

Management of Croup (Acute laryngotracheobronchitis)

For more detailed information, please read the complete guideline



Key features:

- Most common in 6 months to 6 years old (very rare <3 months old)
- Coryza, hoarse voice/cry
- Harsh barking cough
- Stridor
- May be febrile

Risk factors for severe disease include:

- Known airway abnormality e.g. subglottic stenosis
- Previous admissions with severe croup
- Young age < 6 months old
- Underlying chronic lung or neuromuscular disease

General Management:

- All children should receive minimal handling, keep with carers
- Defer IV access and ENT exam
- Do NOT force oxygen or face mask on patient
- There is no role for routine X-rays

Differentials for upper airway obstruction:

- Inhaled foreign body
 - o 1-3 years old, acute onset, may be history of choking episode, cough, respiratory distress.
- Anaphylaxis/acute angioedema
 - o Rapid onset, swelling lips/tongue, urticaria, wheeze/respiratory compromise, cardiovascular compromise
- Acute bacterial infections (febrile, toxic appearing)
 - o Acute epiglottitis - drooling, absent cough, reluctance to lie flat
 - o Bacterial tracheitis - tender trachea, productive cough, recent URTI
 - o Retropharyngeal abscess - neck pain/stiffness, dysphagia, drooling
 - o Peritonsillar abscess - sore throat, muffled voice
- Inhalational injury/burn
- Airway anomalies (laryngomalacia, subglottic haemangioma) - usually chronic course
- Reduced pharyngeal tone due to reduced conscious level

MILD (Westley Score 0-2)

- Normal observations
- Normal WOB
- Normal conscious level
- Stridor only when agitated
- Normal O2 saturations

MODERATE (Westley Score 3-7)

- Increased RR
- Moderate WOB
- Intermittent agitation
- Intermittent at rest
- Normal O2 saturations

SEVERE (Westley Score ≥8)

- Marked increase or decrease in RR
- Marked increased WOB
- Agitation or drowsiness
- Persistent stridor
- **Hypoxia = late and life-threatening**

Refer early to PaNDR for advice (01223 274 274)

- Single dose dexamethasone 0.15 – 0.6 mg/kg (max 12mg) PO
- Nebulised budesonide 2mg if unable to give dexamethasone
- Discharge home if stridor free at rest with written safety netting advice

- Nebulised adrenaline 0.5mlg/kg of 1:1000 to max 5ml
- Dexamethasone 0.6mg/kg PO/IM/IV or nebulised budesonide 2mg
- Repeat dose of nebuliser adrenaline if not improving
- If deteriorating – **see intubation considerations**

INDICATIONS FOR INTUBATION

Severe croup not responding to treatment
Falling conscious level
Exhaustion
Life-threatening hypoxia

- Most senior anaesthetist (ideally paediatric) must be present
- Call early for ENT support
- Anticipate difficult airway
- prepare smaller tube size than expected
- Gas induction generally favoured

References:

- Woods, CR. Croup: Clinical features, evaluation and diagnosis. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2022
- NICE Croup Management Guideline, updated Feb 2019, accessed at cks.nice.org.uk

Management of Croup (Acute Laryngotracheobronchitis) Guideline

1. Scope

For use within Paediatric and Neonatal Decision Support and Retrieval Service (PaNDR) for the East of England.

2. Purpose

To provide guidance on diagnosis and management of children presenting with croup.

3. Definitions

UAO – upper airway obstruction

ETT – endotracheal tube

URTI – upper respiratory tract infection

RR – respiratory rate

WOB – work of breathing

4. Introduction

The child or infant presenting with signs and symptoms of acute upper airway obstruction requires careful consideration for appropriate management and risk stratification. Although this guideline will focus on the management of croup, it is important to carefully consider the differential diagnosis for any child presenting with UAO.

Croup is as an acute inflammatory condition of the larynx and subglottic airway most commonly caused by parainfluenza virus. It typically affects children from 6 months to 6 years of age – it is uncommon under 6 months and rare under 3 months. Croup usually begins with coryza, which progresses over 12-48 hours to include fever, dysphonia, barking cough and stridor. The spectrum of illness can vary from a mild, self-limiting illness to life-threatening upper airway obstruction (UAO) requiring intubation and ventilation. Children may be febrile but are usually systemically well.

Key aspects of management include considering alternative diagnoses and grading the severity of UAO. Where presentation is typical, no investigations are needed and they may distress child and worsen symptoms.

Children with signs of severe UAO should be discussed early with local senior clinician and PaNDR service.

5. Clinical presentation

As croup is most often caused by a viral infection, concomitant or preceding coryza and fever are common. The signs and symptoms of subsequent upper airway obstruction will depend in part on the degree of inflammation and the resultant effects on the child's upper airway anatomy. Table 2 shows the grading of severity based on clinical and physiological signs. In general, as severity of upper airway obstruction increases a child will go from intermittent stridor only when agitated to persistent stridor with increased work of breathing. In more extreme cases a child may present in the distinctive "sniffing" position – with head extended and neck flexed – in an attempt to maximise airway patency.

Consider croup in any child with features of upper airway obstruction coupled with preceding or concomitant features of viral URTI.

6. Differential diagnoses for acute upper airway obstruction

Alternative causes of acute UAO should be considered in children <3 months old and those presenting with atypical features. These may include children without preceding coryzal/viral illness, those who are systemically unwell with toxic appearance or those with acute onset of UAO in the absence of other features. Table 2 briefly describes some of the other conditions to be considered – the management of these conditions is beyond the scope of this guideline.

Table 1 – Differential diagnosis for children with acute upper airway obstruction

Pathology	Key Clinical Features
Inhaled foreign body	Acute onset, typically 1-3 years of age, may be history of choking episode, cough, respiratory distress
Anaphylaxis/acute angioedema	Rapid onset, swelling lips/tongue, urticaria, wheeze/respiratory compromise, cardiovascular compromise
Airway anomalies (laryngomalacia, subglottic haemangioma)	Usually more chronic course
Acute bacterial infections:	Febrile, systemically unwell
- Acute epiglottitis	Drooling, absent cough, reluctance to lie flat
- Bacterial tracheitis	Recent URTI with productive cough, tender trachea
- Retropharyngeal abscess	Neck pain and stiffness, reduced neck movement, dysphagia, drooling
- Peritonsillar abscess	Sore throat, muffled "hot potato" voice
Reduced upper airway tone due to reduced level of consciousness	Reduced level of consciousness. UAO resolves with simple airway manoeuvres

7. Croup severity assessment

Severity assessment is on clinical and physiological signs alone – **there is no role for haematological investigations or imaging if the diagnosis of croup is clear.** The Westley Score is often used to categorise severity based on clinical features and oxygen saturations (Table 2). Children with severe cases of croup may initially appear agitated with increased respiratory rate – if left untreated, decompensation may follow with obtundation and reduced level of consciousness.

Table 2 – Westley Croup Score Severity Assessment

Score	Stridor	Retractions	Air Entry	SaO2 <92%	Conscious Level
0	None	None	Normal	None	Normal
1	Upon agitation	Mild	Mild decrease		
2	At rest	Moderate	Marked decrease		
3		Severe			
4				Upon agitation	
5				At rest	Decrease

- Mild (croup score 0-2)
- Moderate (croup score 3-5)
- Severe (croup score 6-11)
- Impending respiratory failure (croup score 12-17)

HYPOXIA IS A LATE AND LIFE-THREATENING SIGN

8. Initial management

General management principles for all cases of croup:

- All children should receive minimal handling
- Defer IV access
- DO NOT attempt ENT examination
- DO NOT force an oxygen or face mask on the child's face
- There is no role for routine investigations (including nasopharyngeal aspirate, X-rays and blood tests)

Further management revolves around reducing upper airway inflammation to improve obstruction – response to treatment should result in an improvement in clinical and physiological parameters.

Table 3 – Croup management by severity

	Mild	Moderate	Severe
Steroid	Single dose oral dexamethasone 0.15mg/kg	Single dose oral dexamethasone 0.6mg/kg (max 12mg) Or Nebulised budesonide 2mg if unable to give dexamethasone	Single dose oral/IM/IV dexamethasone 0.6mg/kg (max 12mg) +/- Nebulised budesonide 2mg
Adrenaline	Not required	Not required	Nebulised adrenaline 0.5ml/kg of 1:1000 to max 5mls Repeat if necessary
Disposition/other	Discharge with advice sheet	Discharge if stridor free at rest with advice sheet	Early involvement of senior clinicians Will require admission

9. Intubation and transport considerations

Intubation should be considered in a child with severe croup who is not responding to treatment, or in the presence of exhaustion, hypoxia or reduced conscious level.

Refer early to PaNDR for advice (01223 274 274)

The most experienced anaesthetist available must be present at the intubation. Call for ENT support early. Preparations should be made for a difficult airway (link [here](#) for Difficult Airway Society Paediatric Difficult Airway Guidelines).

Anticipate a smaller ETT than would be indicated by age (consider croup tube if available). Prepare cuffed ETT 0.5mm and 1.0mm smaller than would be indicated by age (consider croup tube if available).

Do NOT cut ETT.

Most anaesthetists would favour a spontaneously breathing inhalational with sevoflurane for the child with critical croup.

Following intubation, the ETT should be securely taped and the child should be sedated and paralysed to ensure safety of ETT. Usually these children are easy to ventilate once upper airway obstruction is bypassed.

1. Monitoring compliance with and the effectiveness of this document

Note: It is not necessary to reproduce the questions below in the document but it is crucial that all the listed topics are covered. The questions and responses are for guidance only.

See [appendix 2](#) (an extract from the [developing Trust documents](#) policy) for notes on how to complete this section.

2. References

- Woods, CR. Croup: Clinical features, evaluation and diagnosis. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2022
- NICE Croup Management Guideline, updated Feb 2019, accessed at cks.nice.org.uk
- <https://das.uk.com/files/APA2-UnantDiffTracInt-FINAL.pdf>
- <https://www.mdcalc.com/calc/677/westley-croup-score>

3. Associated documents

- PaNDR intubation checklist

4. Equality and diversity statement

This document complies with the Cambridge University Hospitals NHS Foundation Trust service equality and diversity statement.

5. Disclaimer

It is the responsibility of all staff to ensure they are using the latest version of a document.

Document management

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Author(s):	Dr Oliver Meller-Herbet, Dr Andrew Hughes		
Pharmacist:	Nigel Gooding		
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