PAEDIATRIC ACUTE CARE GUIDELINE	
Croup	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

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Croup

Croup (laryngotracheobronchitis) is an upper respiratory illness characterised by a hoarse voice, barking cough, and stridor.
The clinical symptoms are a result of inflammation and narrowing of the upper airway (larynx, trachea and bronchi).

Background

- Croup is usually caused by the Parainfluenza virus, but a variety of respiratory viruses may be responsible
- Symptoms usually become more evident at night
- Most cases are mild (and don't require admission)
- Severe cases can be life-threatening due to potential airway compromise

Assessment

- Don't upset the child – this will exacerbate the symptoms
- The severity of the stridor is not an indication of the severity of croup

History

- Ask about the onset and duration of symptoms – cough, stridor, increased work of breathing.
- Past history – previous episodes of croup, underlying upper airway abnormality, underlying neuromuscular conditions.
- Possibility of inhaled foreign body, or anaphylaxis.

Examination

- It is important not to exacerbate the symptoms by upsetting the child – keep your assessment short and as non-invasive as possible. Keep the child in their most comfortable position (eg: in parents arms).
- **Observations**: heart rate, respiratory rate, temperature, SpO_2 (and BP if severe).
- **Behaviour**: child alert and interested in surroundings, or altered conscious state eg: irritable, lethargic.
- **Respiratory** assessment: cyanosis (this is a very late sign), barking cough, stridor (when upset or at rest), air entry on auscultation, there may also be wheeze.
- Work of breathing: degree (mild, moderate or severe) and type of recession (sternal, intercostal, subcostal, tracheal tug).
- Watch for signs of impending respiratory exhaustion.

Clinical Severity

Mild symptoms	Moderate symptoms	Severe symptoms
• Barking cough • No stridor at rest • No sternal recession or tracheal tug • Normal behaviour	• Barking cough • Audible stridor at rest • Mild sternal recession +/- trachael tug • May be irritable at times	• Persistent stridor at rest • Pallor and mottling • Severe sternal recession +/- tracheal tug • Drooling • Irritable or lethargic

Investigations

- Do not routinely test for viruses unless the child is being admitted to inpatient ward.
- Chest X-Ray is not indicated (except for those in extremis, i.e. those considered for PICU admission).

Differential diagnoses

- Underlying congenital abnormality eg: laryngomalacia, tracheomalacia
- Inhaled foreign body
- Anaphylaxis
- Epiglottitis
- Bacterial tracheitis

Management

- All children with croup receive corticosteroids.
- Additional treatments depend on the severity and may include nebulised adrenaline.

Croup management flowchart

Resuscitation

Life threatening croup:

- Transfer the child to the rescuscitation room, activate the resuscitation team
- Give nebulised adrenaline immediately (5mLs of 1:1000, undiluted)
- Give high flow oxygen (15L/min via a non-rebreather mask)
- Prepare for intubation.

Initial management

Severe croup is treated as above with high flow oxygen and nebulised adrenaline.
Adrenaline can be repeated 10 minutely as required.
All severe and life threatening croup should be discussed with a Senior Doctor +/- Paediatric Intensive Care Unit and the child admitted under the General Paediatric Team.

Moderate croup will need observation (e.g.: ED observation ward) until there is no stridor at rest.
All children requiring an adrenaline nebuliser should be observed for at least 3 hours.

Mild croup will not need observation and can be discharged home, after administration of oral steroid.
All children presenting with any severity of croup, should receive corticosteroids.

Medications

Steroids

- Steroids start working by 30 minutes and reduce time in hospital, transfers to PICU, the chances of intubation for inpatients, and also reduce the likelihood of relapse after discharge home.
- Steroid therapy is extremely successful in treating stridor, but does not resolve the underlying viral symptoms.
- Usually a single dose of steroid is all that is required in mild to moderate croup.

Steroids			
Medication	**Dose**	**Route**	**Treatment**
Dexamethasone	0.15mg/kg	PO	ALL croup presentations should be treated with oral dexamethasone.
Prednisolone	1mg/kg	PO	If oral dexamethasone is not available.
Dexamethasone	0.15mg/kg	IM	Rarely required. Can be given if oral steroids are not tolerated (e.g. vomited).
Dexamethasone	0.6mg/kg	IV	For severe cases of croup (PICU candidates)

Adrenaline

The effect of adrenaline is short lived and is thought **not** to change the natural history of croup. It may be repeated after 10 minutes if necessary. Children receiving adrenaline need to be observed for a minimum of 3 hours afterwards.

Adrenaline – nebulised				
Preparation	**Dose**	**Maximum Dose**	**Dilution Volume**	**Route/Delivery**
1:1000 adrenaline	0.5mL/kg	5mL	Doses of 5mL can be given undiluted. Doses < 5mL – dilute with 0.9% sodium chloride to 5mL	To be given with oxygen at 8 litres per minute via the nebuliser. (Oxygen delivery at less than 8 litres per minute will not drive the nebuliser adequately).

Admission criteria

As a “rule of thumb” children without stridor do not need to be admitted. This decision would be influenced by the distance parents live from the hospital, the reported severity of symptoms at home and past history of severe croup. The younger the child, the more conservative the approach.

Discharge criteria

The child must meet all of the following criteria:

- Clinically improved
- Steroids received
- No stridor at rest
- No other clinical or social concerns

Health information (for carers)

- Provide Health Facts Sheet – Croup

Nursing

- Minimal nursing intervention is encouraged to avoid distressing the child and increasing respiratory distress.
- Patients should remain in a position of comfort
- Children with croup require close observation
- Baseline observations: heart rate, respiratory rate, SpO2 and temperature
- The presence or absence of the following clinical features should be assessed and documented – stridor, barking cough, degree and type of recession (i.e. mild, moderate, severe, intercostal, subcostal, tracheal tug), air entry, cyanosis, conscious state (normal or altered)
- Observations should be recorded at least hourly whilst in the emergency department
    - Any significant changes should be reported immediately to the medical team
- SpO2 and ECG monitoring is recommended if adrenaline is given
    - Before applying consider whether the risk of distress negates the accuracy of monitoring

Isolation

Children admitted to hospital with croup should be isolated

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