Common Nasal Sinus Problems

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Disclosures

• No commercial relationships to disclose

Learning Objectives

• Differentiate the types of adult sinus infections, their diagnosis and treatment.
• Develop a practical approach to treatment of epistaxis.
• Identify the differential diagnosis of nasal obstruction.

Other lectures in this meeting address pediatric sinus disease, chronic sinus disease, allergy, empty nose syndrome, septal perforation, and ENT emergencies.
**Adult Sinusitis**

A medical illustration showing a person holding their nose, possibly indicating pain or discomfort.

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**Anatomy Review**

A diagram showing various parts of the nasal anatomy, including:
- Frontal
- Ethmoid
- Sphenoid
- Maxillary

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**Anatomy Review**

<table>
<thead>
<tr>
<th>3 or 4 paired sinuses</th>
<th>Drainage system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meati turbinates</td>
<td>Nerve supply</td>
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<tr>
<td></td>
<td>Vascular supply</td>
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<td>Related structures</td>
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**NOSE AND SINUSES**

Page 2
Physical Exam Findings in Sinusitis

- Bilateral nasal mucosal edema
- Purulent nasal secretions
- Sinus tenderness (Not a sensitive or specific finding)
  - Frontal sinuses – forehead tenderness (can also be tension headache)
  - Maxillary sinuses – dental or malar pain
  - Ethmoid sinuses – periorbital
  - Sphenoid sinuses – earaches, neck, top of head… vague
- Posterior (nasopharyngeal) drainage may be associated with clinical symptoms of sore throat and cough.
- The nose should be examined for a deviated nasal septum, nasal polyps, and epistaxis. Foreign bodies and tumors can mimic symptoms of sinusitis and should be in the differential diagnosis, especially if the symptoms are unilateral. The ears should be examined for signs of associated otitis media, and the chest for the presence of asthma exacerbation, as comorbid conditions.

Terminology of Sinusitis

The type of infection is often identified and described by history, more than by clinical findings.

Acute Rhinosinusitis

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Acute</td>
<td>Upper 4 weeks of acute nasal drainage, pressure, or tenderness accompanied by fever, obstruction, nasal pain, anosmia, or facial pain</td>
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<tr>
<td>Acute bacterial</td>
<td>Acute rhinosinusitis that is caused by, or is presumed to be caused by, bacterial infection. A clinician should diagnose ABR when: a. symptoms or signs of acute rhinosinusitis are present less than 10 days and the symptoms are not improving</td>
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<tr>
<td>Acute viral</td>
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Chronic Rhinosinusitis

12 weeks or more with two or more of the following symptoms:
• Nasal congestion
• Nasal drainage, anterior or posterior
• Facial pain, pressure, or fullness; headache
• Diminished sense of smell

Subacute Rhinosinusitis

4-12 weeks of symptoms

Recurrent Acute Rhinosinusitis

3 - 4 or more acute episodes per year

Viral Rhinosinusitis

• Typically associated with upper respiratory infection.
• Mucus in URI-associated VRS is typically not described as persistently purulent.
• Nasal congestion is a predominant symptom without persistent or worsening head congestion, headache, or facial pain or fatigue.
• Symptoms would be expected to peak on about day 3 to 5 and resolve within 7 to 10 days.
• TREATMENT is supportive, with fluids, head elevation, steam, smoking cessation. Short (2-3 day) course of topical decongestants helps severe congestion for selected patients.
• Self-limited; resolves usually in less than 2 weeks.
Acute Bacterial Sinusitis

- When symptoms worsen after 3 to 5 days or persist longer than 10 days and are more severe than normally experienced with a viral infection, a secondary bacterial infection is likely.
- The most commonly involved sinuses in both acute and chronic sinusitis are the maxillary and the anterior ethmoid sinuses.
- *S. pneumoniae, H. influenzae and M. catarrhalis* are the most common organisms. Multiorganism involvement including anaerobes should be considered.

Bacterial Sinusitis Symptoms

- nasal congestion for longer than 7 days
- purulent rhinorrhea
- postnasal drip, and facial pain and pressure
- Possible associated referred pain to the ears and teeth
- cough, often worsening at night
- Other symptoms can include fever, nausea, fatigue, impairments of smell and taste, and halitosis.

Acute Bacterial Sinusitis - Treatment

- High dose Amoxicillin is the first line antibiotic. Failure to respond- add clavulenic acid and possibly obtain culture via Calgi swab.
- Other options include cephalosporins (cefdoxime proxetil or cefuroxime). In patients allergic to beta-lactams, trimethoprim-sulfamethaazole, clarithromycin, and azithromycin may be prescribed but might not be adequate coverage for *H. influenzae* or resistant *S. pneumoniae*.
- If no improvement at 3 days consider fluoroquinolones: gatifloxacin, moxifloxacin, and levofloxacin.
- Penicillin, erythromycin, and first-generation cephalosporins are not recommended for treating acute sinusitis because of inadequate antimicrobial coverage of the major organisms.
- Surgical drainage is required for failures on antibiotics and topical decongestants.
Chronic Rhinosinusitis

- Acute organisms, plus
  - Staphylococcus aureus
  - coagulase-negative Staphylococcus
  - anaerobic bacteria, predominantly gram-negative bacilli and Peptostreptococcus species

- Symptoms more indolent, lasting for months.
  - Nasal congestion
  - postnasal drainage
  - Chronic cough that is described as worse at night or on awakening in the morning
### Chronic Rhinosinusitis Management

- Long-term antibiotics
- Nasal steroids
- Allergy treatment when indicated
- Avoidance of irritants
- Leukotriene inhibitor for selected patients
- Surgery

### Supportive therapy for all sinusitis patients

- Topical decongestant nasal sprays (oxymetazoline or phenylephrine hydrochloride) may be used no longer than 3 to 5 days.
- Mucolytic agents (guaifenesin) can help to decrease the viscosity of the mucus.
- Saline spray or irrigation can help clear secretions.
- Topical corticosteroids are not indicated for acute sinusitis but may be helpful for chronic sinusitis, nasal polyps, and allergic and non-allergic rhinitis.
- Antihistamines are not indicated for sinusitis but may be helpful for underlying allergic rhinitis.
- Adequate intake of fluids may help thin secretions.
- Smoking cessation will improve ciliary motility.

### Co-Morbid and Predisposing Conditions

- Asthma
- Allergy
- Aspirin Sensitivity
- Chronic Bronchitis
- Environment: daycare, cigarette smoke exposure, barotrauma
- Foreign Body
- Immunodeficiency (primary or acquired)
- Immotile Cilia Syndrome
- Mechanical nasal obstruction (septum, adenoid, developmental)
- Polyposis
- Neoplasm
Testing in CRS patients

- **Sinus culture** to guide antibiotic therapy. Endoscopy gives adequate visualization for an ostial specimen.
- **Allergy evaluation** via skin testing or RAST
- **Imaging** –
  - Limited coronal sinus CT gives diagnostic information while limiting radiation exposure. Plain films, transillumination, and ultrasound are not adequate.
  - Full coronal sinus series under image guidance protocol is indicated for surgical planning.
- Consider sweat chloride test for cystic fibrosis, ciliary function tests for immotile cilia syndrome, blood tests for HIV, or other tests for immunodeficiency, such as immunoglobulin levels.
- Additional evaluation for comorbid conditions

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EPISTAXIS

A practical approach

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EPISTAXIS
5-10% of the population experience an episode of epistaxis each year. 10% of those will see a physician. 1% of those seeking medical care will need a specialist.

Think: Where is it bleeding?  
Why is it bleeding?  
What are we going to do about it?

First question: Where is it bleeding?

Kesselbach’s Plexus/Little’s Area:  
- Anterior Ethmoid (Ophth)  
- Superior Labial A (Facial)  
- Sphenopalatine A (IMAX)  
- Greater Palatine (IMAX)

Woodruff’s Plexus:  
- Pharyngeal & Post. Nasal  
  AA of Sphenopalatine A (IMAX)
Where is it bleeding?

Kesselbach’s Plexus – Anterior Bleeding
(a.k.a. Little’s)

Where is it bleeding?

Woodruff’s Plexus – Posterior Bleeding

Where is it bleeding?

Anterior vs. Posterior?

• Anterior: younger, usually septal vs. anterior ethmoid, most common (>90%), typically less severe
• Posterior: older population, usually from Woodruff’s plexus, more serious.
• POST-OP bleeds can be anterior, posterior, or both.
Second Question: *Why is it bleeding?*

The nose is a vascular organ subject to incredible heating/humidification requirements

- Vasculature runs just under mucosa
- Arterial to venous anastomoses
- ICA and ECA blood flow

**Why is it bleeding?**

- **Local factors**
  - Trauma (most common)
    - Vascular
    - Infectious/inflammatory
    - Iatrogenic
    - Neoplasm
    - Desiccation
    - Foreign Bodies/other

Why is it bleeding?

Local Factors – Trauma

- Nose picking
- Nose blowing/sneezing
- Nasal fracture
- Nasogastric/nasotracheal intubation
- Trauma to sinuses, orbits, middle ear, base of skull

- Barotrauma
- Perforation
Why is it bleeding?

TRAUMA

Nasal Fracture with Septal Hematoma

Why is it bleeding?

Local Factors – Infection/Inflammation

- Rhinitis/Sinusitis
  - Allergic
  - Bacterial
  - Fungal
  - Viral

Why is it bleeding?

Local Factors – Iatrogenic nasal injury

- Functional endoscopic sinus surgery
- Rhinoplasty
- Nasal reconstruction
- Nasal intubation
Why is it bleeding?

Local Factors – Desiccation

- Cold, dry air—more common in wintertime
- Dry heat
- Nasal oxygen
- Anatomic abnormalities
- Atrophic rhinitis

Why is it bleeding?

Local Factors - Neoplasm

- Juvenile nasopharyngeal angiofibroma
- Inverted papilloma
- SCCA
- Adenocarcinoma
- Melanoma
- Esthesioneuroblastoma
- Lymphoma

Why is it bleeding?

Local Factors – “Other”

- foreign bodies: Self-inflicted (pedi) or traumatic
- Intranasal parasites
- Septal perforation
- Chemical (cocaine, nasal sprays, ammonia, etc.)
Why is it bleeding?

- Systemic factors
  - Vascular
  - Infection/Inflammation
  - Coagulopathy

HHT: Hereditary Hemorrhagic Telangiectasia

Why is it bleeding? Etiology by Age

- Children—foreign body, nose picking, nasal infection
  - 1 of 3 with chronic bleeds have coagulation disorder
- Adults—trauma, idiopathic
- Middle age—tumors
- Old age—hypertension, medications

Question 3:
What are we going to do about it?

Don't PANIC!
What are we going to do about it?

Initial Management
- ABC's
- Medical history/Medications
- Vital signs—need IV?
- Physical exam
  - Anterior rhinoscopy
  - Endoscopic rhinoscopy
- Laboratory exam
- Radiologic studies

Epistaxis: a contemporary evidence based approach.
Barnes ML, Spielmann PM, White PS.

Epistaxis: a contemporary evidence based approach.
Barnes ML, Spielmann PM, White PS.
What are we going to do about it?

Non-surgical treatments

• Pressure/Expulsion of clots
• Topical decongestants/vasoconstrictors
• Cautery (AgNO₃ vs. Trichloroacetic acid vs. Bipolar vs. Bovie) has the best result in initial treatment per recent data review.
• Nasal packing
• Control of hypertension (?)
• Correction of coagulopathies/thrombocytopenia
  – FFP or whole blood/reversal of anticoagulant/platelets/Vit K

Nasal packs

• Anterior nasal packs
  – Traditional
  – Recent modifications
• Posterior nasal packs
  – Traditional
  – Recent modifications
• Ant/Post nasal packing
ANTERIOR PACKING

Pick a Pack, any pack…

What are we going to do about it?

ANTERIOR PACKING

A. Do not place at an angle.

B. Place on the horizontal, along floor of nose.

C. Inflate with saline or air as required by packing type.

D. Secure string.
**What are we going to do about it?**

**Posterior Packs – Admission**

- Elderly, COPD, and those with other chronic diseases may need to be admitted to the ICU
- Continuous cardiopulmonary monitoring
- Antibiotics (toxic shock)
- Oxygen supplementation may be needed
- Mild sedation/analgesia
- IV fluids
What are we going to do about it?

**Indications for surgery/embolization**

- Continued bleeding despite nasal packing
- Pt requires transfusion/admit hct of <38% (Barlow)
- Nasal anomaly precluding packing
- Patient refusal/intolerance of packing
- Posterior bleed vs. failed medical management after >72hrs (Wang vs. Schaitkin)

What are we going to do about it?

**Non-surgical treatments to avoid reoccurrence**

- Humidity/emollients
- Discontinue offending meds
- Nasal saline sprays
- Avoidance of nose picking/blowing
- Sneeze with mouth open
- Bed rest with head elevation
- Avoid straining

What are we going to do about it?

**Tips and Pearls**

- AgNO3 x 30 seconds or more (not on both sides of septum)
- Antibiotic cream vs. silver nitrate
- Cautery does not work with no platelets/ poor clotting
- Ice water rinses for patient may slow bleeding and prevent swallowing of blood and clots.
- Antihistamines to prevent re-bleeds?
- Secure strings of sponge packs!
- Packing stays in 2-7 days.
- Don't forget antibiotic coverage with Packs.
Tips and Pearls

• Don’t pack nose in unconscious person with suspected skull fractures.
• Monitor patients for necrosis especially with high-pressure packs and balloon packs
• Not all hospitals have embolization-trained interventionalists.
• No hard-set protocols. Do what is best for your particular patient.

Nasal Obstruction

Nasal Obstruction is a sensed or observed reduction in nasal airflow in one or both nasal passages. It is a common complaint often described as stuffiness or congestion, and is correlated with a decreased quality of life. Physiologic congestion and decongestion occurs throughout the nasal cycle in a side-to-side pattern which can be influenced by position, sleep, and environmental factors.

• Most causes of nasal obstruction are diagnosed with history and examination, but imaging studies and lab work to evaluate for allergy, immunodeficiency, cystic fibrosis, and ciliary dyskinesia may be indicated.
History

**Nasal:**
- Stuffiness
- Pain
- Nosebleeds
- Sneezing
- Alteration in sense of smell
- Drainage.

**Non-nasal:**
- Ear blockage
- Keratosis
- Halitosis
- Snoring
- Sleep apnea
- Headache
- Facial pain

Obtain the patient’s history of trauma, medications, and environment.

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Physical Exam

- Check the ears for middle ear effusion or TM retraction. (An adult’s persistent unilateral effusion indicates a nasopharyngeal mass until proven otherwise.)
- Examine the neck for lymphadenopathy.
- Inspect the face and nose for symmetry and note even subtle deformities and signs of trauma. Observe for cartilage or nasal valve collapse.
- Examine each side of the nasal airway for patency, and the septum for deviation, perforation, or hematoma. Note the characteristics and position of the turbinates. Note the characteristics and location of any drainage, crusts, foreign bodies, polyps, or masses.
- Even with adequate lighting, it can be difficult to see the middle and posterior parts of the nasal cavity; endoscopy may be required.
- Sinus imaging in the form of coronal CT is not always indicated for obstruction or sinusitis. If the patient cannot be examined adequately and fails to improve with conservative measures, a referral to further investigation is indicated.

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Differential Diagnosis

**Fixed Obstruction** vs. **Intermittent Obstruction**

- **Fixed Obstruction**
  - Deviated Septum
  - Nasal fracture
  - Septal hematoma
  - Turbinate hypertrophy
  - Nasal valve collapse
  - Polyposis
  - Neoplasm
  - Atrophic rhinitis
  - Ciliary dyskinesia
  - Nasopharyngeal sources: adenoid, neoplasm, juvenile angiofibroma
- **Intermittent Obstruction**
  - URI
  - Acute sinusitis
  - Chronic sinusitis
  - Allergic rhinitis
  - Non-allergic rhinitis (e.g., rhinitis of pregnancy)
  - Drug-induced
  - Allergic fungal sinusitis
  - Wegener granulomatosis
  - Sarcoidosis
Sinonasal Neoplasms

- 3% of aerodigestive malignancies
- 1% of all malignancies
- 2:1 males: females
- Sixth to seventh decades
- Symptomatology difficult
- Nasal cavity neoplasms (benign = malignant in frequency)
  - Benign - inverting papilloma
  - Malignant - SCCA
- Sinus neoplasms (malignant)
  - SCCA
- Maxillary most common

Epidemiology of nasal neoplasms

- Occupational exposure in >40%
  - nickel workers - SCCA
  - hardwood dust & leather tanning - adenoCa
- Viral - HPV, EBV
- Cigarettes & alcohol

Presentation

- Symptoms are similar to common problems
- 6 to 8 month delay in diagnosis
- Cranial neuropathies & proptosis
  - RARE
Presentation

- Oral - 30%
  - tooth pain, trismus, palatal fullness, erosion
- Nasal - 50%
  - obstruction, epistaxis, discharge, erosion
- Ocular - 25%
  - diplopia, proptosis, tearing, pain, fullness
- Auditory - Conductive Hearing Loss
- Facial
  - V2 numbness, asymmetry, pain

Advanced Disease

- Classic Triad
  - facial asymmetry
  - tumor bulge in oral cavity
  - nasal mass

Squamous Cell CA

- Most common - 80%
- Max > nasal cavity > ethmoids
- Males
- Sixth decade
- 90% have eroded walls of sinuses
**Fungiform** (50%) - septum

**Cylindrical** (3%) - lateral nasal wall

**Inverting** (47%) - lateral nasal wall

recurs, locally destructive, malignant potential

men, 6th-7th decades, unilateral

SCCA - 2-13%

Recurrence - 0-80%

**BENIGN NEOPLASMS**

- polyps

**QUESTIONS??????????**
Suggestions for Reading

American Academy of Otolaryngology – Head & Neck Surgery (www.entnet.org)
- Clinical Consensus Statement for appropriate use of CT in paranasal sinus disease, 2012.

Epistaxis: a contemporary evidence based approach.
Barnes ML, Spielmann PM, White PS.