PERTUSSIS:

OVERVIEW:
- “Whooping cough”
- Bacteria remain on the surface of airways
  - Do not invade the tissues
- Spread by cough and nasal droplets
- Bacteria produces toxins which paralyze respiratory cell cilia
  - Can cause other infections

RISK FACTORS:
- Contact with nasal or oral droplets from another human with pertussis
- Non-immunized
- Outbreaks every 3-5 years
- Regardless of climate, geographic, location, etc...
  - “Equal opportunist”
- Infants most susceptible to severe disease

COMMON PATHOGENS:
- Bordetella pertussis: aerobic gram-negative coccobacillus
  - Humans are the only host
  - Endemic worldwide

SIGNS & SYMPTOMS:
- Catarhal stage: 1-2 weeks
  - Runny nose
  - Sneezing
  - Low-grade fever
  - Mild cough
- Paroxysmal stage: 1-6 weeks
  - Bursts of coughs
  - Thick mucus
  - Long inspiratory effort (high-pitched whoop)
  - Vomiting
  - Exhaustion
  - Appears normal between attacks
- Convalescent stage: 2-3 weeks
  - Gradual recovery

COMMON PHYSICALS:
- Bacteria pneumonia
- Seizures
- Encephalopathy
- 12% mortality in infants < 6 months old

NOTE: in adults & older children pertussis usually not serious ⇒ they can give it to younger children (so still vaccinate)

PHARMACOTHERAPY:
- Antibiotics
  - Incubation/catarhal stage: may prevent or minimize severity
  - Paroxysmal phase: decreased transmission to others
    - Does not affect duration of pertussis or severity of disease
- Diphenhydramine or salbutamol: no change in cough episodes
- Pertussis immunoglobulin: decrease in whoops per day -3.1

VACCINATIONS: DtaP (diphtheria, tetanus, acellular pertussis)
- Effectiveness: approx. 85%, wanes over 6-12 years
  - Q10 booster
- Dose: 0.5 mL IM

PROPHYLAXIS USING ANTIBIOTICS (MACROLIDES):
1. Direct contacts prior to them developing S/S
  - Does not change course of disease within a community if there is an outbreak
  - Direct contact = face-to-face exposure for ≥ 5 min; shared confined space in close proximity (household, office) for ≥ 1 hr; respiratory/oral/nasal secretion exposure (kissing, coughed/sneezed upon)
2. Vulnerable persons
   a. Infants < 2 months of age
   b. Infants < 12 months (depending on comorbidities & vaccination status)
   c. Pregnant women in 3rd trimester (azithromycin or erythromycin)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Child</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin</td>
<td>Infant &lt; 6 mo: 10 mg/kg PO daily x 5 days</td>
<td>500 mg PO x 1 then 250 mg PO daily</td>
</tr>
<tr>
<td></td>
<td>Child: 10 mg/kg PO x 1, then 5 mg/kg PO daily x 4 days</td>
<td>500 mg PO BID x 7 days</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>7.5 mg/kg PO BID x 7 days</td>
<td>500 mg PO BID x 7 days</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>10 mg/kg PO QID x 7 days</td>
<td>500 mg PO QID x 7 days</td>
</tr>
<tr>
<td>TMP/SMX (ALLERGY)</td>
<td>5 mg/kg TMP PO BID x 10 days</td>
<td>1 DS tab PO BID x 10 days</td>
</tr>
</tbody>
</table>
### CROUP:

**OVERVIEW:**
- Laryngotraceobronchitis
- Common cause of upper airway obstruction in children
- Most common children < 6 years

**RISK FACTORS:**
- Late fall – early winter
- Age: 3 months to 3 years
- Boys > girls

**COMMON PATHOGENS: VIRUSES**
- Parainfluenzae virus types 1 & 3
- Influenza A & B
- Adenovirus
- Respiratory syncytial virus (RSV)
- Humanmetapneumovirus
- Coronavirus

Mycoplasma: swabs show it’s there but doesn’t contribute to croup

**COMMON SYMPTOMS (S/S):**
- Cough: seal-like barky cough
- Rhinorrhea
- Fever
- Symptoms worsen at night
- Inspiratory stridor (as worsen, also on expiratory)
- Chest wall retractions
- Xray: steeple sign (narrowing into a point/ tip)
  - Problem in children since they already have smaller airways
- Respiratory failure

**NON-PHARM MANAGEMENT:**
- Keep child calm (stress closes airways even more)
- Cold air: reduces inflammation

**PREVENTION:**
- Avoid exposure to respiratory viruses
- Handwashing
- Cover mouth when coughing

**PHARMACOTHERAPY:**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Effects</th>
<th>Effectiveness/Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corticosteroids</strong></td>
<td>Reduce:</td>
<td>• Lower doses have some effectiveness</td>
</tr>
<tr>
<td>Dexamethasone 0.6 mg/kg PO x 1 dose</td>
<td>• Intubations</td>
<td>• 0.6 mg/kg greatest effectiveness in majority of patients regardless of severity</td>
</tr>
<tr>
<td></td>
<td>• Duration of intubation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Need for re-intubation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hospital admission</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hospital length of stay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rate of return to HCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relieve sx within 2-3 hours</td>
<td></td>
</tr>
<tr>
<td>Budesonide</td>
<td>• Reduces need for intubation</td>
<td>• Effective &amp; equivalent to systemic dexamethasone</td>
</tr>
<tr>
<td>2 mg inh via nebulizer x 1 dose</td>
<td>• Reduces respiratory distress</td>
<td>• Routine use limited by cost</td>
</tr>
<tr>
<td></td>
<td>o Onset: 10 mins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Duration: 1-2 h</td>
<td></td>
</tr>
<tr>
<td>Epinephrine</td>
<td>• Tachycardia</td>
<td>• Short-term effects</td>
</tr>
<tr>
<td>5 mg inh via nebulizer</td>
<td></td>
<td>&gt; Sx management rather than txt</td>
</tr>
</tbody>
</table>
# Lecture 24

### Pertussis, Croup & Bronchiolitis

#### BRONCHIOLITIS:

**OVERVIEW:**
- Most common reason for admission to hospital for infants < 1 year old
- LOWER respiratory tract infxn
- Obstruction of small airways
  - Acute inflammation
  - Edema
  - Necrosis of epithelial cells
  - Increased mucus

**RISK FACTORS:**
- Age < 1 year
- Ex-prem (born < 35 weeks CGA)
- Congenital cardiac disease
- Chronic pulmonary disease
- Immunodeficiency
- Winter and spring
- Viral URTI

**COMMON PATHOGENS:** viruses (multiple at once)
- RSV
- Human metapneumovirus (HMPV)
- Influenza A & B
- Rhinovirus
- Adenovirus
- Parainfluenza

#### S/S:
- Viral prodrome: fever, cough, rhinorrhea
- Decreased feeding
- ↑ RR, wheeze, crackles
- Respiratory distress
  - Grunting
  - Nasal flaring
  - Indrawing
  - Retractions
  - Abdominal breathing

#### PHARMACOTHERAPY:
- Self-limiting disease: lasts > 21 days; peaks around days 8-10
- Supportive care
  - Oxygen
    - If O₂ sat < 90%
  - Epinephrine – inhaled
    - Small reduction in hospital admissions if given in ED
    - Inadequate data for routine use to change outcomes
    - Used for bronchodilation, increase cardiac output & BP
  - 3% NaCl – inhaled
    - MOA: increased mucociliary clearance & rehydration of airway
    - Variable effectiveness in studies
    - Optimal dose & duration unknown
    - No evidence for outpatient use
    - Controversial
  - Not recommended
    - Salbutamol
    - Corticosteroids
    - Antibiotics
    - Antivirals EXCEPT oseltamivir (for influenza A & B)

#### MONITORING:
- Respiratory isolation
- Continuous vital signs (RR, O₂ sat, HR, BP)
- Temperature q4h
- Lethargy, agitation
- Chest auscultation at least q4h
- Apnea monitoring if severe
- Hydration status (ins & outs)

#### PREVENTION:
- Handwashing
- Avoid exposure to others with URTI
- Breastfeeding

#### PALIVIZUMAB:
- Monoclonal antibody against RSV
- Immunoprophylaxis: passive immunity
  - Not a vaccine
  - Cost ++++
- Season changes annually
  - Nov 14, 2016 to Mar 31, 2017
- Dose: 15 mg/kg IM monthly x 3-4 doses
  - Decreased hospitalizations from RSV (NNT = 16-20)
  - No evidence that prevents mechanical ventilation or death