Asthma-
THE most common Pediatric Disease

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Asthma

- Usually acquire before the age of 10
- These patients exhibit hyper-reactive airways
  - Spasm
  - Constriction
  - Swelling
  - Secretions are in the lumen of the airways
    - The above usually occur due to some various stimuli
- Life threatening if severe airway obstruction
- Etiology unknown, mortality rate continues to climb
• Two types of Asthma
  
  1. extrinsic—usually develops with exposure to allergenic substances
  
  2. intrinsic—associated with respiratory tract infections
Pathophysiology-2 phases

- **Acute allergic phase**
  - Presence of triggering stimuli on airway causes rupture or degranulation of mast cell
  - Mast cell releases histamines, leukotrienes, eosinophilic factors and protaglandins
  - These factors affect the smooth muscle of tracheobronchial tree and the resulting affect is bronchospasm, edema, vasodilation, increased secretions, and accumulation of eosinophils

- **Inflammatory phase**
  - Eosinophils, neutrophils, macrophages and lymphocytes release mediators
    - Initiation of inflammatory response of airways

- **(Terminal phase=acute respiratory failure)**
Pathophysiology (continued)

- As resistance to flow increases you have an increased work of breathing therefore leading to V/Q mismatching
- Air trapping results secondary to increased FRC
- Airway narrowing
  - Larger V/Q mismatching that leads to hypoxemia that leads to hyperventilation that leads to hypocarbic conditions
    - VICIOUS CYCLE
- Cardiovascular and metabolic function changes
  - Pt dehydrated, tachypneic, fever
- Lactic acid buildup
- Metabolic Acidosis
Signs and Symptoms

- Success or failure of treatment will help develop appropriate plan
- Wheezing, shortness of breath
- Dehydration, infection
- S/S will depend upon degree of attack
  - Mild=dry cough, slight wheeze
  - Moderate=productive cough, tachypnea, wheeze, tachycardia, cyanosis
  - Severe=diminished breath sounds, retractions, shallow breathing, stupor/lethargy from hypoxemia
Signs and Symptoms

- **ABG classification into 4 stages**
  - 1. within normal limits
  - 2. decreased PCO2/pH slightly alkalotic
  - 3. normal PCO2/pH in fatigued, hypoxemic patients
  - 4. increased PCO2/decreased pH/decreased PO2=INTUBATE IMMEDIATELY!!!

- **Measure PEFR**
  - Will measure amount of obstruction present and the response to treatment

- **DON’T MISTAKE WHEEZING for a misdiagnosis!!**
Treatment

- AVOID PRECIPITATING FACTORS that trigger attack

- Oxygen nearly indicated in all cases due to some level of hypoxemia

- 80:20 heliox mix

- Multiple inhaled respiratory agents
- NANC (nonadrenergic noncholinergic)
  - Plays significant role in maintaining airway
- Sympathetic
- Parasympathetic
Respiratory Agents

- **Sympathomimetics (B2 adrenergic agonists)**
  - Most commonly used
  - Stimulate B2 adrenergic sites
  - Bronchodilation
  - Inhibit mast cell degranulation
  - Reduce pulmonary vasculature permeability
  - Improve mucociliary transport of secretions

- Epinephrine=oldest drug used to treat asthma
- Longer duration medications have been developed
Respiratory Agents

- **Parasympatholytics**
  - Anticholinergics
  - Chemically similar to acetylcholine but acts as an agonist
  - Do not stimulate continuation of nerve impulse
  - Atropine and derivatives

- **Corticosteroids**
  - Suppress release of inflammatory mediators
  - Help with prophylactic reversal of airway hyper-reactivity
  - Beclomethasone, Flovent, Funisolide
Respiratory Agents

- **Miscellaneous medications**
  - Intal
  - Tildac
  - Antibiotics
  - Adequate hydration
  - Subcutaneous epi
  - Adequate humidification for secretion clearance
  - Intubation and mechanical ventilation
  - Magnesium sulfate
  - Heliox

- Aerosolized bronchodilators Q3-Q4 or with acute exacerbation may use high dose continuous
Lung Physiology

1. Give parasympathetic agent first to have better bronchodilation of the larger airways

2. Sympathomimetic agent second to better penetrate peripheral airways
   - Oral theophylline is good to use to help reduce symptoms

Be aware of rebound bronchoconstriction from overuse of B2 adrenergic (will cause desensitization)