Obstructive Airways Disease

Non-CF Bronchiectasis

- Increasing due to increasing CT quality and increasing immunosuppression
- More common in women
- Cole Cycle
    - Impaired mucociliary clearance cycle -> Inflammation
        - Microbes linger
        - Stimulation of more mucous
        - Microbial colonization
    - Decreasing health -> damage to lung -> impaired clearance
        - Made worse by inflammation
- Reid classification is just CT description that doesn't help in diagnosis, treatment, etc
- Etiology
    - 50% idiopathic
    - Acquired bronchial obstruction
        - aspiration, tumors, adenopathy, stenosis
    - Post infection
        - check childhood infection (pertussis, measles)
        - any lung infection
    - ABPA
    - Host impaired defense
        - IgG or IgG subclass deficiency (look at subclass or vaccine response)
        - IgA deficiency
        - HIV
        - Chronic granulomatous disease
    - Autoimmune
        - RA, sjögrens, SLE
        - UC, crohn's
    - Primary Ciliary Dyskinesia
        - part of Kartagener's syndrome
            - dextocardia, bronchiectasis, sinusitis
        - Defect of dynein arms seen on electron microscopy
    - Young's Syndrome
        - looks like CF but normal sweat chloride and pancreatic function
        - bronchiectasis, sinusitis, and azoospermia
    - Genetic disorders
    - Alpha 1 ATD
    - Inhalation injury
    - Transplantation of any organ, AIDS, immunosuppression
    - Chronic aspiration
- Traction bronchiectasis
    - distortion of airway due to parenchymal disease

    - different disease processes than primary bronchiectasis
    - fibrosis distorting airways
- Symptoms
    - Daily purulent sputum production!
    - SOB, rhonchi, whz, hemoptysis, etc.
- Workup
    - HRCT, PFTs
    - Sputum for AFB, fungus, bacteria
    - CBC with diff
    - sweat chloride
    - CFTR gene mutation -/+
    - quantitative immunoglobulin w/u. If IgG is low then…
        - IgG subclass
        - antibody titer before and 4 weeks after immunization
        - if IgG is low but subclass and immunization response okay, replacement won't help
    - IgE -> if elevated look for aspergillus specific IgE
    - A1AT levels
    - Nasal NO (low = dx), ciliary bx (primary ciliary dyskinesia w/u)
- Chronic Treatment
    - DNAse therapy is contraindicated in nonCF bronchiectasis
    - treat underlying cause
    - pseudomonas more dangerous
    - airway clearance
    - hypertonic saline or mannitol
    - macrolides
        - decrease exacerbations
        - may increase resistance in atypicals
        - probably avoid MAI
    - others
        - inhales steroids
        - NAC
        - vaccinations
        - pulm rehab
        - inhaled antibiotics for chronic (not acute exacerbations)
- Acute exacerbations
    - IV abx directed toward sputum
    - Treatment 10-21 days
- Surgery
    - remove obstructed lung
    - uncontrolled hemorrhage
    - focal area of resistant organisms unresponsive to medicine
    - lung transplant

Cystic Fibrosis

- Path

    - autosomal recessive
    - Defect CFTR chromosome 7 (delta F508 classic)
    - Causes abnormal chloride ion transport across epithelial cells in exocrine glands
    - More common in white but occurs in all races
- Classic
    - Sweat chloride > 60 with at least one organ dysfunction
- Non-classic
    - 2% of case
    - Normal or intermediate sweat chloride
        - <40 CF unlikely
        - 40-60 intermediate
        - > 60 CF likely
    - Typically disease limited to one organ and is milder
    - Dx with 2 copies of CFTR mutation or nasal potential difference
- Adult Presentations
    - About 7%
    - More likely to have more GI s/sx or infertility and less lung disease
    - Less likely to have classic delta F508 and more likely to have rare mutations
    - Less likely to have pancreatic insufficiency
- Diagnosis (1 of 3 below with organ dysfunction)
    - Sweat chloride < 60 mmol/L
    - Presence of two CFTR mutations
    - Abnormal nasal potential difference
- Typical Presentation
    - bronchiectasis
    - hyperinflation and obstruction
    - steatorrhea due to pancreatic insufficiency
    - 95% men infertile due to defects in sperm transport
- Timeline of CF infections
    - Staph early
    - Pseudomonas late
- Contraindicated in AE CF
    - steroids
        - ICS only used in maitence in patients with asthma, ABLA, etc.
    - ibuprofen
    - Inhaled NAC
- Treatment of AE
    - systemic Abx
    - inhaled can be used in mild AE and maintenance therapy
- Ivacaftor (VX-770)
    - FDA approved for G551D mutations (5% of all CF)
    - Potentiator therapy restores function of mutant CF protein
- Survival
    - Median survival continues to improve
    - Less abx. More airway clearance.

- Transplant
  - **FEV1 < 30%**
  - AE requiring ICU (especially young females having frequent AEs)
  - recurrent PTX or hemoptysis
  - hypercapnia or hypoxia
  - pHTN

Bronchiolitis / Bronchiolitis Obliterans

- Path
  - Nonspecific inflammatory injury of the small airways
  - Bronchial epithelial injury with repair leading to inflammation and fibrosis causing continued obstructive pattern
  - Mostly commonly seen as bronchiolitis obliterates in adults
  - Inhale injuries cause bronchiolitis and not interstitial lung disease
  - Two classifications (often co-exist)
    - Constrictive
      - Concentric narrowing with obliteration of airway
      - Progressive irreversible airway obstruction
    - Proliferative
      - cellular appearance with fibroblast proliferation and luminal exudates
      - Most common
      - Typically responds to steroids
      - Different than BOOP
  - Other types
    - Follicular
      - BALT
      - Connective tissue disease
    - Airway centered interstitial fibrosis
      - centrilobular and peribronch fibrosis
      - tobacco
    - Diffuse panbronchiolitis
      - Japan
      - Non smokers with chronic sinusitis
- Causes
  - Inhalation injury
  - Infection
  - Drug induced
    - Amiodarone
  - Connective tissue disease
  - Organ transplant
  - Idiopathic
- BOS / Bone Marrow Transplant Association
  - 5-15% in patients with chronic graft vs host
  - occurs 4-6 months after transplant
  - risk factors include MTX and early viral infection

        - treatment increased immunosuppression, macrolides, and steroids
        - poor prognosis: 13% survive 5 years
- Presentation / Diagnosis
    - Dyspnea and cough 2-8 weeks after exposure
    - CXR normal
    - HRCT
        - centrilobular nodules
        - tree in bud
        - air trapping / mosaic (more in expiratory films(
    - Obstructive PFTs with constrictive bronchiolitis
    - Restrictive PFTs with proliferative bronchiolitis
    - Decrease DLCO
    - Hypoxemia
    - Open lung as transbronchial bx is inadequate
- Treatment
    - ICS
    - Cough suppressants
    - Macrolides for constrictive
    - Steroids for proliferative