

B04: Croup and Epiglottitis

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Updated: May 01, 2025

Reviewed: December 19, 2023

Introduction

Croup and epiglottitis are infectious inflammations of the upper airway. Although adults and children can develop swelling in their upper airways as a result of illness, this inflammation is significantly more pronounced in children because of their inherently smaller airways. Both croup and epiglottitis are serious medical emergencies that require early identification and intervention.

Essentials

- Epiglottitis in children is typically of abrupt onset and is associated with the 'three Ds': drooling; dysphagia; and distressed breathing. Coughing is rare. Classically, children adopt a tripod position and are reluctant to lie down. Adults may complain only of a severe sore throat, fever, and muffled voice. **Do not** attempt to visualize the oropharynx in these cases, unless necessary to control the airway in severely decompensated patients. Because out-of-hospital treatment options are so limited, urgent conveyance to an appropriate facility is of high importance. Do not place these patients in a supine position as doing so may cause respiratory arrest.
- The onset of croup is slower and is generally associated with a prodromal history of viral symptoms (e.g., fever, cough, nasal congestion, etc). The barking or seal-like cough, with or without inspiratory stridor, is the hallmark of croup. Treatment of croup should be initiated regardless of the degree of stridor, as the inflammation can extend throughout the entire respiratory tract (a condition known as laryngotracheobronchitis).
- An effective treatment for croup in the out-of-hospital setting is nebulized epinephrine. Children who exhibit stridor while at rest should be treated with nebulized epinephrine regardless of whether they demonstrate retractions, agitation, lethargy, or cyanosis. Nebulized epinephrine is not indicated for epiglottitis. [Westley Croup Score](#)
- Croup is most prevalent in children between six months and three years of age and is uncommon in those over six years old.
- Paramedics and EMRs/FRs should be aware of the possibility of other causes of upper airway obstruction, including foreign bodies, trauma, and inhalation injuries.

Additional Treatment Information

- Because the inflammation of croup can extend throughout the respiratory tract, compromising ventilation and oxygenation, paramedics and EMRs/FRs must be aware of the potential for sudden deterioration. An early warning sign of deterioration is a fall in oxygen saturation, though supplemental oxygen can artificially prop up SpO₂ limiting the usefulness of this tool. Patients with croup should not be kept on oxygen except as necessary to provide nebulized epinephrine therapy and should be monitored closely for other signs of increasing respiratory distress.
- Although cold or hot humid air can sometimes provide a temporary relief of symptoms for croup, these should not be considered definitive treatments.

General Information

- Epiglottitis is a cellulitis of the epiglottis and surrounding structures caused either by a bacteremia or direct invasion by pathogenic organisms. Bacteria, viruses, and fungi have all been implicated in infectious epiglottitis, though similar symptoms can be seen in cases of trauma, inhalational injury, and airway burns. Although the disease was once commonly seen in children (again, because of the significant differences in airway size), epiglottitis has become comparatively rare due to routine immunization against *Haemophilus influenzae* type B (Hib) as part of routine childhood vaccinations. Risk factors for the development of epiglottitis, in both children and adults, include non-compliance with recommended immunization schedules and immune deficiencies.
- As a general rule, croup is caused by a viral infection and thus, often presents with a history of viral symptoms (e.g., nasal congestion, cough, sore throat, fever). It is important to remember that although the primary

manifestation of croup is upper airway stridor, the entirety of the respiratory tract can be inflamed (laryngotracheobronchitis).

- In both croup and epiglottitis, the tissues of the upper airway can act as a one-way valve, allowing exhalation while restricting inspiration. The prolonged inspiratory time can be a helpful tool to differentiate between upper and lower airway inflammation. If mechanical ventilation becomes necessary, higher airway pressures may be necessary to overcome this phenomenon.

Interventions

First Responder

- Provide reassurance and a calming environment
- Keep the patient warm and protect from further heat loss
- Place the patient in a position of comfort, as permitted by clinical condition. In general, limit patient movement
- Provide supplemental oxygen where indicated
 - → [A07: Oxygen Administration](#)
- Conduct ongoing assessment and gather collateral information, such as medications and identification documents
- Establish ingress and egress routes from the patient's location
- Communicate patient deterioration to follow-on responders

Emergency Medical Responder – All FR interventions, plus:

- Monitor oxygen saturation and provide supplemental oxygen to maintain an SpO₂ ≥ 94%
 - → [A07: Oxygen Administration](#)
- Convey early
- Consider intercept with additional resources

Primary Care Paramedic – All FR and EMR interventions, plus:

- For croup: [EPINEPHrine](#) via nebulizer over 15 minutes
 - [CinCall consultation recommended](#) to discuss care planning options.
 - ☐ **Requires completion of PCP scope expansion education:**
 - Consider [dexamethasone](#) PO, IM IV, IO for significant stridor without marked improvement from inhaled EPINEPHrine
 - [CinCall consultation required](#) prior to administration of dexamethasone

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Consider need for invasive airway management in severely decompensated patients. Intubation should be reserved for patients in extremis; difficulty should be predicted in these cases.
 - [CinCall consultation required](#) prior to attempting intubation for patients with perfusing rhythms who are breathing spontaneously.
- Consider need for antipyresis
 - [Acetaminophen](#)

Algorithm

Westley Croup Severity Score

| Clinical Feature | Assigned Score |
|------------------------|---|
| Level of consciousness | Normal, including sleep = 0 Disoriented = 5 |
| Cyanosis | None = 0 With agitation = 4 At rest = 5 |
| Stridor | None = 0 With agitation = 1 At rest = 2 |
| Air entry | Normal = 0 Decreased = 1 Markedly decreased = 2 |
| Retractions | None = 0 Mild = 1 Moderate = 2 Severe = 3 |

| Score | Severity | Description | Management |
|---------|-------------------------------|---|--|
| ≤ 2 | Mild | <ul style="list-style-type: none"> Occasional barking cough No stridor at rest Mild or no retractions | <ul style="list-style-type: none"> Home treatment (antipyretic, fluids, mist) Outpatient: Single dose PO dexamethasone |
| 3 to 7 | Moderate | <ul style="list-style-type: none"> Frequent barking cough Stridor at rest Mild to moderate retractions No or little distress or agitation | <ul style="list-style-type: none"> Single dose PO dexamethasone Nebulized epinephrine Hospitalization not generally needed |
| 8 to 11 | Severe | <ul style="list-style-type: none"> Frequent barking cough Stridor at rest Marked retractions significant distress and agitation | <ul style="list-style-type: none"> Single dose PO/IM/IV dexamethasone Repeated doses of nebulized epinephrine prn Inpatient admission usually required Improved after corticosteroid and nebulized epinephrine |
| ≥ 12 | Impending respiratory failure | <ul style="list-style-type: none"> Depressed level of consciousness Stridor at rest Severe retractions Poor air entry Cyanosis or pallor | <ul style="list-style-type: none"> Single dose PO/IM/IV dexamethasone Repeated doses of nebulized epinephrine prn ICU admission usually required May require intubation |

Evidence Based Practice

Pediatric Stridor

Supportive

- [Epinephrine-Nebulized](#)
- [Oxygen-Humidified](#)
- [Steroids-Oral](#)

Neutral

Against

Practice Updates

- 2023-09-29: added dexamethasone to PCP interventions
- 2023-12-19: removed COVID-related restrictions

