7. Sinusitis

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INTRODUCTION – AGENTS

Causative agents of acute bacterial sinusitis are similar to those seen in other infections of the head and neck and include *Streptococcus pneumoniae, Haemophilus influenzae,* and *Moraxella catarrhalis.* Anaerobes are less frequently encountered in acute sinusitis but play a role in chronic sinusitis. Viruses can also cause acute rhinosinusitis.

EPIDEMIOLOGY

Sinusitis is a common chronic condition for which patients seek physician attention in the United States. There are more than 25 million patient visits per year pertaining to sinus problems, including allergic rhinitis, viral upper respiratory infections, vasomotor rhinitis, bacterial rhinosinusitis, and nasal polyposis. Sinusitis occurs in patients of all ages but is more common in adults. Children with cystic fibrosis, however, are a unique population at much higher risk for sinus disease caused by atypical organisms, especially *Pseudomonas.*

CLINICAL FEATURES

The spectrum of acute to chronic sinusitis is mostly dependent on the duration of signs and symptoms. Acute sinusitis is defined as an infection that generally clears within 4 weeks. Chronic sinusitis is an infection that has been present for about 12 weeks despite treatment. Subacute sinusitis lasts longer than 4 weeks but less than 12 weeks. Recurrent acute sinusitis may be referred to as chronic (recurrent) sinusitis if a patient is afflicted with more than four infections in a year, each clearing completely (Tables 7.1 and 7.2).

Sinusitis presents with symptoms of facial pressure, headache, rhinorrhea, and smell disturbances (Table 7.3). The technical definition of sinusitis splits symptomatology into major and minor symptoms. Sinusitis is suggested by the presence of two major factors or one major and one minor factor, or by the presence of pus on nasal examination. Patients may have a history of a precedent viral upper respiratory infection (Table 7.2).

History of aspirin sensitivity may suggest underlying polyposid disease consistent with Samter’s triad. The repetitive abuse of inhaled substances such as methamphetamines or cocaine may predispose to altered nasal and sinus architecture. The patient’s dentition should be checked carefully. A maxillary tooth infection can be responsible for unilateral maxillary sinusitis.

Table 7.1 Major and Minor Sinusitis Factors

<table>
<thead>
<tr>
<th>Major Factors</th>
<th>Minor Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial pain/pressure (in conjunction with other nasal symptoms)</td>
<td>Headache</td>
</tr>
<tr>
<td>Facial Fullness</td>
<td>Halitosis</td>
</tr>
<tr>
<td>Nasal Obstruction</td>
<td>Fatigue</td>
</tr>
<tr>
<td>Nasal Discharge (purulence)</td>
<td>Dental pain</td>
</tr>
<tr>
<td>Nasal Obstruction (nasal obstruction)</td>
<td>Facial pain (in case of rhinitis)</td>
</tr>
<tr>
<td>Fever (in acute rhinosinusitis)</td>
<td>Cough</td>
</tr>
<tr>
<td>Ear pressure/fullness</td>
<td></td>
</tr>
</tbody>
</table>


Table 7.2 Rhinosinusitis Definitions

<table>
<thead>
<tr>
<th>Type</th>
<th>Rhinosinusitis</th>
<th>Duration</th>
<th>History (See also Table 7.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>≤4 weeks</td>
<td>≥2 major factors or 1 major factor and 1 minor factor or nasal purulence on exam</td>
<td></td>
</tr>
<tr>
<td>Subacute</td>
<td>4–12 weeks</td>
<td>Same</td>
<td></td>
</tr>
<tr>
<td>Recurrent Acute</td>
<td>≤4 episodes/year, each episode 7–10 days, clears between episodes</td>
<td>Same</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>≥12 weeks</td>
<td>Same Note: Facial pain in the absence of other nasal symptoms is not suggestive of chronic sinusitis</td>
<td></td>
</tr>
</tbody>
</table>

Sinusitis with human immunodeficiency virus (HIV), from poorly con-nation. Cultures are positive for fungi, and CT imag-ease that is suspected of neoplasm, indications of a complica-tion of sinus disease, and in a suspected case of invasive fungal disease.

**DIFFERENTIAL DIAGNOSIS**

It is difficult to distinguish among chronic bacterial rhinosi-nitis, viral rhinitis (the common cold), allergic rhinitis, vaso-motor rhinitis, and migraine headache. An allergy history is often helpful. Migraines are frequently misdiagnosed as sinusitis. An endoscopic nasal examination and a computed tomography (CT) scan can be instrumental in separating bac-terial rhinosinusitis from other diagnoses (Figure 7.1).

Functional obstruction by polyps or other lesions may cause sinusitis. This should be evident on nasal examination. Dental infections may cause a unilateral maxillary sinusitis and therefore all dentition should be carefully examined. Allergic fungal sinusitis is usually caused by *Aspergillus*. Patients will characteristically have an elevated IgE level, and Chorret-Leyden crystals are noted on pathological exami-nation. Cultures are positive for fungi, and CT imag-ing demonstrates a unilateral opacification of the involved sinuses, often with a stippled appearance and bone erosion. Treatment is corticosteroids and surgical debridement, and possibly immunotherapy.

Much less common is invasive fungal sinusitis. These patients are usually immunocompromised, from infection with human immunodeficiency virus (HIV), from poorly con-trolled diabetes, or from immunosuppressive therapy such as treatment of blood malignancies or post-bone marrow transplant. Emergent evaluation of the sinus with endoscopy and biopsy of any necrotic or ulcerative tissue is required. Magnetic resonance imaging (MRI) is the study of choice to demonstrate the extent of the disease, which is usually unilateral and invades bone, but can destroy other tissues. Most patients with invasive fungal sinusitis require emergent debridement in the operating room.

**LABORATORY AND RADIOGRAPHIC FINDINGS**

Diagnosis is usually made on history and clinical exam. An appropriate clinical history, combined with findings such as purulent localized drainage, is usually sufficient. Endoscopic examination of the nose has become a mainstay of rhinology practice because the examination can be accomplished under topical anesthesia in the office setting. In situations in which treatment is refractory, culture-directed medical therapy may be useful.

In the majority of patients, CT sinus imaging consisting of direct coronal and axial views is more informative after the patient has completed 3–4 weeks of optimal medical therapy. This is because a certain amount of mucosal thickening and fluid can be found in healthy asymptomatic patients. Abnor-mal imaging findings are more reliable after medical treat-ment and may indicate a need for surgery. Exceptions to this would include patients with polypoid disease, unilateral dis-ease that is suspected of neoplasm, indications of a complica-tion of sinus disease, and in a suspected case of invasive fungal sinusitis.

**TREATMENT AND PROPHYLAXIS**

Medical treatment consists of nasal saline irrigation, decon-gestants (topical or oral), antibiotics, and sometimes mucolyt-ics. Nasal saline rinsing is best achieved with a volume of 10–20 mL irrigated through the nasal cavity with a bulb syringe three to four times a day. The patient must be edu-cated not to use topical decongestants, such as oxymetazo-line (Afrin), for more than a few days, as chronic use causes an addictive type pattern in which cessation of the oxymeta-zoline results in rebound inflammation and edema (rhinitis...
Sinusitis medicamentosa). Antibiotic therapy directed at a bacterial infection is warranted. Direct visualization with a rigid endoscope may reveal a specific draining sinus, which may be cultured. Corticosteroid medication, either via topical sprays or in oral form, is indicated for some types of infection or for nasal polyposis. Antihistamines are recommended when the history is suggestive of an allergic component.

After conservative medical treatment, imaging and surgical treatment may be warranted. Coronal sinus CT scans without contrast are the most common imaging modality. Surgical intervention may include localized drainage, creation of a middle meatal maxillary antrostomy, or other sinus surgery, often performed endoscopically.

**COMPLICATIONS AND ADMISSION CRITERIA**

Complications can range from preseptal cellulitis of the orbit to cavernous sinus thrombosis with intracranial extension and death. Edema of the eyelid, restriction of extraocular movements, or vision change should warrant urgent imaging and ophthalmologic consultation. Rare complications of sinusitis include meningitis, epidural abscess, subdural abscess, brain abscess, or isolated cavernous sinus thrombosis.

The patient with suspected invasive fungal sinusitis warrants immediate treatment, because complications can include orbital invasion, resulting in loss of vision and/or the globe, intracranial extension, and death.

**PEAPLARS AND PITFALLS**

1. Medical therapy is usually the first-line of treatment and includes irrigation, decongestants, and antibiotics.
2. Eyelid edema, vision changes, or cranial nerve involvement may indicate serious complications and should be evaluated immediately.
3. Mucosal changes in the sinuses can be associated with viral upper respiratory infections.
4. Diagnosis is usually made clinically. CT imaging or culture is useful in refractory cases.
5. If sinusitis is unresponsive to first-line antibiotics, practitioners can consider broadening coverage, obtaining direct cultures, or CT imaging.

**REFERENCES**


