ADVANCES IN THE TREATMENT OF SINUSITIS

- Robert Hughes MD
- North Country ENT
Paranasal Sinuses

Each sinus is named after the bone it resides in!
Lateral Aspects of Sinuses
There are 4 sets of Paranasal Sinuses

- Frontal
- Maxillary
- Ethmoid
- Sphenoid
Frontal Sinuses
Maxillary Sinuses

- Largest (think Maximum!)
- Two, symmetrical but vary in size and shape from person to person
- Can be seen at birth
- Apices at bottom of sinus!
Ethmoid Sinuses

- Paired
- Divided into 3 groups-
  - anterior- 2-8 cells
  - middle- 2-8 cells
  - posterior 2-6 cells
- 6-22 possible each side
Sphenoid Sinuses

- Paired (sometimes one)
- Great variation in size and shape
- Asymmetric
- Directly below Sella turcica
Development

- Start as small sacs around nasal meatus & recesses

- Grow – invading bone- forming air sinuses and cells

- Maxillary seen at birth
• By age 6 or 7 frontals & sphenoids distinguish themselves
• Maxillary Sinuses enlarge as permanent teeth erupt
• Ethmoids around puberty

• All full developed age 17-18

• All sinuses communicate nasal cavity and each other
Functions of Paranasal Sinuses?

- Not definitely known!- but speculated:
  - decrease weight of skull
  - resonating chamber for voice
  - help warm and moisten air
  - act as airbags in trauma
  - possibly control immune system
Implications of Recent Knowledge

- The maxillary sinus was classically considered the major focus of the disorder.
- Most maxillary sinusitis is now known to be secondary to disease in the ostiomeatal complex (OMC).
- Even minor swelling in a critical area can result in ostial obstruction and significant symptoms.
Normal Anatomy of Paranasal Sinuses
Paranasal sinuses are joined to nasal cavity via small orifices called **Ostia** (harbour city of ancient Rome)

- **Ostia** easily blocked by allergic inflammation or swelling of nasal lining
- Drainage of mucous is disrupted
- **Sinusitis** may result!
What is Sinusitis?

- Inflammation of sinuses-
- Some are caused by bacterial infection of membrane lining- can fill with pus!
- Usually from common cold (after first attack, recurrence more likely)
- Can spread from upper tooth infection
- Non infectious inflammation
- Role of Acid Reflux Disease  LPR
Rhinosinusitis

**Differential Diagnosis**

- **Allergic** (seasonal or perennial)
- **Infective** (acute or chronic)
- **Structural** (polyps, septum, turbinates, etc)
- **Other** (idiopathic, NARES, hormonal, etc)
Symptoms of Sinusitis

- Loss of smell
- Fever
- Fullness or tension
- Pain
- 37 million Americans suffer every year
- Decongestion opens up ostia to restore drainage
Facts About Chronic Sinusitis

• Chronic Sinusitis:
  – Is more prevalent than heart disease and asthma.
  – Has a greater impact on quality of life than congestive heart failure and chronic back pain.
  – Symptoms may significantly affect people physically, functionally, and emotionally.

• Chronic sinusitis (not including acute sinusitis) results annually in an estimated 18-22 million physician office visits.
AAO-HNS Rhinosinusitis Categories

- Acute rhinosinusitis (the patient has symptoms present for less than 4 weeks)
- Subacute rhinosinusitis (the patient has symptoms present for more than 4 weeks, but less than 12 weeks)
- Chronic rhinosinusitis (the patient has symptoms present for greater than 12 weeks)
- Recurrent acute rhinosinusitis (the patient has more than 4 acute episodes over 1 year)
- Acute exacerbation of chronic rhinosinusitis (the patient develops an acute infection, with new acute symptoms, superimposed over a chronic infection, with a constant baseline level of symptoms)
AAO-HNS Rhinosinusitis Criteria

**Major Factors**
- Purulence in nasal cavity on examination
- Facial pain/pressure
- Nasal obstruction/blockage
- Fever (acute only)
- Hyposmia/anosmia
- Nasal discharge/purulence
- Discolored postnasal drainage

**Minor factors**
- Headache
- Fever (all nonacute)
- Halitosis
- Fatigue
- Dental pain
- Cough
- Ear pain/pressure/fullness
Factors Associated with Chronic Rhinosinusitis

- Allergies
- Immunodeficiency
- Genetic/congenital
- Anatomic Variations
- GERD/LPR
Microbiology of acute sinusitis (adults)

- S. pneurn (20–43%)
- H. influenzae (22–35%)
- Strep spp. (3–9%)
- Anaerobes (0–9%)
- M. catarrhalis (2–10%)
- S. aureus (0–8%)
- Other (4%)
Recommended abx for adults with acute bacterial rhinosinusitis

- Mild disease with no recent antimicrobial use
- Augmentin, Amoxicillin
- Vantin
- Ceclor
- Omnicef
Switch if no improvement after 72 hours

- Tequin, Levaquin, Avelox
- Augmentin
- Combination (Amox or clinda + Suprax)
Abx for acute sinusitis if PCN–allergic

- Bactrim
- Doxycycline
- Zithromax, Biaxin, Erythromycin
- Switch to quinolone if no improvement in 72 hours
Complications of sinusitis

- Periorbital cellulitis
- Preseptal cellulitis/abscess
- Orbital cellulitis
- Orbital abscess
- Cavernous sinus thrombosis
Chronic rhinosinusitis

- Antibiotics
- Antihistamines
- Nasal steroids
- Normal saline irrigations
- Allergy evaluation +/− immunotherapy
Migaine

- Often Sinusitis is actually tied to Migraines
- Physicians will label 50% of subjects meeting IHS criteria as having migraine
- Patients will label their symptoms as sinus related 90% of the time when they actually meet the IHS criteria for migraine
- Nasal symptoms often accompany migraine which clouds the diagnosis
International Headache Society Classification of Migraine

• Migraine
• Tension-Type Headache
• Cluster Headache and other cephalgias (Trigeminal Neuralgia, Hemicrania, etc)
• Other
Migraine Definition

- IHS criteria: Migraine/aura (3 out of 4)
  - One or more fully reversible aura symptoms indicates focal cerebral cortical or brainstem dysfunction.
  - At least one aura symptom develops gradually over more than 4 minutes.
  - No aura symptom lasts more than one hour.
  - HA follows aura w/free interval of less than one hour and may begin before or w/aura.

History, PE, Neuro exam show no other organic disease.

At least five attacks occur
What is migraine?

Migraine without aura (MO)

At least five attacks fulfilling these criteria:

- Headache lasting 4–72 h (2–48 h in children)
- With at least two of:
  - unilateral location
  - pulsating quality
  - moderate/severe intensity
  - aggravated by activity
- Accompanied by at least one of:
  - nausea
  - vomiting
  - photophobia and/or phonophobia
- No evidence of organic disease

Migraine with aura (MA)

At least two attacks fulfilling these criteria:

- At least three of the following:
  - one or more fully reversible aura symptoms
  - gradually developing or sequential aura symptoms
  - no one aura symptom lasts longer than 1 h
  - headache shortly follows or accompanies aura
- No evidence of organic disease

Headache Classification Committee of IHS (1988)
Subtypes?

- Classic
- Atypical
- Chronic Daily HA
- Cluster HA
- Transformed Migraine
- Medication overuse HA
- Chronic Tension type HA
More subtypes?

New Daily Persistent HA
Hemicranial continua
Hypnic Migraine
Paroxysmal Hemicrania
Neuralgiform HA
No Classification For SINUS HEADACHE
ALLERGY HEADACHES

» When is allergy a factor in headache management???
» Often Multiple conditions coexist
» It is often difficult do distinguish these conditions form one another: Allergy-Sinusitis-Migraine Headaches
Antigens for allergic rhinitis
Allergic Rhinitis

- Widespread affliction—the most common allergic disease
- Affects 10–30% of American adults
- >20 million people, adults and children
- Results in missed work and school days, poor quality of life
Symptoms of allergic rhinitis

- Allergic salute
- Shiners
- Itchy, red conjunctiva
- Sneezing
- Post-nasal drip, rhinorrhea, congestion
Allergy skin prick testing
Common allergens--

- Dust
- Mold, mildew
- Plants
- Animal dander
- Feathers/down
Associated diseases

- Asthma
- Allergic fungal sinusitis
- Cystic fibrosis
- Mucociliary dysfunction
- Connective tissue disorders (Wegener’s granulomatosis, sarcoid)
Associated diseases

- Nasal polyposis
- Samter’s triad (aspirin sensitivity, nasal polyps, asthma)
- GERD/LPR
Indications for sinus surgery

- Nasal polyposis
- Anatomic blockage—deviated septum, enlarged turbinate, concha bullosa
- Mucocele
- Orbital abscess
Indications for sinus surgery

- Fungal sinusitis—allergic vs. invasive (mucor)
- Tumor of nasal cavity or sinus
Indications for sinus surgery

- Chronic, recurrent sinusitis
- Failure to respond to maximal medical therapy
- Obtain cultures
PATHOGENESIS OF SINUSITIS

There are three main factors lead to the sinusitis development:

- The most important factor is the opening of sinus hole. It may be blocked due to different reasons. As a rule, the hole may be blocked by the swollen mucous membrane. The other reason may be an anomaly of anatomical structures. The retain of secret, decrease the pressure of oxygen contribute the bacteria multiplication.
Deviated Nasal Septum
Nasal Polyps
SURGICAL TREATMENT FOR RHINOSINUSITIS

- SEPTAL SURGERY
- TURBINATE SURGERY
- SINUS SURGERY FOR VENTILATION AND DRAINAGE
- SINUS SURGERY FOR POLYPOsis
Historical perspectives

End of 19th century:
- George Caldwell and Henri Luc described the canine fossa approach to maxillary sinus

1901:
- Hirschman was the first to perform nasal endoscopy using a modified cystoscope

1960:
- Hopkins rod telescope was patented

1978:
- Messerklinger published a landmark collections of endoscopic images

1980s:
- Stammberger published a series of papers on FESS
Sinuplasty: A new tool

“Sinuplasty is a new technique in performing endoscopic sinus surgery—not a new procedure but rather a new tool that further reduces mucosal damage and advances us toward our ultimate goal of improving function with maximal mucosal preservation.”

Raymond Weiss, MD
Balloon technology

- Available in other specialties: cardiology, gastroenterology, endovascular surgery, and urology
- Angioplasty has effectively provided an alternative to open heart surgery
-- Balloon dilation technology may have potential application where surgical management of sinus disease is required.

-- The technology has limited surgical indications at this time.

-- Patients treated with balloon dilation may still require conventional sinus surgery.

-- In a small group of very selected patients, the use of balloon dilation technology alone may eliminate the need for other surgical procedures.
Three companies that manufacture balloon catheters have reported their use in endoscopic sinus surgery:

- **Acclarent, Inc (Menlo Park, CA, USA)**

- **Quest Medical, Inc (Allen, TX, USA)**

- **Entellus Medical, Inc (Maple Grove, MN, USA)**
Schematics of Balloon Sinuplasty
Luma Sinus Illumination System (Luma light)

Fig. 1. A discrete focus of transillumination over the targeted sinus indicates guidewire presence within the sinus. Small manipulations of the guidewire should result in movement of the transillumination focus over the region of the anterior sinus wall.

Fig. 2. Diffuse transillumination over the targeted sinus is a false positive result. This pattern of transillumination does not confirm guidewire presence within the sinus.

Measurement of success in balloon sinuplasty

- SNOT–20
- CT sinus
- Lund–Mackay CT score
- Nasal endoscopy to look for ostia patency
Conclusions:

- Balloon sinuplasty is a novel technology for otolaryngologists
- It is a safe technique with low morbidity
- It is shown to improve patient symptoms in data of 2 year follow up in a selected group of patients
- It holds promises for office type sinus procedures
- More study is needed to define its role in sinus surgery in particular patient selection and disease type best suited for this technology
THANK YOU

- ANY QUESTIONS ????????