

South Australian Paediatric Practice Guidelines

acute croup in children

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Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

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Management summary

Severity	Management
Mild	<p>Children with no stridor at rest or respiratory distress may be managed at home. Easy access to further medical review should be available.</p> <p>Oral dexamethasone – 0.15 mg/kg (max 10 mg) stat OR Prednisolone 1 mg/kg (max 50mg) daily for 2 days</p>
Moderate	<p>Dexamethasone – 0.15 mg/kg/dose orally (maximum 10 mg) OR Prednisolone 1 mg/kg (max 50mg) daily for 2 days <i>If the child is vomiting or is reluctant to drink:</i> Dexamethasone – 0.15 mg/kg/dose (max 10 mg) IM OR Budesonide - 2 mg nebulised</p> <p>Improvement should begin from 2 hours post administration. The anti-inflammatory effect of dexamethasone lasts 2-4 days.</p> <p>If improvement does not occur or stridor is worsening: Adrenaline (1:1000 strength) – 0.5ml/kg/dose to maximum of 5 ml via nebuliser Improvement is seen within 10-30 minutes and the clinical effect lasts for 1-2 hours. Can be repeated every 15-20 minutes.</p> <p>Oxygen – if $\text{SaO}_2 < 93\%$ or significant respiratory distress</p> <p>NB Avoid upsetting the child if possible. Consider holding oxygen tubing a few centimetres from the child's nose and mouth (blow by oxygen).</p> <p>Discharge if the child improves and the symptoms settle (see discharge criteria below). Observe for minimum of 3 hours following adrenaline administration.</p> <p>If the child does not improve, admit to hospital or arrange transfer to a facility with paediatric beds (see admission criteria below)</p>

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Severe	<p>Involve senior help early (eg Consultant, ICU, MET team or consider calling for advice)</p> <p>Oxygen – high flow oxygen by mask or blow by oxygen</p> <p>Adrenaline (1:1000 strength) – 5 ml <u>via nebuliser</u> (can be repeated every 15-20 minutes as required)</p> <p>Dexamethasone – 0.15 mg/kg/dose orally (maximum 10 mg) OR Prednisolone 1 mg/kg (max 50mg) daily for 2 days <i>If the child is vomiting or is reluctant to drink:</i> Dexamethasone – 0.15 mg/kg/dose IM OR Budesonide - 2 mg nebulised (In children with severe croup, budesonide may be mixed with adrenaline and nebulised simultaneously)</p> <p>Admit or arrange transfer to a facility with paediatric beds.</p> <p>Repeated observations (½ - 1 hourly) of heart rate, respiratory rate, stridor, alertness and pulse oximetry are required until improvement occurs. Then manage as per instructions for moderate croup.</p> <p>If poor response to adrenaline or rapid relapse despite repeated adrenaline doses, consider intubation. Expert assistance (e.g. senior anaesthetic or ICU staff) should be alerted and discussion with MedStar Kids initiated. Repeat doses of adrenaline may be given pending intubation or retrieval.</p>
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Important points

- > Croup is an acute illness characterised by mucosal swelling and inflammation of the larynx, subglottic area and upper trachea (laryngotracheitis)
- > Croup is usually viral
- > Non infective spasmodic croup occurs in a small subset of children.
- > Children typically present with onset of barking cough, inspiratory stridor and variable increase in work of breathing.
- > Croup mainly affects children 6 months to 3 years of age.
- > Children with croup should be kept comfortable and unnecessary handling avoided
- > Steroids are the cornerstone of management
- > Nebulised adrenaline should be given for acute severe croup
- > Senior help should be requested early in severe croup or if epiglottitis is suspected

Causes

- > Croup is usually viral
 - > parainfluenza types 1 and 3 (most common)
 - > respiratory syncytial virus
 - > metapneumovirus
 - > influenza
 - > adenovirus
- > Non infective spasmodic croup occurs in a small subset of children.

Assessment

- > Croup is a clinical diagnosis.
- > Key features on history are:
 - > acute onset of a seal-like barking cough
 - > stridor
 - > hoarseness
 - > respiratory distress
 - > fever

The child should not look toxic. While drooling is more typical of epiglottitis, some children may drool.

Examine the child on the parents' lap to minimise distress.

Do not examine the throat with a tongue depressor.

Examine for:

- > signs of toxicity
- > respiratory effort
 - > chest wall retractions
 - > respiratory rate
 - > pulse oximetry (hypoxia from upper airway obstruction implies critical obstruction)
 - > heart rate
- > inspiratory, expiratory or biphasic stridor
- > degree of alertness

Spasmodic croup is difficult to differentiate from viral croup. Episodes can recur within the same night and for two to four successive evenings. A striking feature of spasmodic croup is its recurrent nature. The clinical course is usually benign.

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Main differential diagnoses

The main differential diagnoses are

- > acute epiglottitis
- > bacterial tracheitis
- > peritonsillar / retropharyngeal abscess
- > foreign body aspiration
- > anaphylaxis

Acute epiglottitis presents with a rapid onset of toxicity and upper airway obstruction with difficulty swallowing, a sore throat and a soft stridor. They are usually more comfortable sitting up/leaning forward. The most common cause is *H. influenzae* type B which is now uncommon in immunised children. If epiglottitis is suspected, call for senior help early. See the table below for a comparison of clinical signs.

CLINICAL SIGN	CROUP	EPIGLOTTITIS
Rapidity of onset	Progress over 12-48 hours	Hours (rapid onset)
URTI preceding	Usually	No
Cough	Barking	Minimal
Drinking	Yes	Difficult
Posture	Unremarkable	Sits up, leans forward
Drooling	No	Mouth open and drools
Appearance	Unwell	Ill/ toxic
Temperature	Fever usually <38°C	>38°C
Cry	hoarse	soft
Voice	hoarse	muffled
Stridor	loud inspiratory	soft

Acute bacterial tracheitis presents as progressive respiratory distress with increasing stridor in a febrile toxic child in the context of prodromal viral respiratory tract infection. The usual causes are *H. influenzae* type B and *S. aureus*.

Acute epiglottitis and bacterial tracheitis are potentially fatal if missed and are airway emergencies. If in doubt, these more serious conditions should be excluded.

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The primary goals in the management of **acute epiglottitis and bacterial tracheitis** are to secure the airway and administer appropriate antibiotics. Airway management and examination should be performed by an experienced multidisciplinary team ideally including someone skilled in paediatric intubation who can secure the airway by intubation if necessary (preferably via inhalation technique). In these cases, the patient should not be laid down.

Peritonsillar or retropharyngeal abscess presents with fever, drooling, a change in voice quality and neck extension and painful neck movements.

Foreign body aspiration has an abrupt onset of cough without fever, often in a setting of the child playing with small objects.

Anaphylaxis presents as acute onset (minutes to hours) of an allergic reaction following exposure to an allergen and presenting with generalised urticaria, pruritus, swollen lips-tongue-uvula, respiratory compromise with dyspnoea and wheeze, hypotension, hypotonia, collapse and abdominal pain.

Assessment of clinical severity:

CLINICAL SIGN	MILD	MODERATE	SEVERE	IMPENDING RESPIRATORY FAILURE
Cough	Barking cough	Barking cough	Barking cough but may be quiet	Barking cough (may be quiet or absent due to exhaustion)
Stridor	No stridor at rest	Inspiratory stridor at rest	Marked stridor (may be biphasic)	Audible stridor at rest (may be soft)
Chest retractions	No chest retractions	Chest wall retractions	Severe chest retractions	Chest retractions (may be reduced)
Mental state	Alert	Alert	Agitated or Lethargic	Lethargy, fatigue, listless Reduced level of consciousness
Colour	Pink	Pink	May be cyanosed	Cyanosis without oxygen

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Investigation

- > Routine X-rays have no indication.
- > Laboratory tests are not required as the diagnosis of croup is clinical.
- > Additional investigations may be required to exclude one of the differential diagnoses.

Management

- > Management depends on the age of the child, severity, time of day, parent capabilities, ability to access an urgent review i.e. access to phone, transport, ambulance etc and access to medical review.
- > Children with croup of any severity should be made comfortable with minimal handling and upsetting the child.
- > Hypoxia may be due to lower respiratory tract disease but if due to upper airway obstruction implies critical narrowing and is a medical emergency.

Management summary:

Severity	Management
Mild	Many children older than 12 months may be managed at home. Easy access to further medical review must be available. Oral dexamethasone – 0.15 mg/kg (max 10 mg) stat OR Prednisolone 1 mg/kg (max 50mg) daily for 2 days
Moderate	Dexamethasone – 0.15 mg/kg/dose orally (maximum 10 mg) OR Prednisolone 2 mg/kg kg (max 50mg) daily for 2 days <i>If the child is vomiting or is reluctant to drink:</i> Dexamethasone – 0.15 mg/kg/dose (max 10 mg) IM OR Budesonide - 2 mg nebulised Improvement should begin from 2 hours post administration. The anti-inflammatory effect of dexamethasone lasts 2-4 days . If improvement does not occur or stridor is worsening: Adrenaline (1:1000 strength) – 0.5ml/kg/dose to maximum of 5 ml via nebuliser Improvement is seen within 10-30 minutes and the clinical effect lasts for 1-2 hours. Can be repeated every 15-20 minutes. Oxygen – if SaO ₂ < 93% or significant respiratory distress NB Avoid upsetting the child if possible. Consider holding oxygen tubing a few centimetres from the child's nose and mouth (blow by oxygen). Discharge if the child improves and the symptoms resolve (see discharge criteria below) However, if the child does not improve, admit to hospital or arrange transfer to a facility with paediatric beds (see admission criteria below)

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Severe	<p>Involve senior help early (eg Consultant, ICU, MET team or consider calling for advice)</p> <p>Oxygen – high flow oxygen by mask or blow by oxygen</p> <p>Adrenaline (1:1000 strength) – 5 ml <u>via nebuliser</u> (can be repeated every 15-20 minutes as required)</p> <p>Dexamethasone – 0.15 mg/kg/dose orally (maximum 10 mg) <i>If the child is vomiting or is reluctant to drink:</i> Dexamethasone – 0.15 mg/kg/dose IM OR Budesonide - 2 mg nebulised (In children with severe croup, budesonide may be mixed with adrenaline and nebulised simultaneously)</p> <p>Admit or arrange transfer to a facility with paediatric beds.</p> <p>Repeated observations (½ - 1 hourly) of heart rate, respiratory rate, stridor, alertness and pulse oximetry are required until improvement occurs. Then manage as per instructions for moderate croup.</p> <p>If poor response to adrenaline or rapid relapse despite repeated adrenaline doses, consider intubation. Expert assistance (e.g. senior anaesthetic or ICU staff) should be alerted and discussion with MedStar Kids initiated. Repeat doses of adrenaline may be given pending intubation or retrieval.</p>
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Primary and pre-hospital care:

- > Assess the severity as per the above table
- > Begin care as per the management table doing whatever is possible depending on circumstances (e.g. availability of oxygen)
- > Consider giving dexamethasone as single dose

N.B. There is no evidence that steam or humidified air speeds recovery. Steam is associated with burns and scalds and is therefore not recommended

.Indications for hospital assessment and/or admission

Absolute:

- > Significant respiratory symptoms persisting at least 4 hours after steroid administration:
 - > Audible stridor at rest
 - > Significant respiratory effort
 - > Oxygen requirement

Relative:

- > young age, especially younger than 6 months
- > poor oral intake and degree of dehydration

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- > social issues (e.g. distance from medical assistance, lack of transport)
- > inadequate monitoring or follow up available
- > significant parental anxiety
- > repeated presentations within 24 hours

Criteria for discharge from emergency department

- > No stridor at rest
- > Normal pulse oximetry
- > Normal colour
- > Normal level of consciousness
- > Demonstrated ability to tolerate fluids by mouth
- > At least 3 hours after the administration of adrenaline
- > Parents able to return for care if respiratory distress recurs at home
- > Parents have access to telephone, ambulance and/or early medical review.

Discharge advice

- > Parents should be advised that if child develops mild respiratory distress, it may be safe to drive to the nearest emergency department for treatment (See parent information sheet)
- > If child develops severe croup with agitation and cyanosis, the parent should call 000 for ambulance transport to an emergency department
- > Ensure the GP receives a discharge letter with all relevant clinical and management details

Inpatient care

- > Repeated close monitoring of respiratory rate, heart rate, oxygen saturation, stridor, alertness, air entry, cyanosis and chest retractions
- > Repeat doses of steroids are not usually required
- > Care as per management table
- > Discharge criteria are the same as for discharge from the emergency department except the child should be stable for a longer period if there is poor access to medical care.

References

1. Johnson D, Klassen T, Kellner J. Diagnosis and management of croup: Alberta Medical Association Clinical Guidelines. *Alberta Medical Association*, 2005
2. Woods C. Approach to the management of croup. *UpToDate* 2010.
3. Royal Children's Hospital Croup Guideline and Parent Information Sheet – accessed online
4. Bjornson C, Johnson D. Croup. *Lancet*, 2008; **371**: 329-339
5. Russell KF, Wiebe N, Saenz A et al. Glucocorticoids for croup (review). The Cochrane Collaboration 2009.
6. Clarke M. Diagnosis and management of croup. BC Children's Hospital Clinical Practice Guidelines. 2007
7. Health for kids in the south east; Monash medical centre. Evidence based practice guidelines for the management of croup in children. 2007

Information for parents

Parenting and Child Health. Women's and Children's Health Network.

Available at URL:

<http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=114&np=304&id=1855>

Appendix 2 (Parent Information Sheet)

(Adapted from Women's and Children's Hospital information sheet)

What is croup?

Croup is usually caused by a virus which produces swelling of the child's voice box (larynx) or windpipe (trachea). It usually affects children up to the age of five years. Croup often begins like a cold and then the child develops a harsh barking "croupy" cough. The voice is hoarse and the child may make a noise when breathing in (STRIDOR). The child may also have a sore throat and a fever

Generally a child is mildly unwell with a cough and fever but has some periods in a day when active.

The stridor is most common when a child is upset, especially when the child suddenly awakens at night.

A small group of children have continuous difficulty breathing or swallowing and need to see a doctor.

How can it be treated?

Attacks of coughing and stridor usually settle if a child is comforted.

The child may be able to breathe better sitting up, in a parents arms or against two or three pillows.

Warm drinks may help settle coughing attacks. If the child has a fever, paracetamol should be given. Do not smoke around the child.

Antibiotics do not help, as the croup is caused by a virus.

How long does it last?

The acute period of croup lasts from two to five days, and is usually worse at night. The cough usually lasts longer, as the throat is often irritated even after the infection is gone.

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A few children get repeated attacks of croup, sometimes without having a viral infection. There is no permanent damage from ordinary croup.

Children who have difficulty breathing when resting need urgent medical attention

You should seek medical help urgently if:

- > Your child is getting worse.
- > The chest is sucked in as the child breathes in, and the child is working hard to breathe.
- > There is difficulty swallowing.
- > Stridor is heard even though your child is resting quietly.
- > Your child looks ill, and has a high temperature.
- > You are concerned for any reason.

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