

CROUP

Introduction

Croup is a common illness that manifests most commonly with barking cough, hoarse voice, inspiratory stridor, and varying degrees of respiratory distress. Croup syndrome refers to any number of diseases that vary based on anatomic location of involvement. The most common of these is acute laryngotracheitis, involving the larynx, subglottic tissues and trachea. Cases can extend to laryngotracheobronchitis (LTB) or laryngotracheobronchopneumonitis (LTBP).

Epidemiology:

- accounts for 15% of respiratory illness in pediatrics
- average incidence in <6yo of 3%, with 1.5-31% of these getting admitted
- average age for viral croup is 1-6yo, with a mean of 18mo, peak in 2nd year
- multiple studies in N. America have demonstrated peaks in October of odd numbered years

Etiology:

- 65-75% of cases are due to Parainfluenza (types 1,2,3)
- most severe cases are due to Influenza A
- Also seen with RSV, Adenovirus, Measles
- LTB and LTBP are more often caused by bacterial infection (*S. aureus*, *S. pyogenes*, *S. pneumoniae*)

Pathogenesis:

- Nasopharynx involvement spreads down respiratory tree with varying degrees
- Causes inflammation of tracheal walls, limiting vocal cord movement
- Subglottic area is already most narrow part of pediatric upper airway, and now the resultant edema narrows this further
- Disease progression results in obstruction by exudates and pseudomembranes

Clinical Presentation

Acute laryngotracheitis:

- Upper respiratory symptoms (rhinorrhea, pharyngitis, low-grade fever, cough)
- After 12-24 hours, patient develops a barking cough, possibly stridor
- The majority of cases have only hoarse voice and cough

Acute laryngotracheobronitis/pneumonitis:

- initially the same symptoms as acute tracheitis
- after 5-7 days, symptoms suddenly worsen with high fever and increased WOB

Differential diagnosis includes foreign body, trauma, angioneurotic edema, retropharyngeal or peritonsillar abscess, bacterial tracheitis, AND EPIGLOTTITIS!

Laboratory Work-up

Laboratory work-up is minimally useful:

- Anterior CXR may show subglottic narrowing ("steeple sign"), although this can be seen in healthy children depending on phase of respiration
- CBC may show elevated wbc with left shift, though nonspecific
- NP aspirates will not affect management decisions, only cohorting

Treatment

Treatment is dependent upon severity of disease. Mild, moderate, severe disease can be defined as follows:

- MILD: barking cough, no/intermittent stridor at rest, happy, playful
- MODERATE: stridor at rest, tracheal tug/chest wall retraction, can be placated
- SEVERE: stridor at rest, severe tracheal tug/chest wall retraction, apathetic/restless

Epinephrine:

- Proven effective for moderate to severe croup
- Racemic nebulized epinephrine stimulates alpha-adrenergic receptors for capillary constriction and thus fluid resorption leading to decreased laryngeal mucosal edema
- Effects last approximately 2 hours, resulting in potential Rebound Effect (in ER will monitor for four hours prior to discharge)

Corticosteroids:

- Recommended in moderate to severe croup
- Oral, nebulised, intramuscular, and intravenous steroids all proven effective over placebo (at 6,12, and 24 hours)
- In mild croup, one study has shown a single dose of dexamethasone has reduced number of patients requiring subsequent care in 7-10days
- Dexamethasone orally dosed from 0.15-0.6mg/kg are effective; most use 0.15-0.3mg/kg

Heliox:

- Two small studies available regarding heliox in moderate croup:
 - One showed no difference between heliox and oxygen
 - One showed no difference between heliox and racemic epinephrine

Mist treatment:

- The standard of home treatment since the 19th century
- No adequate studies have ever proven the efficacy of mist treatment
- Presumed mechanism through moisture and soothing inflamed airways; cool equal to warm mist
- Mist therapy can be detrimental in croup with wheeze as it induces bronchospasm

Discharge Criteria

From the ER and the inpatient service, the goal of discharge is very similar:

No stridor at rest, not requiring racemic epinephrine (at least four hours), normal respiratory effort, good parental education and comfort

References

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