Croup

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OBJECTIVES:
1. Provide criteria for accurate diagnosis
2. Provide criteria for assessment of severity
3. Provide criteria for transfer to emergency care
4. Outline appropriate therapies
5. Reduce unnecessary laboratory testing, radiography, and hospitalization
6. Prevent return visits for croup and decrease overall costs

SUMMARY:
1. *Patient with mild to moderate croup symptoms should be treated with one dose of 0.6 mg/kg* of oral dexamethasone*
2. *Patients with moderate or severe croup symptoms should all receive one 0.6 mg/kg dose of oral dexamethasone and be transferred to an emergency care setting for further management*

**At provider discretion, may use 0.15-0.30 mg/kg dosing for mild cases*

Croup

1. **Inclusion Criteria**
    a. Previously healthy
    b. 6 months to 6 years of age

2. **Exclusion Criteria**
    a. Symptoms suggestive of other diagnosis (expiratory wheeze, drooling or difficulty swallowing, prolonged or recurrent stridor, poor response to treatment)
    b. Known upper airway abnormality (laryngomalacia, tracheomalacia, history of vascular ring/sling or tracheoesophageal fistula)
    c. Hypotonia or neuromuscular disorder (trisomy 21)

3. **Assessment**
    a. **Definition**: Acute viral infection that results in inflammation and swelling of the upper airway (also called laryngotracheobronchitis)
        i. Most common etiologies: Parainfluenza, RSV, influenza A and B, mycoplasma pneumoniae, other respiratory viruses
    b. **Diagnosis**: Croup is a clinical diagnosis made in the setting of acute onset of barky cough with or without inspiratory stridor, hoarse voice, and/or respiratory distress.
        i. May have a fever
        ii. May be abrupt in onset or preceded by mild URI symptoms
        iii. Symptoms are usually worse at night
    c. **Diagnostic testing**
        i. Perform pulse oximetry and obtain vital signs
        ii. Do not routinely obtain a chest radiograph
        iii. Do not routinely use viral testing
    d. **Assess severity**
        i. Mild to moderate croup
            1. Occasional barky cough
            2. No audible stridor at rest OR stridor at rest with no signs of distress
            3. No or mild suprasternal and/or chest wall retractions
            4. Child is happy and prepared to eat, drink and play
        ii. Moderate to severe croup
            1. Stridor at rest AND one or more of the following:
                a. Prominent sternal wall retractions
                b. Tachypnea
                c. Agitation/restlessness/tired appearing
                d. Difficulty with talking or feeding

Croup

4. **Disposition**
    a. **Outpatient management recommended for**:
        i. Patients with mild to moderate croup
    b. **Indications for transfer to emergency department**:
        i. Moderate to severe croup
        ii. Hypoxemia (oxygen saturation <92%)
        iii. Presence of co-morbid conditions
        iv. Failure to respond to therapy

5. **Management**
    a. **Mild to moderate Croup**
        i. Administration of single dose of oral dexamethasone (0.15-0.6 mg/kg, round dose to nearest 2 mg dosage, maximum dose of 16 mg)[1],[2]
        ii. No observation required prior to discharge
        iii. There is no evidence for administering a second dose of oral dexamethasone
    b. **Moderate to severe croup**
        i. Arrange EMS transfer to local ED
        ii. Make the child as comfortable as possible – often by sitting in the lap of parent
        iii. Avoid agitation with unnecessary procedures
        iv. Administer oral dexamethasone (0.6 mg/kg, round dose to nearest 2 mg dosage, maximum dose of 16 mg)
        v. Consider administration of nebulized racemic epinephrine 2.25% (0.5 ml in 2.5 ml saline) prior to transfer if available

6. **Disposition**
    a. **Discharge to home**
        i. Patient must meet the following discharge criteria:
            1. Minimal stridor at rest (stridor with activity to be expected)
            2. Minimal retractions
            3. Able to talk or feed without difficulty
        ii. If discharge criteria are met, provide verbal and written education materials for parents/caregivers
        iii. Do not give additional steroids at discharge

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[1] Some authors advocate for asking about immune deficiency or recent exposure to varicella prior to giving steroids

[2] The majority of evidence exists for doses of 0.6 mg/kg. However, multiple smaller studies suggest that doses of 0.15 mg/kg or 0.3 mg/kg may be as effective as 0.6 mg/kg, but there is no clear consensus at this time. Providers should use their discretion when dosing dexamethasone (8).

iv. As always, consider family's ability to return for appropriate follow up, or seek/access emergency care
v. No specific follow-up is needed unless patient exhibits prolonged stridor (symptoms >7 days)

b. **Transfer to emergency department if:**
   i. Patient meets initial criteria for indications for transfer to emergency department at any time

7. Other Considerations

a. If children are toxic appearing with high fever, and/or poor response to epinephrine, consider bacterial tracheitis
b. If children have sudden onset of high fever, absence of barky cough, dysphagia, drooling, appear anxious and are sitting forward in the "sniffing position", consider epiglottitis and obtain a chest x-ray.