Viral Croup

1. Definition:
    a. Obstruction of the upper airway in the area of the larynx, infraglottic tissues, and trachea, and is due to an infectious agent.
    b. Croup syndrome refers to a group of diseases that varies in anatomic involvement and etiologic agents and includes laryngotracheitis, spasmodic croup, bacterial tracheitis, laryngotracheobronchitis, and laryngotracheobronchopneumonitis.
2. Signs and Symptoms:
    a. Hoarse voice
    b. Dry, barking cough
    c. Inspiratory stridor
    d. Variable amount of respiratory distress
    e. Rhinorrhea
    f. Pharyngitis
    g. Low grade fever
3. Causes:
    a. Parainfluenza viruses types 1, 2, and 3 are responsible for 65% of cases
    b. Influenza A and B
    c. Adenovirus
    d. Respiratory Syncytial Virus
    e. Measles
4. Epidemiology:
    a. Accounts for >15% of respiratory tract disease in pediatrics
    b. Generally occurs in children between 1 & 6 years of age, with a mean age of 18 mos
    c. Peak incidence is about 5 cases per 100 children during the 2^{nd} year of life
    d. Most cases occur during late fall and winter, can occur year round
    e. More common in boys than in girls
5. Pathogenesis:
    a. Viral infection begins in the nasopharynx and spreads to the respiratory epithelium of the larynx and trachea where it halts in laryngotracheitis (if it precedes further down the respiratory tree then it becomes laryngotracheobronchitis, etc.)
    b. Diffuse inflammation, erythema and edema develop in the tracheal walls, and the mobility of the vocal cords becomes impaired.
    c. Subglottic trachea (the narrowest part of a child's upper airway)
        i. Surrounded by firm cartilage
        ii. Swelling leads to airway narrowing and audible inspiratory stridor
        iii. Vocal cord swelling results in a hoarse voice
    d. With progression of disease, the tracheal lumen becomes further obstructed by fibrinous exudate and pseudomembranes.

    e. Spasmodic croup
        i. Subglottic trachea shows noninflammatory edema
        ii. No direct viral involvement of the tracheal epithelium, but an association with the same viruses that cause laryngotracheitis
            1. Allergic reaction to viral antigens (proposed mechanism)
6. Differential Diagnosis:
    a. Epiglottitis
    b. Foreign body aspiration
    c. Angioneurotic edema
    d. Laryngeal diphtheria
    e. Retropharyngeal or peritonsilar abscess
    f. Subglottic stenosis
    g. Infectious mononucleosis
    h. Bacterial tracheitis
    i. Paraquat poisoning
7. Diagnosis:
    a. Primarily clinical grounds
    b. Plain films of the neck
        i. Steeple sign
    c. Pulse oximetry
        i. Normal
8. Treatment:
    a. Cool mist
    b. Nebulized racemic epinephrine
    c. Corticosteroids
    d. Endotracheal intubation
    e. Helium-oxygen mixture
    f. Antibiotics
        i. Reserved for laryngotracheobronchitis or laryngotracheobroncopneumonitis with bacterial disease component