

Croup (Laryngotracheobronchitis) in Children

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Received: October 04, 2016; **Published:** October 24, 2016

Croup is a common viral disease in children. It is caused by inflammation of upper respiratory tract (larynx, trachea, and sometimes bronchi). The word croup is derived from Anglo-Saxon word 'Kropan' meaning 'to cry aloud'.

Epidemiology

It mostly affects children aged 6 months to 3 years, with a peak incidence during second year of life. Boys were 1.43 times more likely to develop croup than girls [1]. Croup accounts for 15% of all emergencies admissions in United States [2] and 2.3% of emergencies presentation in Australia and New Zealand [3,4]. Although croup is usually a mild and self-limited illness, significant upper airway obstruction, respiratory distress and rarely, death can occur [4]. The incidence of croup increases during fall season [5].

Causes

Pathogens commonly involved are Para influenza type 1 (58%), type 2 (60%), type 3 (29%), Respiratory Syncytial virus, Influenza virus, Adenovirus and Mycoplasma Pneumoniae. Para Influenza virus is most common organism in all ages. RSV is more likely to cause croup in children less than 5 years of age whereas Influenza and Mycoplasma Pneumoniae are more common in children above 5 years [6].

Children at increased risk of severe croup:

Children with upper airway abnormalities are more likely to develop severe croup. Children with following disease are at an increased risk of severe croup:

- Preterm
- Previously intubated
- Laryngomalacia
- Tracheomalacia
- Vascular ring
- Down's syndrome

History

Typical croup develops over a few days after coryzal illness (rhinorrhea, sore throat, cough). Fever is typically low grade. This is usually followed by stridor, barking cough and respiratory distress. Symptoms of airway obstruction are usually worse at night. Symptoms usually resolve in 48 hrs but may persist for a week [7,8].

Viruses cause inflammation, hyperemia and edema of larynx leading to subglottic narrowing [9].

Assessment

Assessment of croup's severity is important for its management. Westley croup score is widely used for assessing croup severity [10].

Inspiratory Stridor	Chest Retractions	Air Entry	Cyanosis	Level of Consciousness
0 none	0 none	0 normal	0 none	0 normal, including sleep
1 when agitated	1 mild	1 decreased	4 when agitated	5 disoriented
2 At rest	2 moderate	2 markedly decreased	5 at rest	
	3 severe			

A score of 0-1 – mild croup

A score of 2-7 – moderate croup

A score of 8 or more – severe croup

A sum of > 12 – impending respiratory failure

Another clinically useful scoring system has been developed by Alberta Clinical Practice Guideline Working Group [11]. When performing clinical assessment, following clinical features are considered to grade severity.

Mild	Moderate	Severe	Impending Respiratory Failure
<ul style="list-style-type: none"> - Occasionally barking cough - No stridor at rest - No or mild supra-sternal or intercostals recessions. 	<ul style="list-style-type: none"> - Frequent barking cough - Easily audible stridor at rest - Suprasternal and sternal wall retractions with minimal agitation. 	<ul style="list-style-type: none"> - Frequent barking cough - Prominent inspiratory stridor - Marked sternal wall retractions. - Significant agitation and distress 	<ul style="list-style-type: none"> - Barking cough - Audible stridor at rest - Lethargy or decreased level of consciousness - cyanosis

Croup is primarily a clinical diagnosis. Lab investigations are rarely useful in diagnosing croup.

- CBC is nonspecific.
- Pulse oximetry can be done to assess severity.
- Nasal washing to identify virus.
- Bronchoscopy for recurrent croup.
- Chest X-ray shows subglottic narrowing (STEEPLE SIGN), whereas lateral neck view may reveal distended hypo pharynx (ballooning) during inspiration.

Management

Child with croup should be handled with care as agitation may worsen croup [5]. Ideal management of croup involves relief of airway obstruction and reduction of inflammation. Since it is a viral disease, antibiotics are not indicated. Corticosteroids and nebulized epinephrine are the mainstay of treatment for croup [12]. Mild cases of croup can be managed at home.

Corticosteroids: Corticosteroids act through their anti-inflammatory action. It takes 30 minutes for steroids to decrease respiratory distress [13]. Dexamethasone is most commonly used corticosteroid. Studies have demonstrated dexamethasone at doses between 0.15 to 0.6 mg/kg/dose to be equivocal [14]. Commonly used alternative to dexamethasone is prednisolone (at a dose of 1 mg/kg/dose). Steroids may be given via oral, IM or IV route.

Nebulized Adrenaline: Adrenaline through its B-2 action causes bronchodilation. It also reduces bronchial and tracheal vascular permeability and hence, reduces airway edema. The recommended dose for adrenaline is independent of age and weight (5 ml of undiluted 1:1000 adrenaline nebulizer with oxygen) [15]. Adrenaline has a rapid onset of action with an improvement in croup scores within 30 minutes [16].

Other Treatments:

- Supplemental oxygen in children with significant desaturation (SPO₂ < 93%).
- Nebulized budesonide (2 mg /dose).
- Heliox treatment

In short, croup is a significant medical problem. Adequate clinical assessment of severity with prompt management may reduce morbidity and mortality in children.

Bibliography

1. Floyd W. Denny, *et al.* "Croup: An 11-Year Study in a Pediatric Practice". *Pediatrics Journal of American Academy of Pediatrics* 71.6 (1983): 871-876.
2. Cherry JD. "Clinical Practice". *Croup New England Journal of Medicine* 358.4 (2008): 384-391
3. Acworth J., *et al.* "Patterns of presentations to the Australian and New Zealand pediatric emergency research network". *Emergency Medicine Australasia* 21.1 (2009): 59-66.
4. Segal AO., *et al.* "croup hospitalizations in Ontario: A14 time series analysis". *Pediatrics* 116.1 (2005): 51-55.
5. Bjornson CL and Johnson DW. "Croup". *Lancet* 371.9609 (2008): 329-339.
6. Larry K. Pickering. "Red Book:2003 report of committee on Infectious disease 26th Ed". American Academy of Pediatrics (2003): 479-481.
7. Skolnik NS. "Treatment of Croup: a critical review". *American Journal of Disease of children* 143.9 (1989): 1045-1049.
8. Johnson DW and Williamson J. "Croup: a duration of symptoms and impact on family functioning". *Pediatric Research* 49:83A (2001).
9. Cherry JD and Feign RD. "Textbook of pediatric infectious diseases 3rd ed". Philadelphia (USA),WB Saunders company (2006).
10. Westley CR., *et al.* "Nebulized racemic epinephrine by IPPB for the treatment of croup: a double blind study". *American journal of diseases of children* 132.5 (1978): 484-487.
11. [Guideline] Alberta Medical Association Guideline for the diagnosis and management of croup. Alberta Clinical Practice Guideline 2005 update.
12. Klasson TP, *et al.* "Nebulized budesonide and oral dexamethasone for treatment of croup". *Journal of the American Medical Association* 279.20 (1998): 1629-1632.

13. Geelhoed GC and Macdonald WB. "Oral dexamethasone in the treatment of croup: 0.15 mg/kg versus 0.3mg/kg versus 0.6 mg/kg". *Pediatrics Pulmonology* 20.6 (1995): 362-368.
14. Sparrow A and Geelhoed G. "Prednisolone vs. dexamethasone in croup: A randomized equivalence trial". *Archives of disease in childhood* 91.7 (2006): 580-583.
15. Therapeutic Guidelines Ltd. Croup(internet). Therapeutic Guidelines website (2009).
16. Corneli H., Bolte R. "Outpatient use of racemic epinephrine in croup". *American Family Physician* 46.3 (1992): 683-684.

Volume 2 Issue 4 October 2016

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