Practice Guideline
Croup

Inclusion Criteria:
- Child 6 mos-6 years
- Barky cough
- Stridor

Exclusion Criteria:
- Recent airway procedure or intubation
- Concern for foreign body aspiration
- History of: prolonged intubation, tracheomalacia, laryngomalacia, vascular sling, tracheo-esophageal fistula, airway abnormality, congenital heart disease, chronic lung disease, immunocompromised

Not routinely recommended:
- Chest/neck x-ray
- Antibiotics
- Viral studies

***Medication Dosing:**
- **Dexamethasone** 0.6 mg/kg (max 10mg) PO/IM/IV (crushed tabs or IV solution can be given PO)
- **Nebulized epinephrine** 2.25%
  - < 5kg: 0.25 mL
  - ≥ 5 kg: 0.5 mL

Child 6 mos-6 years presents with barky cough and/or stridor

Initial triage:
- Toxic-appearing
- Altered mental status
- Excessive drooling
- Impending respiratory failure
- Life-threatening airway obstruction
- Cynanosis/Hypoxia (O2 sat < 90%)

Yes → **Exit Guideline**
- Assess and stabilize ABCs
- Initiate ALS / PICU transport to higher level of care

No → Perform History and Physical Exam

Mild Croup
Barky cough with any of the following:
- Barky cough alone
- Hoarse voice, no stridor
- Mild coarse stridor with no increased work of breathing
- Stridor **only** when agitated

→ **Dexamethasone PO***

→ **Consider discharge if following criteria met:**
- **IF** given **Racemic Epi neb**, and observed for **2-3 hrs** with no return of symptoms
- No retractions, increased work of breathing, stridor at rest
- Tolerating PO intake

Moderate Croup
***Stridor at rest** with any of the following:*
- Moderate retractions
- Anxious
- Decreased air entry
- Moderate tachypnea

→ **Dexamethasone PO***
Nebulized Racemic Epi*

→ **Clinically improved**?**

Complete improvement → Consider discharge if following criteria met (see above)

NO or partial improvement →
- **Repeat nebulized Racemic Epi** in 15-20 mins and consider cardiac monitoring
- Consider **Alternate Diagnoses#**

→ Arrange for inpatient admission—if not available transfer via **ALS**

Severe Croup
***Stridor at rest** with any of the following:*
- O2 sat 90-95%
- Severe retractions
- Severe tachypnea
- Markedly decreased air entry
- Grunting, head bobbing, see-saw breathing

→ **Dexamethasone IM***
Nebulized Racemic Epi*
- Supplemental O2 as needed
- IV/IO access-NPO

→ **Severe croup clinically improved**?**

Complete improvement → Consider discharge if following criteria met (see above)

NO or partial improvement →
- **Repeat Racemic Epi**
- Strongly consider **Alternate Diagnoses#**
- Consider intubation
- Arrange for PICU admit or transfer via **EMS**

****Clinically improved**: Resolution of stridor, retractions, and tachypnea. Normal air entry

#Alternate Diagoses: Bacterial tracheitis, Epiglottitis, Foreign body aspiration, Retro-pharyngeal or Para-pharyngeal abscess, Pneumonia, Bronchiolitis, Chemical inhalation

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Introduction/Pathophysiology

Laryngotracheitis (classically referred to as croup) is an inflammatory process of the upper airway (larynx and trachea). It is most commonly caused by a viral infection, most typically parainfluenza virus. It is most commonly seen in children 6-36 months of age, rarely over 6 years of age and is most common in the fall/winter season.

Signs and Symptoms

The following are commons signs and symptoms seen in croup:

- Congestion, nasal irritation
- Coryza
- Barky cough (typically lasts up to 3 days)
- Hoarse voice
- Stridor at rest or increased with agitation
- Fever

The following are **NOT** commonly seen in croup and other diagnoses should be considered:

- Hypotension
- Excessive drooling/inability to control secretions
- Toxic appearing
- Purulent secretions
- Throat pain
- Muffled voice
- Neck mass/swelling
- Rarely, hypoxia/cyanosis

Diagnosis

The diagnosis of croup is primarily a clinical diagnosis. Radiographs and laboratory testing are generally not indicated unless: 1) The course is atypical such as not responding promptly to treatment or recurrent croup or 2) the presentation has atypical features, such as those symptoms listed above including toxic appearance, cyanosis and neck mass.

Differential diagnosis includes Bacterial Tracheitis, Epiglottitis, Foreign Body Aspiration, Retropharyngeal or Parapharyngeal Abscess, Pneumonia, Bronchiolitis, Chemical Inhalation.

Treatment

- **Dexamethasone -** Indicated in all cases of croup. It should be given in the least invasive way possible, preferably PO when possible. Dosing is 0.6 mg/kg with a max dose of 10mg. If you do not have the liquid form available, you can also give crushed tabs or the IV solution by mouth.

- **Nebulized Racemic Epinephrine 2.25% -** Indicated in moderate to severe croup associated with respiratory distress, increased work of breathing and stridor at rest. Recommended dosing is 0.25 mL for <5Kg and 0.5 mL of ≥5kg.

- Recurrent croup may require further outpatient workup (for tracheomalacia, laryngomalacia, vascular sling, tracheo-esophageal fistula, etc.)

Croup Quality Measures

- Rate of antibiotic prescriptions or delivery in ED
- Rate of x-ray use
- Rate of viral testing
- Transfer rate
- Rate of ED return visit < 48 hrs

Acknowledgements

Boston Children's Croup EBG (Weiner et al.), Seattle Croup Clinical Pathway (Enriquez et al.), CHOP Clinical Pathway (Piccione et al.)

References

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3. Russell KF, et al. Glucocorticoids for croup. Cochrane Database Syst Rev 2011; CD001955
4. Bjornson C, et al. Nebulized epinephrine for croup in children. Cochrane Database Syst Rev 2013; 10:CD006619