Sinusitis: Nothing to Sneeze At

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Disease Prevalence

- Affects 35 million Americans – making this disease more common than arthritis or hypertension
- Most common health complaint leading to office visit – 25 million out-patient visits
- Prevalence is increasing

- Three billion dollars spent annually in prescription medications, office visits, ancillary tests and procedures
- Two billion dollars spent annually in OTC medications on treatment of sinusitis
- Underdiagnosed because of its occasional subtle clinical presentation

Paranasal Sinuses

- Ostiomeatal complex: obstruction is key element in disease
  - composed of maxillary sinus ostia, anterior ethmoidal cells and ostia, middle meatus

Pathogenesis
Pathogenesis

- Mucociliary activity: removes microorganisms, pollutants and irritants
- Nasal airflow: lower O₂ leads to growth of organisms, impaired local defenses, altered leukocyte function and mucous membrane swelling

Predisposing Factors

- Viral upper respiratory tract infection
- Allergic rhinitis
- Genetic predisposition
- Anatomic nasal compromise
- Air pollution and smoking
- Nasal polyps
- Pregnancy

Sinusitis Symptoms

- Nasal obstruction, congestion, discharge
- Postnasal drip
- Facial pressure, headache, toothache
- Cough
- Halitosis
- Pharyngitis
- Hyposmia – diminished sense of smell
- Ear fullness
- Fatigue, malaise
- Fever

Time Course of Disease

- Acute: lasts up to four weeks
- Subacute: longer than four but less than 12 weeks
- Recurrent acute: four or more episodes per year
- Chronic: 12 weeks or more

Physical Examination

Anterior Rhinoscopy – Nasal speculum

- Evaluate and inspect: nasal cavity, nasal vestibule and anterior septum
- Look for mucosa color, congestion, secretions, septal deviation and polyps

Technique

- Use bright, focused light source
- Vasoconstriction with Afrin

Physical Examination

Anterior Rhinoscopy

- Technique
  - Hold speculum in left hand
  - Left index finger presses against side of cheek to act as anchor
  - Insert blades 1 cm
  - Open vertically, NOT horizontally
  - Position right hand on patient’s head
Physical Examination
Sinus Palpation
Maxillary
• simultaneous finger pressure over both maxillae
• palpation under the upper lip for fullness
• percussion of maxillary teeth with tongue blade

Physical Examination
Transillumination
Maxillary
1. place light source over the middle of the infraorbital rim to judge light transmission between sides through the hard palate

Physical Examination
Sinus Palpation
Frontal
• finger pressure directed upward toward floor of the sinus
• palpation directly over sinus

Physical Examination
Transillumination
Maxillary
2. place light source in patient’s mouth and note red pupillary reflex, note crescent of light on the lower eyelids, note patient’s sense of light in the eyes when they are closed

Physical Examination
Transillumination
Maxillary
3. inspection over the anterior wall of the maxillary sinus is not dependable

Physical Examination
Transillumination
Frontal
1. place light source below supraorbital rim, under the floor of the frontal sinus at the upper inner angle of the orbit
Physical Examination

Transillumination

Results
1. opaque (no light transmission)
2. dull (reduced light transmission)
3. normal (light transmission typical)
4. always compare one side to the other
5. ethmoid and sphenoid: unable to evaluate

Physical Examination

Nasal Endoscopy

Endoscopic sinus surgery

Nasal Endoscopy

Endoscopic sinus surgery

Radiography

Radiographic hallmarks of sinusitis
1. mucoperiosteal thickening 8mm (adults)
or 4 – 5 mm (children)
2. air-fluid level
3. opacification of sinus

Radiography

Four View Sinus X-Ray Series
1. Caldwell
2. Waters
3. Lateral
4. Submental vertex
Limited Computed Tomography Scan
- Use 4 or 5 mm scan thickness
- Provides more information for similar cost
- Low radiation exposure
- Coronal CT used as preoperative imaging

Magnetic Resonance Imaging
- Evaluation of brain, nasal or sinus tumors
- Fungal sinusitis and complicated sinusitis

Radiography
- Limited Computed Tomography Scan
- Magnetic Resonance Imaging

Treatment
- Analgesics for pain: NSAIDS or acetaminophen
- Steam and saline
- Topical decongestants: use for 3 – 5 days; otherwise, can develop rhinitis medicamentosa, rebound vasodilation
- Oral decongestants: use for 3 - 5 days, use with caution in patients with cardiovascular disease, hypertension or benign prostatic hypertrophy
- Mucoregulators: acetylcysteine – promotes synthesis of normal mucus
- Steam and saline
- Analgesics for pain: NSAIDS or acetaminophen

Fungal sinusitis and complicated sinusitis
- Mucoevacuants: guaifenesin – thins sinus secretions, eases mucus drainage
- Antibiotics: amoxicillin, trimethoprim-sulfamethoxazole, erythromycin; for treatment failure use levofloxacin 500mg daily for 10-14 days
- Mucoregulators: acetylcysteine – promotes synthesis of normal mucus
- Antihistamines: can cause over-drying of mucosa
- Zinc preparations: can cause permanent anosmia
Complicated Sinus Disease

Fungal Sinusitis: cerebro-rhino-orbital phymocytosis

Orbital Cellulitis

Subperiostial orbital abscess or orbital cellulitis: surgical emergency, can lead to blindness, intracranial complications

Mucocele or Pyocele

Case 1

- 16-year-old white male
- Chemotherapy for leukemia
- Antibiotics for persistent sinusitis
- Endoscopic sinus surgery
- Maxillary antrostomy, ethmoidectomy
- All cultures negative
- Three days later – infraorbital pain
- Proptosis OS
- Edema left upper eyelid
- Blurred disc borders, retinal hemorrhages

Case 1

- Six days later – from 20/20 to 20/400 OS
- Complete external ophthalmoplegia
- Dilated, non-reactive pupil
- Macular edema, venous stasis retinopathy
- CT scan – proptosis sinus inflammation
Case 1
- Orbital decompression
- Ethmoidectomy with biopsy
- Culture - phycomycetes
- Started on Amphotericin B

Case 2
- 60-year-old male comes in for routine exam
- Others mentioned OD “droopy”
- PERRL, full ROM, HVF - normal
- OD 3 mm proptotic
- Orbital palpation - periorbita hard and full
- Transillumination - right frontal sinus opacified

70% of mucor pts have diabetes, most of these also have ketoacidosis

Treatment: antifungal therapy, surgical debridement of involved tissues, control of underlying disease

Prognosis is poor with 62% mortality

Pathology is essential, BUT absence of evidence is not evidence of absence
**Case 2**

Coronal MRI - Pansinusitis

**Case 2**

Coronal MRI – Frontal Sinus Mucocele

**Case 2**

Treatment
- Oral antibiotics for one week
- Surgery to remove inflammatory material
- Vision unchanged after surgery
- Proptosis decreased

**Case 3**

- 23-year-old female
- Sharp pain behind OD for two weeks
- Dull bi-frontal headaches for four weeks
- PERRL, full ROM
- Red cap – 20% desaturation OD
- Transillumination – opaque right frontal and maxillary sinuses

**Case 3**

- HVF 30-2 – Right constricted

**Case 3**

MRI - Pansinusitis
Case 3
Treatment
- Clindamycin 300 mg daily x 8 weeks
- Guaifenesin/phenylephrine caps BID
- Traimcinolone inhaler daily both nostrils

Post-treatment VF 30-2

Case 4
- 38-year-old male – slow progressive LOV OS
- VA OD 20/20, OS 10/400
- 3+ RAPD OS, color vision defect OS
- Globe palpation – resistance to backward movement OS
- VF – overall significant depression OS

Proptosis, hyperemia OS

Fundus – OD normal, OS optic atrophy

GDX – NFL loss OS
Case 4
Coronal CT – right and left ethmoid, frontal opacity, left frontal extension into orbit, left maxillary opaque

Axial CT – mucocele left sphenoid sinus
- OS proptosis, optic nerve compression

Treatment
• Surgery to remove mucoceles and inflammatory tissue
• Visual acuity stayed the same OS
• Patient felt he had brighter vision OS
• Slight visual field improvement OS

Case 5
37-year-old male with ↓ VA x 5 yr
• VA OD 20/20, OS 20/30
• No RAPD, IOP 15 OU
• Hertel OD 18, OS 26
• Fundus – choroidal folds OS

Proptosis OS, exotropia

Choroidal Folds
**Case 5**

Red-free image showing choroidal folds

Early and late FANG images – choroidal folds

Axial MRI – Orbital Mucocele

Sagittal and Coronal MRI

**Treatment**

- Surgery to remove mucocele
- Proptosis resolution
- Vision improvement

Mucocele Surgery
References