# Croup

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Approved by: UHSussex Medicines Governance Committee Feb 2022
Publication date: February 2022. Version 2
Review date: February 2024

* Click here to go straight to management pathway on page 3 *

**Background**

- Laryngotracheobronchitis – **viral** inflammation of the upper airways
- 6 months to 6 years old
- worse at night - peaks night two or three of illness

Risk Factors for severe croup:

- Pre-existing narrowing of upper airways
- Subglottic stenosis (congenital or secondary to prolonged neonatal ventilation)
- Down Syndrome
- Chronic lung disease, congenital heart disease, neuromuscular disorders, immunodeficiency
- Previous admissions with severe croup

**Differential diagnoses: see table at end of guideline**

## Assessment

**History and Examination**

- Sudden onset of a seal-like barking cough
  - Often accompanied by stridor / voice hoarseness / respiratory distress with increased work of breathing
- May have fever although should not appear septic/toxic
- Can have associated widespread wheeze due to lower airway swelling

| Severity | Mild | Moderate | Severe |
|---|---|---|---|
| **C**yanosis / oxygen requirement | None | With agitation | At rest (late sign) |
| **A**ir Entry | Normal | Decreased | Markedly decreased |
| **R**espiratory Distress: tracheal tug inter/subcostal recession | None or minimal | Moderate +Nasal flaring +Tracheal tug | Severe +Nasal flaring +Tracheal tug |
| **L**evel of consciousness and activity | Normal | Some intermittent irritability | Increasing irritability +/- lethargy |
| **S**tridor | Minimal or with Agitation | Some present at rest | Present at rest |

**Management – see pathway on next page**

<table>
<tr><th>Severity</th><th>Mild</th><th>Moderate</th><th>Severe</th></tr>
<tr><td>Approach</td><td colspan="3">Leave child in comfortable position. Limit examination, nurse with parents.<br>Avoid upsetting the child – do not try to examine pharynx</td></tr>
<tr><td rowspan="4">Medication<br><br>Note: IV dexamethasone can be given orally</td><td colspan="3">Either<br>0.3mg/kg oral Dexamethasone (max 16mg)<br>or<br>1mg/kg oral Prednisolone if dexamethasone unavailable.<br>Shorter biological half life – may need another dose the following day</td></tr>
<tr><td></td><td colspan="2">2mg Budesonide nebulised if vomiting or unable to take oral steroids</td></tr>
<tr><td></td><td colspan="2">Second dose of 0.3mg/kg oral Dexamethasone (max 16 mg) at CED Senior Doctor’s discretion.<br>Max 0.6 mg/kg per day</td></tr>
<tr><td></td><td colspan="2">Nebulised Adrenaline 0.4ml/kg of 1:1000 adrenaline (max 5mg/dose)<br><br>Can be repeated at 30 min intervals</td></tr>
<tr><td>Personnel</td><td></td><td>Review by Senior CED Doctor</td><td>Senior CED Doctor<br>Senior Anaesthetist<br>Senior ENT if differential diagnosis includes epiglottis / tracheitis</td></tr>
<tr><td>Observation<br>Discharge criteria</td><td>Children with cough only may not require treatment or prolonged observation.</td><td>Observe at least 30min post steroid administration and 4 hours post nebulised adrenaline.<br><br>Consider discharge once stridor-free at rest and reduced work of breathing.</td><td>Consult STRS guidance<br><br>May need intubation and PICU admission or admit to HDU once stable</td></tr>
<tr><td colspan="4">*No improvement? Reconsider diagnosis* (See Page 4)</td></tr>
</table>

## Management Pathway

**Severity of Croup**
* see page 3 for classification

**Mild**

**Dexamethasone 0.3mg/kg (max 16 mg) PO**

**Moderate**

Minimise interventions

**Dexamethasone 0.3mg/kg** (max 16mg) **PO** (max 0.6mg/kg/day)

**Or**

**Budesonide** nebulised 2mg if unable to tolerate PO steroid

Improvement?

YES

DISCHARGE if
- No stridor at rest
- 30 minutes post steroid
- 4 hours post nebulised adrenaline

EDUCATE parents
- Anticipated course
- Signs of respiratory distress
- When to seek help

CROUP leaflet to be given

NO

If improved/stable but after two hours stridor or work of breathing not resolved

**CONSIDER second dose** of **0.3mg/kg** (max 16mg) **dexamethasone** (max 0.6mg/kg/day)

**Or**

If needing escalation **Adrenaline** nebulised (1:1000) 0.4ml/kg (max. 5ml)

**Severe**

Transfer to RESUS
Minimise interventions

Provide supplementary oxygen if hypoxic ('wafting' if needed)

**Adrenaline** nebulised (1:1000) 0.4ml/kg (max. 5ml)

**And**

**Dexamethasone 0.3-0.6mg/kg** (max 16 mg) **PO** (max 0.6mg/kg/day)

**Or**

**Budesonide** nebulised 2mg

CALL FOR HELP
Senior CED Doctor
+/- Senior anaesthetist
+/- Senior ENT

Good response to Nebulised Adrenaline?

YES

Admit to HDU

NO

Repeat Adrenaline
Reconsider diagnosis
Inform STRS

## Not indicated in Croup Management

- Do NOT insert tongue depressor
- NPA, CXR, blood tests are NOT usually indicated and may cause the child distress and worsening of symptoms
- Antibiotics have no role in uncomplicated croup as it has a viral aetiology
- Antitussives such as codeine have no proven effect on the course or severity of croup and may increase sedation
- Humidified air has not been proven to change the severity of croup

## Other Causes of Stridor in Children

| | Cause | Typical Age | Features | Management |
|---|---|---|---|---|
| **Viral Infections** | Croup (Parainfluenza, RSV, Influenza A and B, Adenovirus) | 6m - 3yrs | See above | See above |
| **Bacterial Infections** | Epiglottitis (*H. influenzae type and others, Streptococci, and S. aureus*) | 6 - 12yrs | Toxic<br>Muffled voice<br>Sore throat | Intubation<br>Iv abx<br>Critical care |
| **Trauma** | Tracheitis<br>*(*S.aureus S.pneumoniae, S.pyogenes, M. catarrhalis, H.influenzae)<br>*Often polymicrobial* | 10m - 6yrs | Toxic<br>Insp/expiratory stridor<br>Cough (not painful)<br>Preference for lying flat | Iv abx<br>Intubation<br>Critical care |
| | Retropharyngeal abscess<br>*Often polymicrobial: Group A strep, S.aureus and respiratory anaerobes* | 2 - 4yrs | Toxic<br>Dys/odyno-phagia<br>Drooling<br>Torticollis<br>Dysphonia<br>Lymphadenopathy | Surgical drainage<br>Iv abx |
| | Peritonsillar abscess<br>*Polymicrobial as above* | >10yrs | (Usually) unilateral sore throat<br>Toxic<br>Trismus | Drainage<br>Iv abx |
| | Direct airway trauma - blunt/penetrating<br>Facial trauma or burn<br>Inhalation injury<br>Caustic ingestion | All ages | Swelling/haematoma<br>Soft tissue crepitus<br>Singed facial hair<br>May progress rapidly<br>Smoke exposure<br>Carbonaceous sputum | Early intubation |
| **Allergic** | Anaphylaxis | All ages | Sudden<br>Urticaria<br>Tongue/lips/uvula/facial swelling | APLS<br>Adrenaline<br>Steroids<br>Anti histamine |
| **Other** | Hereditary angioneurotic oedema | First episode <15yrs | As for anaphylaxis<br>Family hx<br>May be triggered by dental work | Intubation<br>C1esterase inhibitor<br>or FFP |
| | Foreign body - airway / upper GI | >6m<br>Peak 2 - 3yrs but all ages | Choking<br>Acute onset<br>No fever | FB removal under GA |
| | Spasmodic croup | 3m - 3yrs | Mainly nocturnal<br>Abrupt onset / offset<br>Recurrent | Severity dependent<br>Steroids |
| | Congenital<br>Laryngeal abnormalities | First few weeks of life | Laryngomalacia<br>Laryngeal webs, cysts, or cleft<br>Subglottic haemangioma<br>Subglottic stenosis | Severity dependent |

## Information Sources:

BMJ Best Practice Croup (2017)
Cochrane Database Syst Rev. Glucocorticoids for croup in children. (2018)
Up to Date (2019)