ANATOMY

- Septum
- Nasal Turbinates
  - Concha Bullosa – Middle Turbinate
- Sinuses: Maxillary, Ethmoid (anterior and posterior), Frontal and Sphenoid
  - Osteomeatal Complex
  - Nasofrontal recess
  - Uncinate process (hiatus semilunaris)
ANATOMY (continued)

- Ciliated pseudostratified columnar epithelium
  - Two layers of mucus
    - Thick "basement" layer
    - Thin less viscous layer that the cilia moves to the ostia
- Mucosal Changes After Surgery and Long Term Disease
- Neuroreceptors for smell (olfactory nerve) and airflow (located in the inferior and middle turbinates)
SIGNS AND SYMPTOMS

- Pain and/or pressure
  - frontal, maxillary, upper teeth, retro-orbital, crown of the head
    - temporal, parietal and occipital headaches are not generally associated with sinusitis
    - children under the age of 12 who complain of headaches and, without prompting from a parent, points to the top of their head, anterior face, eye, or posterior skull most likely have sphenoid sinusitis until otherwise documented by CT or MRI scan

- Fever
SIGN(S AND SYMPTOMS

- Nasal congestion and/or drainage
  - Rhinorrhea
    - postnasal drainage
    - purulent
    - color does not determine infection

- Obstruction
  - Deviated septum
  - Hypertrophy of turbinate(s)
  - Polyps

ACUTE SINUSITIS

- Less than one month duration
- Purulent drainage, fever, significant sinus pain and pressure
- Isolated acute infection without recurrent "sinus symptoms"
  - Most commonly secondary to upper respiratory viral infection or other inflammatory condition
    - perennial allergic rhinitis with inflammation
    - destruction of the ostia/drainage passages of the sinuses
    - primarily neutrophilic inflammation with a small amount of eosinophils

COMMON BACTERIA

- Streptococcus pneumoniae
- Haemophilus influenza
- Moraxella catarrhalis
CHRONIC SINUSITIS

- Greater than three months duration
  - multiple treatments or infections within one year
  - multiple year history of recurrent infections or episodes of sinus pain and pressure
  - symptoms that coincide with changes in altitude or weather
  - chronic nasal congestion and drainage

CHRONIC RHINOSINUSITIS (CRS) WITHOUT POLYPS

- Neutrophilic inflammation associated with obstruction and inflammation of sinus ostia
CHRONIC RHINOSINUSITIS (CRS) WITH POLYPS

- Associated with eosinophilic inflammation with some association with interleukin 4 and 5 and IgE mediated response
- No difference in the composition of the mucin between systemic atopic patients versus nonatopic patients
- Patients with genetic mucociliary transport diseases such as cystic fibrosis or, patients who have significant acquired changes of the mucosa following surgery may also have neutrophilic inflammation

ALLERGIC FUNGAL SINUSITIS (AFRS)

- Non-invasive
  - local fungal hyphae in the mucin
  - allergic response to the fungus
  - polyps with thick grey to brownish “greasy” mucin drainage
ALLERGIC FUNGAL SINUSITIS (AFRS)

- Invasive
  - Microscopic invasion of fungus in the mucosa
  - Necrotic black tissue with nonpainful debridement is an emergent life threatening fungal infection
NONALLERGIC RHINITIS

- May be caused by drugs such as:
  - Beta blockers
  - Methyldopa related
  - Reserpine
  - Oral contraceptives
  - Nasal sprays (OTC)
  - Decongestants

- May also be caused by certain conditions such as:
  - Pregnancy
  - Hypothyroidism
  - Temperature related
  - Recumbency rhinitis
  - End-stage vascular atony (Chronic allergic/inflammatory)
  - Paradoxical nasal obstruction (Nasal cycle)
  - Non-airflow rhinitis (Adenoid hypertrophy, choanal atresia)

TREATMENT

- Nasal and oral steroids
- Antibiotics
- Nasal saline irrigation
- Ponaris emollient
- Oral decongestants and antihistamines
  - Conservative use
- Biofilm formation
- Surgery
NON-SURGICAL TREATMENT

• Acute sinusitis
  – Antibiotics – ten days to three weeks
  – Nasal steroids – six to eight weeks
  – Nasal saline irrigations – six to eight weeks
  – Mucocilia may take up to four to six weeks to resume normal function
  – CT scan of sinuses if indicated
  – Optional:
    • Nasal spray decongestants – three days only
    • Short course of oral steroids
  – Surgery if indicated

NON-SURGICAL TREATMENT

• Chronic or recurrent sinusitis without polyps
  – Nasal steroids – long-term treatment
  – Nasal saline irrigation – long-term treatment
  – Antibiotics with acute intermittent sinus infections up to six weeks
  – CT scan sinuses
  – Otolaryngologist evaluation
  – Surgery

NON-SURGICAL TREATMENT

• Chronic rhinosinusitis with polyps
  – Otolaryngologist evaluation
  – Nasal steroids – long-term treatment
  – Nasal saline irrigation – long-term treatment
  – Antibiotics with acute intermittent sinus infections up to six weeks
  – Allergy testing
  – Surgery
NON-SURGICAL TREATMENT

• Allergic Fungal Sinusitis (AFRS)
  – Nasal steroids – long-term treatment
  – Nasal saline irrigation – long-term treatment
  – Amphotericin B, mucopricin, steroid or gentamycin irrigations
  – Most common organism – Aspergillus fumigates
  – Antibiotics with acute intermittent sinus infections up to six weeks
  – CT scan sinuses
  – Otolaryngologist evaluation and management
  – Surgery

SURGICAL TREATMENT

• Open sinus procedures
  – Caldwell Luc
  – Trephination
  – Frontal sinus osteoplastic flap
SURGICAL TREATMENT

• Functional endoscopic sinus surgery (FESS)

SURGICAL TREATMENT

• Image guided endoscopic sinus surgery
• Balloon sinuplasty
OMT!!

- Will assist in differentiating and treating musculoskeletal generated cephalgia from sinusitis
- May assist with mucosal clearance