Croup
(Laryngo-Tracheo Bronchitis)

1. Epidemiology
   a. Incidence of complicated croup cases
      i. Hospitalizations: 1-15% of US cases (20,000 per year)
      ii. Intubations: 1-5% of cases hospitalized
   b. Boys affected more than girls by ratio of 1.4 to 1
   c. Outbreaks and epidemics occur in autumn to early winter
   d. Affects ages under 10 years (peaks at age 1-2 years)

2. Pathophysiology
   a. Subglottal infection

3. Etiology
   a. Parainfluenza virus type 1
   b. Parainfluenza virus types 3, 2
   c. Respiratory Syncytial Virus (RSV)
   d. Influenza A and Influenza B
   e. Mycoplasma pneumoniae

4. Symptoms (Gradual Onset)
   a. Fever
   b. Coryza (acute rhinitis) precedes other symptoms by several days
   c. Upper respiratory symptoms rapidly develop
      i. Hoarseness
      ii. Cough: “Barking” Or “Seal-like”
      iii. Inspiratory Stridor
   d. Symptoms worse at night

5. Signs
   a. "Sound worse than they look" (Opposite of Epiglottitis)
   b. Mild to Moderate respiratory distress
   c. Mild Wheezes

6. Labs
   a. Complete Blood Count with mild Leukocytosis

7. Radiology: Neck XRay
   a. Subglottic Narrowing
   b. "Steeple" sign on PA Neck XRay (40-50% of croup cases)
   c. Narrowing of subglottic region from mucosal edema
   d. Images
8. Differential Diagnosis (Croup is diagnosis of exclusion)
   a. Epiglottitis
   b. Bacterial tracheitis
   c. Peritonsillar Abscess
   d. Foreign-body obstruction
      i. History of choking episode (88%)
      ii. Neck XRay PA and Lateral if object is radiopaque

9. Management: Emergency Department and Inpatient
   a. Keep Patient Calm!
   b. Humidified Oxygen
      i. Use Humidified Oxygen Tent for Infants
   c. Nebulized Racemic Epinephrine
      i. Pharmacokinetics
         1. Effects last 90 to 120 minutes
      ii. Precautions
         1. Avoid too frequent use due to tachyphylaxis
         2. Observe 2-4 hours after racemic epinephrine
      iii. Dose
         1. Nebulizer mix: Racemic Epinephrine (2.25%)
            a. Child under 6 months: 0.25 ml & 2-3cc NS
            b. Child: 0.5 ml & 2-3cc NS
            c. Adolescent: 0.75 ml & 2-3cc NS
         2. Frequency of dosing
            a. Nebulized Racemic Epinephrine may be repeated in 30 minutes
            b. Monitor Heart Rate closely with repeat dosing
   d. Corticosteroids
i. Dexamethasone (Decadron)

1. Indications
   a. Moderate Croup with 2-3 awakenings on prior night

2. Contraindications
   a. Exposure to Varicella Zoster within prior 3 weeks
   b. Varicella Virus Vaccine (Varivax) in prior 2 weeks

3. Preparations
   a. Dexamethasone (Decadron)
      i. 0.6 mg/kg IM/IV/PO
      ii. Oral as effective as intramuscular
   b. Nebulized Budesonide or Dexamethasone
      i. Effective, but IM/IV/PO
      Dexamethasone (Decadron) preferred

4. Efficacy in Croup
   a. Clinical improvement
      i. Improvement onset in 6 hours
      ii. Improvement continues for 12-24 hours
   b. Decreases need for intubation by 80%
   c. Adverse Effects
      i. Increased appetite
      ii. Increased aggressiveness

   e. Antibiotics
      i. Not indicated unless concurrent bacterial infection

   f. Helium Added to Oxygen
      i. May prevent intubation in borderline patients

   g. Intubation
      i. Indicated less frequently now with above management
      ii. Significant risk of subglottic stenosis
      iii. Use ET Tube at least 1 size smaller than predicted