunner DJ, Stevens ER. The pathogenesis of orbital complications of sinusitis. *Laryngoscope*. 1970;80:1414-28. <https://doi.org/10.1288/00005537-197009000-00007>.
14. Nicoli TK, Oinas M, Niemelä M, Mäkitie AA, Atula T. Intracranial suppurative complications of sinusitis. *Scand J Surg*. 2016;105(4):254-62. <https://doi.org/10.1177/1457496915622129>.