Croup

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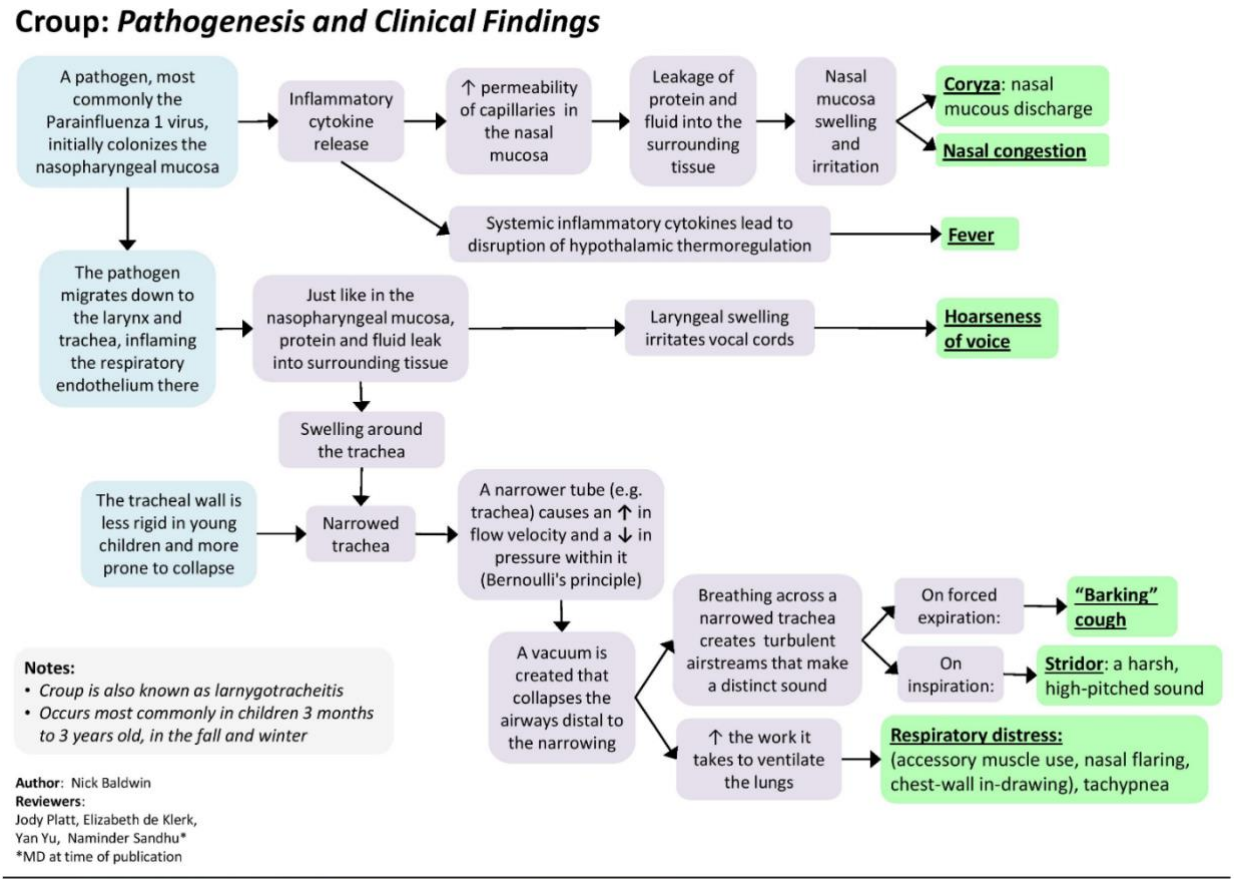
What is croup (i.e. laryngotracheitis)?

- A clinical syndrome classified by rapid onset of upper airway symptoms including
  - Barking cough
  - Inspiratory stridor
  - Hoarseness
- May be associated with other viral symptoms
- Occurs in those aged 6 months – 5 years (peak **2 years**)
  - As the airways increase in size, croup is no longer possible as the amount of airway inflammation is insufficient to cause obstruction

Pathophysiology

- Viral infection -> inflammation and soft tissue edema -> narrowing of subglottic regions -> patient upper airway obstruction
- Occurs most often in the fall and winter during parainfluenza, RSV, and influenza season



https://calgaryguide.ucalgary.ca/croup-pathogenesis-and-clinical-findings/

Identify and Treat Respiratory Distress

Signs of severe croup

- Stridor at rest (often biphasic on inspiration and expiration)
- Moderate to severe indrawing
- Persistent agitation/distress

Treatment of severe croup

1. Minimize agitation to minimize the work of breathing
2. Give O2 if cyanotic or low O2 sats -> passive blow-by oxygen
3. Nebulized epinephrine at 5mL of 1mg/ml (1:1000) or racemic (2.25%) at 0.5mL in2.5mL of NS (reserved for severe croup)
4. Dexamethasone 0.6mg/kg up to 10mg PO (or IM/IV if patient cannot tolerate PO)
5. Observe for 2 hours for severe croup. If stridor recurs, repeat nebulized epinephrine and send to PICU

Signs of impending respiratory failure

- Stridor at rest which may now be quiet or decreased
- Decreasing WOB indicating fatigue
- Lethargy or decreased level of consciousness
- Supplemental oxygen needed to maintain O2 saturations > 92%
- Dusky or poor perfusion

Treatment of respiratory failure

1. Intubation
2. To PICU

Treatment of mild to moderate croup

Mild croup: barky cough, hoarseness, or inspiratory stridor WITHOUT stridor at rest and NO indrawing at rest

Moderate croup: inspiratory stridor at rest, indrawing at rest, but no agitation or distress

1. 0.6mg/kg up to 10 mg of dexamethasone PO
    a. Should improve symptoms within 2 hours and last 24 hours thereby decreasing the rate of return to hospital and allowing shorter hospital stays for those admitted
2. Moderate croup requires 4 hours of observation
3. Mild croup does not require observation

Differentiating the Severity of Croup

Feature	Mild	Moderate	Severe	Impending respiratory failure
Barky cough	Occasional	Frequent	Frequent	Often not prominent due to fatigue
Stridor	None or minimal at rest	Easily audible at rest	Prominent inspiratory and occasionally expiratory	Audible at rest, but may be quiet or hard to hear
In-drawing suprasternal and/or intercostal	None to mild	Visible at rest	Marked or severe	May not be marked
Distress, agitation or lethargy (CNS hypoxia)	None	None to limited	Substantial lethargy may be present	Lethargy or decreased level of consciousness
Cyanosis	None	None	None	Dusky or cyanotic without supplemental oxygen

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Rule out other serious diagnoses before diagnosing croup

Diagnosis	Red flags
Croup	- Sudden onset and rapid progression of symptoms, often less than 12 hours - A previous episode of croup - Underlying abnormality of the upper airway - Medical conditions that predispose to respiratory failure (eg, neuromuscular disorders) - Fever - Barky, seal-like cough - Hoarseness may be present in croup, but is not a typical finding in epiglottitis or foreign body aspiration
Anaphylaxis	- Respiratory symptoms with another organ involvement i.e. GI symptoms, rash, or hypotension **especially after exposure to a potential or known allergen**
Foreign body	- Developmental age - Witnessed ingestion - Rapid onset of symptoms - Unequal air entry on auscultation and x-ray
Retropharyngeal abscess	- Decreased neck ROM - Fever - Cellulitis - Seen on neck x-ray
Epiglottitis	- Unvaccinated - Fever - Pain "D's" - Dysphagia - Drooling - Dysphonia - Dyspnea Thumb sign on neck x-ray
Bacterial tracheitis	- Fever - Neck x-ray

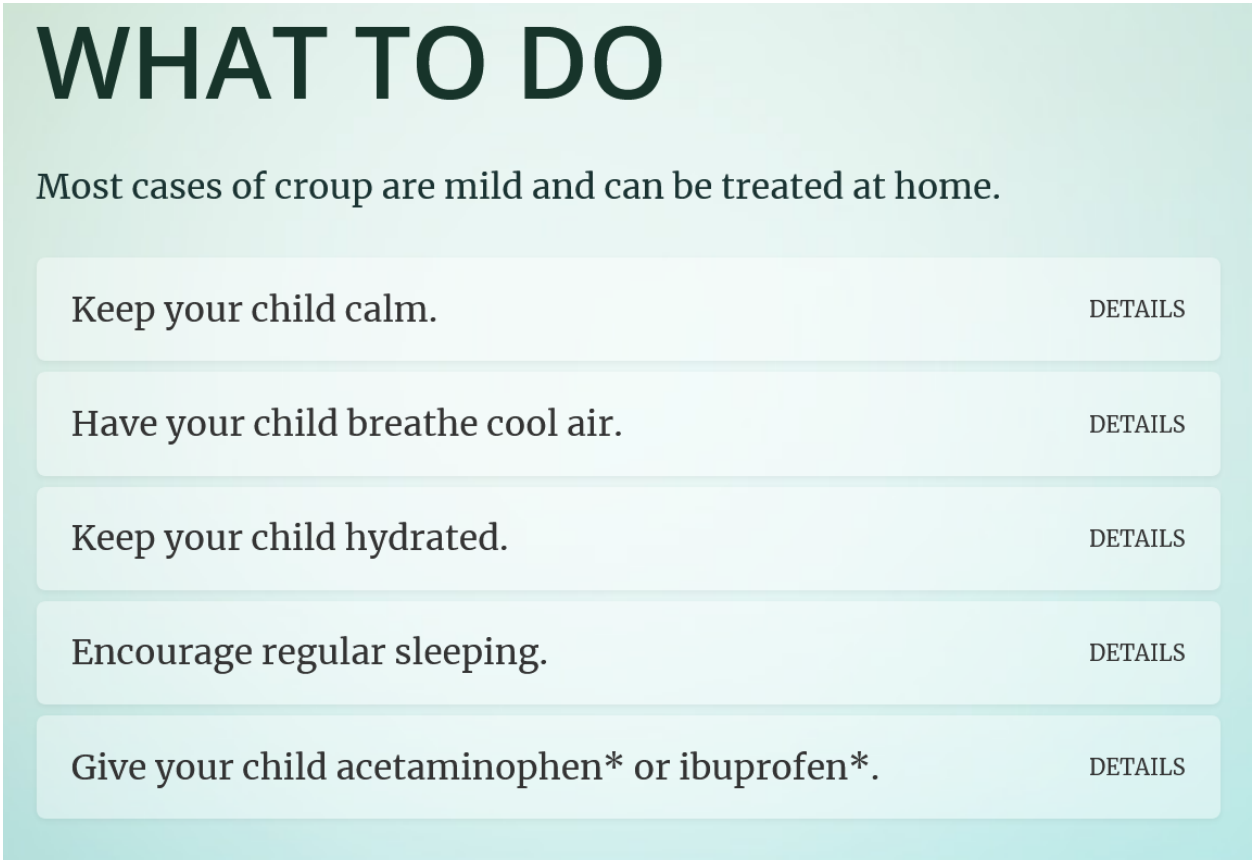
Always ask about vaccination status, sick contacts, daycare, and the circumstances around the illness

Upper vs Lower Respiratory Involvement on Exam

Upper Airway	Lower Airway
- Adventitious sounds on auscultation not heard over lungs - Inspiratory stridor	- May hear crackles or wheeze - No stridor

Educating the Parents

1. Explain that it is a viral infection (i.e. RSV, influenza, parainfluenza), so antibiotics won't help
2. It may occur again
3. The steroid will last 24-48 hours and the symptoms may come back
4. Reasons to return to the ED
    a. Stridor at rest
    b. Increased work of breathing
    c. Lethargic or cyanotic
    d. Dysphagia
    e. Decreased urination
    f. Worsening cough
    g. Drooling
    h. Fever
5. Follow up with GP in 24-48 hours to ensure resolution of symptoms
6. Seek care if symptoms persist >5 days



http://croup.trekk.ca/

Resources

1. TREKK croup: http://croup.trekk.ca/
2. CPS statement: https://www.cps.ca/en/documents/position/acute-management-of-croup
3. Calgary Guide: https://calgaryguide.ucalgary.ca/croup-pathogenesis-and-clinical-findings/