



Acute Rhinosinusitis: A Diagnostic and Therapeutic Approach



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Sinusitis is more accurately termed rhinosinusitis and is defined as an inflammation of the nasal and sinus mucosa, which invariably coexist. Based on signs and symptoms, it is often impossible to distinguish the etiology of rhinosinusitis. Of all rhinosinusitis, only 0.5% to 2% have positive bacterial cultures.¹ The remainder are largely viral rhinosinusitis, otherwise known as the common cold. The diagnostic challenge therefore rests in detecting the small proportion of cases where a bacterial etiology is most likely. These cases may therefore be amenable to treatment with antibiotic therapy.

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Figure 1. CT scan view of osteomeatal complex.

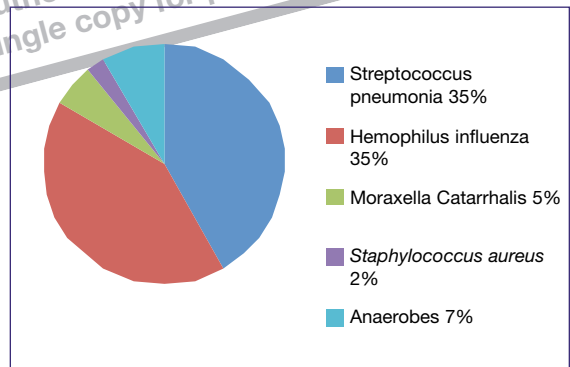


Figure 2. Bacterial incidence in acute rhinosinusitis.

► What is the pathophysiology?

The concept that the disease primarily involves the osteomeatal complex, which is the area where drainage of the maxillary, anterior ethmoid and frontal sinuses takes place (Figure 1).

The pathophysiologic mechanism of sinus disease is related to disruption of one of three factors:

- patency of the sinus ostium (opening),

- the highly regulated mucociliary function and
- mucus production.

► What are the bacteria involved?

The bacteria involved in the etiology of acute rhinosinusitis in Canada are illustrated in Figure 2.² The incidence of penicillin resistance is rising in

Table 1
Signs and symptoms of rhinosinusitis

Major

- Facial pain/pressure/fullness
- Nasal obstruction/blockage
- Nasal or postnasal discharge/purulence (by history or physical exam)
- Hyposmia/anosmia
- Fever (in acute rhinosinusitis)

Minor

- Headaches
- Halitosis
- Fatigue
- Dental pain
- Cough
- Otagia

Table 2
Indications for a sinus film

- Equivocal diagnosis
- Severe symptomatology
- Hospitalized patients
- Comorbid conditions
- Resistant organisms
- Significant frontal symptoms (suspected frontal sinusitis, which carries a higher risk of intracranial complications)

Canada. Fourteen and a half per cent of *Streptococcus pneumoniae*, 33% of *Haemophilus influenzae* and > 95% of *Moraxella catarrhalis* are β -lactamase producing organisms.³



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Figure 3a. Right maxillary sinus air-fluid level.



Figure 3b. Right maxillary opacification.

► **How can it be diagnosed?**

The signs and symptoms suggestive of rhinosinusitis are listed in Table 1. Diagnosis of acute bacterial rhinosinusitis may be made if signs and symptoms persist after 10 days or worsen after five days. Facial pain or headache alone, even when present in an area of a sinus, is neither sensitive nor specific for sinus disease. Contrary to popular belief, change in colour of secretions is not a specific sign of bacterial infection. Neutrophil and macrophage influx beginning in the third to fourth day of a viral rhinosinusitis contributes to the formation of coloured secretions.⁴

Sinus films are not recommended in the routine evaluation of an uncomplicated community-acquired rhinosinusitis. Indications are listed in Table 2. A meta-analysis of six studies demonstrated that positive plain film radiographs have

Table 3**Treatment of rhinosinusitis**

- Antibiotics
- Topical corticosteroids
- Decongestants
- Antihistamines
- Nasal saline irrigation
- Mucolytics

Table 4**Indications for using second-line antibiotics**

- No clinical response to treatment with first-line antibiotics within 72-96 hours
- Allergy to β -lactam antibiotics
- The use of antibiotics in the preceding 3 months
- Underlying chronic illness or immunosuppression
- Prolonged duration of symptoms

An air fluid level (Figure 3a) or a complete opacification of a sinus detected on plain films (Figure 3b) is diagnostic of acute rhinosinusitis. Mucosal thickening is not sufficiently reliable. CT scanning is the gold standard radiologic test to evaluate the sinuses. However, because of inaccessibility and cost, it does not play a significant role in the diagnosis of non-complicated acute rhinosinusitis.

Rhinosinusitis can be classified according to the:

- duration of symptoms (*i.e.*, acute [less than four weeks], subacute [four to 12 weeks] and chronic [\geq 12 weeks]),
- etiology (*i.e.*, viral, bacterial, or fungal), or
- site (*i.e.*, frontal, ethmoidal, maxillary, sphenoidal, or pansinusitis where all sinuses are involved).

► *How can it be treated?*

The goal of treatment is to provide symptomatic relief and prevent complications. Treatment includes:

- nasal saline irrigation,
- topical nasal steroids,
- antihistamines in the case of allergic patients,

moderate sensitivity (76%) and specificity (79%) compared with maxillary sinus puncture.⁵

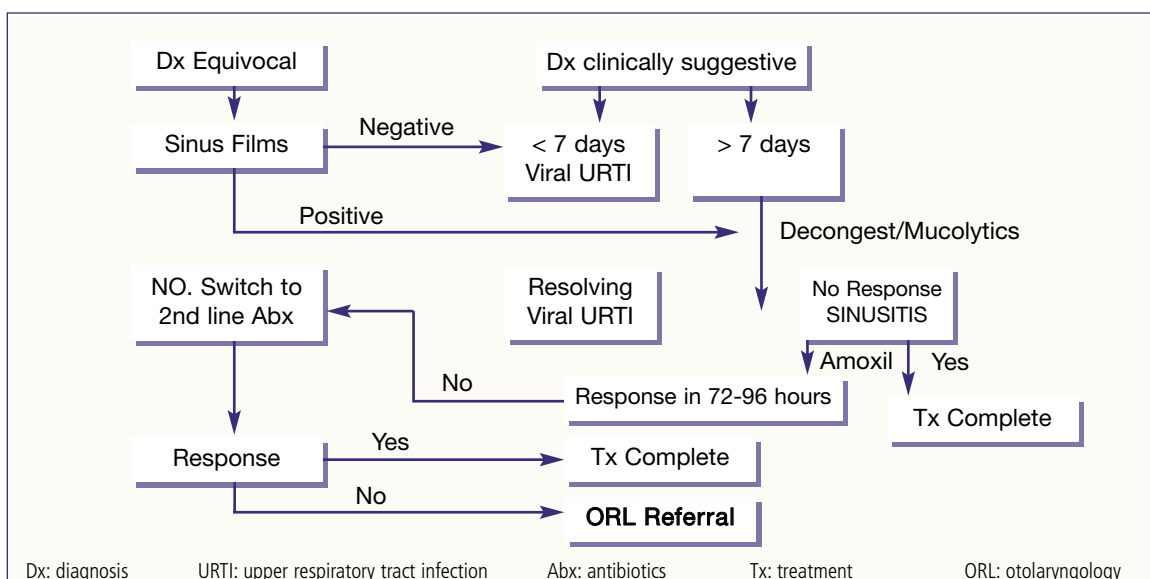


Figure 4. Treatment algorithm for acute rhinosinusitis.

- mucolytics (provided the patient's water intake is sufficient),
 - antibiotics and
 - oral or topical nasal decongestant (Table 3).
- Topical decongestants are not recommended for more than three to five days, as prolonged use may lead to dependence and a rebound rhinitis often referred to as rhinitis medicamentosa. Duration of antibiotic treatment recommended is usually seven to 10 days. Despite quoted resistance rates, amoxicillin is still recommended as the first-line treatment, as it is clinically effective in > 95% of cases. In instances where a second-line antibiotic is indicated (Table 4), amoxicillin-clavulanate, macrolides, cephalosporins (second generation) and fluoroquinolones can be used.

Acute rhinosinusitis is among the most diagnosed conditions in Canada.

► Conclusion

Acute rhinosinusitis is among the most diagnosed conditions in Canada. The large majority of these cases are evaluated and treated by primary care physicians. In an era of increasing antibiotic resistance, judicious and selective use of antibiotic therapy is pertinent. This article attempts to aid practitioners in distinguishing the minority of patients in whom a bacterial etiology may benefit from antibiotic therapy, as opposed to the majority of viral rhinosinusitis cases who require only supportive symptomatic treatment.

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