STRIDOR

• High pitched sound
  – Turbulent air flow in a partially obstructed upper airway

• Location of obstruction:
  – Above the glottis
    • Inspiratory Stridor
  – At or immediately below the glottis
    • Inspiratory and expiratory stridor (Biphasic Stridor)
STRIDOR

Inspiratory Stridor: Above the glottis

Biphasic Stridor: Glotic or Subglottic

Expiratory Stridor: Wheezing

Epiglottitis

Croup, bacterial tracheitis

Asthma
<table>
<thead>
<tr>
<th></th>
<th>Epiglottitis</th>
<th>Laryngotracheitis (croup)</th>
<th>Bacterial Tracheitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Supraglottis</td>
<td>Subglottis</td>
<td>Trachea</td>
</tr>
<tr>
<td>Age</td>
<td>2-6 years of age</td>
<td>6-36 mo of age</td>
<td>3 mo to 6 years of age</td>
</tr>
<tr>
<td>Onset</td>
<td>Rapid onset</td>
<td>Slow onset</td>
<td>Rapid onset</td>
</tr>
<tr>
<td>Stridor</td>
<td>Inspiratory, biphasic stridor</td>
<td>Biphasic stridor</td>
<td>Biphasic stridor</td>
</tr>
<tr>
<td>Appearance</td>
<td>Toxic appearance</td>
<td>Uncommon toxic appearance</td>
<td>Toxic appearance</td>
</tr>
<tr>
<td>Symptom</td>
<td>Drooling</td>
<td>No drooling</td>
<td>No drooling</td>
</tr>
<tr>
<td>Voice</td>
<td>Hoarseness of voice</td>
<td>Hoarseness of voice</td>
<td>Possible hoarseness of voice</td>
</tr>
<tr>
<td>Cause</td>
<td>Bacterial</td>
<td>Viral</td>
<td>Bacterial</td>
</tr>
</tbody>
</table>
CROUP

- Other name:
  - Laryngotracheobronchitis
- Most common cause
  - Parainfluenza viral infection
- Location
  - Subglottic and causes subglotic narrowing
- Age
  - 3 months and 3 years of age
CROUP

• Clinical presentation
  – URI with or without fever
  – Barking or brassy cough
  – Inspiratory stridor or biphasic
  – Retraction, hypoxia and respiratory distress in severe cases
  – Child may prefer to sit or be held upright
CROUP

• Diagnosis
  - It is a clinical diagnosis
  • Radiograph is not necessary in typical cases

- CXR
  • Steeple sign but can be absent
  • Steeple sign can present in normal person as normal variant
CROUP

- **Management**
  - Supportive
    - Observation/Reassurance
    - Adequate hydration always required
  - Dexamethasone
    - Single dose of Dexe. is very beneficial in mild croup
    - Decreases edema and the need for hospitalization
CROUP

• **Management**
  - Oxygen and racemic epinephrine in moderate to severe cases
  - Do not cause rebound obstruction
  - Helium-oxygen (Heliox) may be effective in children with severe croup
ACUTE STRIDOR

- **Spasmodic croup**
  - Common in children aged 1-3 years
  - Recurrent or nocturnal croup
  - Begin suddenly and resolve rapidly
- May be associated with:
  - GE reflux
  - Allergies
  - Psychological factors
2 year-old boy has fever, sore throat, dysphagia and neck pain for 2 days, on physical exam, stridor, neck stiffness, and retropharyngeal bulge.

Radiological findings: CT images of the upper neck with contrast reveal a hypodense oval collection in the prevertebral space with peripheral rim of enhancement which is suggestive for a retropharyngeal abscess.

Final diagnosis: Retropharyngeal abscess.
- Plain film soft tissue views of lateral neck.
- Widening of soft tissues, with anterior displacement of airway

*Hint*

“Antero-posterior diameter of prevertebral soft tissue space in children should not exceed the diameter of the adjacent vertebral bodies”
ACUTE STRIDOR

- Retropharyngeal abscess
  - Children younger than 6 years
  - Abrupt onset of high fevers
  - Difficulty swallowing
  - Refusal to feed
  - Sore throat
  - Hyperextension of the neck
  - Respiratory distress
ACUTE STRIDOR

- Peritonsillar abscess
  - Adolescents and preadolescents
  - Severe throat pain
  - Trismus
  - Trouble swallowing or speaking
  - Contralateral displacement of the uvula
  - Incision and drainage give immediate relief
<table>
<thead>
<tr>
<th>Retropharyngeal Abscess</th>
<th>Peritonsillar Abscess</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 years old</td>
<td>adolescent</td>
</tr>
<tr>
<td>Fever, throat pain, neck stiffness</td>
<td>Fever, throat pain, trismus</td>
</tr>
<tr>
<td>Purulence of retropharyngeal lymphnode</td>
<td>Purulence of tonsillar fossa Deviation of tonsil and uvula</td>
</tr>
<tr>
<td>May need imaging studies</td>
<td>Usually diagnosed clinically</td>
</tr>
</tbody>
</table>
CHRONIC STRIDOR

• Laryngomalacia
  – Diagnosis
    • Clinical diagnosis
      – Typical inspiratory noises (worsen when supine)
      – Normal cry, normal growth and development
  • Laryngoscopy and bronchoscopy
    – If moderate to severe obstruction, difficulty feeding and breathing, unable to gain weight
CHRONIC STRIDOR

- Vascular Ring
  - Most common types of complete vascular ring
    - Right sided aortic arch
    - Double aortic arch
  - Presents with stridor
    - When encircle the trachea and esophagus
- Chromosome 22p11 deletion evaluation
CHRONIC STRIDOR

- Vascular Ring
  - Noisy breathing
    - That do not change with position or bronchodilators
  - CXR may reveal the location of the aortic knob
  - MRI and CT scan the best diagnostic studies for detailed anatomy
  - Echocardiography
  - Barium (indentation of the vascular ring)
CHRONIC STRIDOR

- Laryngeal webs
  - Incomplete recanalization of the laryngeal lumen during embryogenesis
  - Weak cry and biphasic stridor
- Surgery can be curative if significant obstruction
CHRONIC STRIDOR

• Laryngeal hemangiomas
  – 50% accompanied by cutaneous hemangiomas in the head and neck.
  
  – Clinical Presentation
    • Inspiratory or biphasic stridor
    
    • It may worsen as the hemangioma enlarges.
CHRONIC STRIDOR

- Laryngeal papillomas
  - Papillomas are the most common cause of respiratory neoplasm in children
  - Transmission
    - Vertical transmission of the HPV (genital warts) during the birth process.
  - HPV virus
    - HPV 6, and 11 are the most commonly associated
    - 60% are born to mother with condyloma accuminata
CHRONIC STRIDOR

- **Subglottic stenosis (SGS)**
  - Inspiratory or biphasic stridor
  - Congenital subglottic stenosis
    - Rare
    - Usually associated with other genetic syndrome
  - Acquired
    - Due to airway instrumentation or prolonged intubation (more common)
CHRONIC STRIDOR

- Tracheomalacia
  - Expiratory wheezing secondary to airway cartilage floppiness
  - Wheezing due to airway narrowing/collapse during expiration
- Associations
  - Esophageal atresia or tracheoesophageal fistula
- Causes
  - Congenital
  - Mechanical ventilation in premature infants
HEMOPTYSIS

• Definition
  – Hemoptysis is coughing blood (hematemesis is vomiting blood)
  – Bright red blood

• Differential Diagnosis of hemoptysis
  – Upper airway (nasopharyngeal bleeding) e.g.:
    • Epistaxis or nose bleed which is very common
  – Gastrointestinal bleeding
  – Bronchitis
HEMOPTYSIS

- Examination of the nose and throat (The most common source)
- Determine the PH of emesis
  - If acidic and dark → stomach
  - If alkaline and bright red (lung)
- Coagulation studies
- Rule out infectious causes.
- It is important to obtain a urinalysis and kidney function tests to rule out renal involvement.
BACTERIAL TRACHEITIS

• Background
  – The most common cause is staph aureus, (also M cat, Strep)
  – Mean age is 4 years (range 4 wk to 13 yr)

• Clinical presentation
  – Brassy and barking cough
  – Similar to croup but the patient has high fever and looks very toxic
  – Respiratory distress
  – Stridor
BACTERIAL TRACHEITIS

• Clinical Presentation
  – Patient may lie flat
  – No drooling or dysphagia
  – Rapid progression
    • Purulent secretion to obstruct airway
    • May mandate early endotracheal intubation
  – Failure to respond to racemic epinephrine or corticosteroids
BACTERIAL TRACHEITIS

Management

- Intubation
  - Specially younger patients
  - 50-60% do not need intubation

- X-ray are not needed
  - May show the classic finding of pseudomembrane detachment in the trachea
BACTERIAL TRACHEITIS

- Management
  - Humidification and careful suctioning of the ET Tube important
  - Antistaphylococal treatment e.g. nafcillin, or vancomycin
  - Prognosis is excellent
  - Complications can include toxic shock, septic shock, pulmonary edema, ARDS and subglottic stenosis
COMMON COLD

• Cough remedies
  – Not helpful in most the cases of common cold specially young children

• First generation antihistamine
  • Reduce rhinorrhea by 25-30%, via its anticholinergic effect

• Second generation antihistamine
  – Not helpful
COMMON COLD

• Conditions that mimic the common cold
  – Allergic Rhinitis
    • Prominent itching and sneezing
    • Nasal eosinophils (Nasal smear may be useful if allergic rhinitis is suspected)
  – Nasal Foreign body
    • Unilateral foul smelling secretions
    • Bloody nasal secretions
10 month-old girl in months of January presents with fever, runny nose, cough, poor feeding, tachypnea, respiratory distress, wheezing, low oxygen saturation, and positive RSV.

**Radiological findings:** An A-P chest x-ray shows the typical bilateral perihilar fullness of bronchiolitis and hyperventilation in the peripheral lung areas resulting from air-trapping. The left lung is more affected than the right one.

**Final Diagnosis:** RSV bronchiolitis
ACUTE BRONCHIOLITIS

• Viral bronchiolitis is the most common lower respiratory tract infection in 2 years of age and younger
• RSV responsible for more than 50% of acute bronchiolitis
• Other causes
  – Human meta-pneumovirus
  – Parainfluenza virus
  – Adenovirus
  – Influenza
  – Rhinovirus
  – Mycoplasma
ACUTE BRONCHIOLITIS

- Risk factors for persistent wheezing include:
  - Maternal asthma
  - Maternal smoking
  - Persistent rhinitis
  - Eczema at <1 year of age
ACUTE BRONCHIOLITIS

• Clinical presentation
  – Nasal congestion, rhinorrhea and cough
  – Tachypnea
    • Earliest and most sensitive vital sign change
  – Nasal flaring
  – Grunting
  – Intercostal, supracostral, and subcostal retractions
ACUTE BRONCHIOLITIS

• Clinical presentation
  – Crackles, wheezes, and referred upper airway noise
  – Apnea
    • Young infants <2 month
    • Former premature infants
  – May progress to impending respiratory failure
ACUTE BRONCHIOLITIS

• Clinical Presentation

  – Day of illness

  • Peak or the worst symptoms on day 3 to 4 of illness
  • Parents education about possible worsening of symptoms
  • Making decisions regarding admission and discharge of patients
ACUTE BRONCHIOLITIS

• Diagnosis
  – Clinical Diagnosis
  – Common radiological findings include:
    • Hyperinflation from air trapping
    • Peribronchial thickening
      – From lymphomoncytic infiltration
    • Areas of atelectasis
    • Infiltrates
ACUTE BRONCHIOLITIS

• Management
  - Assess
    • Respiratory rate, work of breathing, and hypoxia
  - Mainstay of treatment is supportive:
    • Oxygen if hypoxia
    • Hydration
    • Frequent nasal suctioning
ACUTE BRONCHIOLITIS

- Management
  - The AAP recommendation
    - Avoid routine treatment of bronchiolitis with bronchodilators and systemic steroids
  - Patients with recurrent wheezing may respond to bronchodilator therapy
  - Ribavirin should not be used routinely in the treatment of bronchiolitis
ACUTE BRONCHIOLITIS

• Prevention
  – Synagis 15mg/kg monoclonal antibody injection IM.
  – Pre-matures and high risk infants
  – Hand washing is the best measure to prevent nosocomial infection