Children and Infants - Acute Management of Croup

Summary Basic clinical practice guidelines for the acute treatment of infants and children with croup.

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INFANTS AND CHILDREN: ACUTE MANAGEMENT OF CROUP

PURPOSE

The *infants and children: acute management of croup* clinical practice guideline (attached) has been developed to provide direction to clinicians and is aimed at achieving the best possible paediatric care in all parts of the state.

The clinical practice guideline was prepared for the NSW Department of Health by an expert clinical reference group under the auspice of the state wide Paediatric Clinical Practice Guideline Steering Group.

MANDATORY REQUIREMENTS

This policy applies to all facilities where paediatric patients are managed. It requires all Health Services to have local guidelines/protocols based on the attached clinical practice guideline in place in all hospitals and facilities likely to be required to assess or manage children with croup.

The clinical practice guideline reflects what is currently regarded as a safe and appropriate approach to the acute management of croup in infants and children. However, as in any clinical situation there may be factors which cannot be covered by a single set of guidelines. This document should be used as a guide, rather than as a complete authoritative statement of procedures to be followed in respect of each individual presentation. **It does not replace the need for the application of clinical judgement to each individual presentation**.

IMPLEMENTATION

Chief Executives must ensure:

- Local protocols are developed based on the *infants and children: acute management of croup* clinical practice guideline.
- Local protocols are in place in all hospitals and facilities likely to be required to assess or manage paediatric patients with croup.
- Ensure that all staff treating paediatric patients are educated in the use of the locally developed paediatric protocols.

Directors of Clinical Governance are required to inform relevant clinical staff treating paediatric patients of the revised protocols.

REVISION HISTORY

Version	Approved by	Amendment notes
December 2004 (PD2005_392)	Director-General	New policy
August 2010 (PD2010_053)	Deputy Director-General Population Health	Rescinds PD2005_392. Second edition of the clinical practice guidelines.

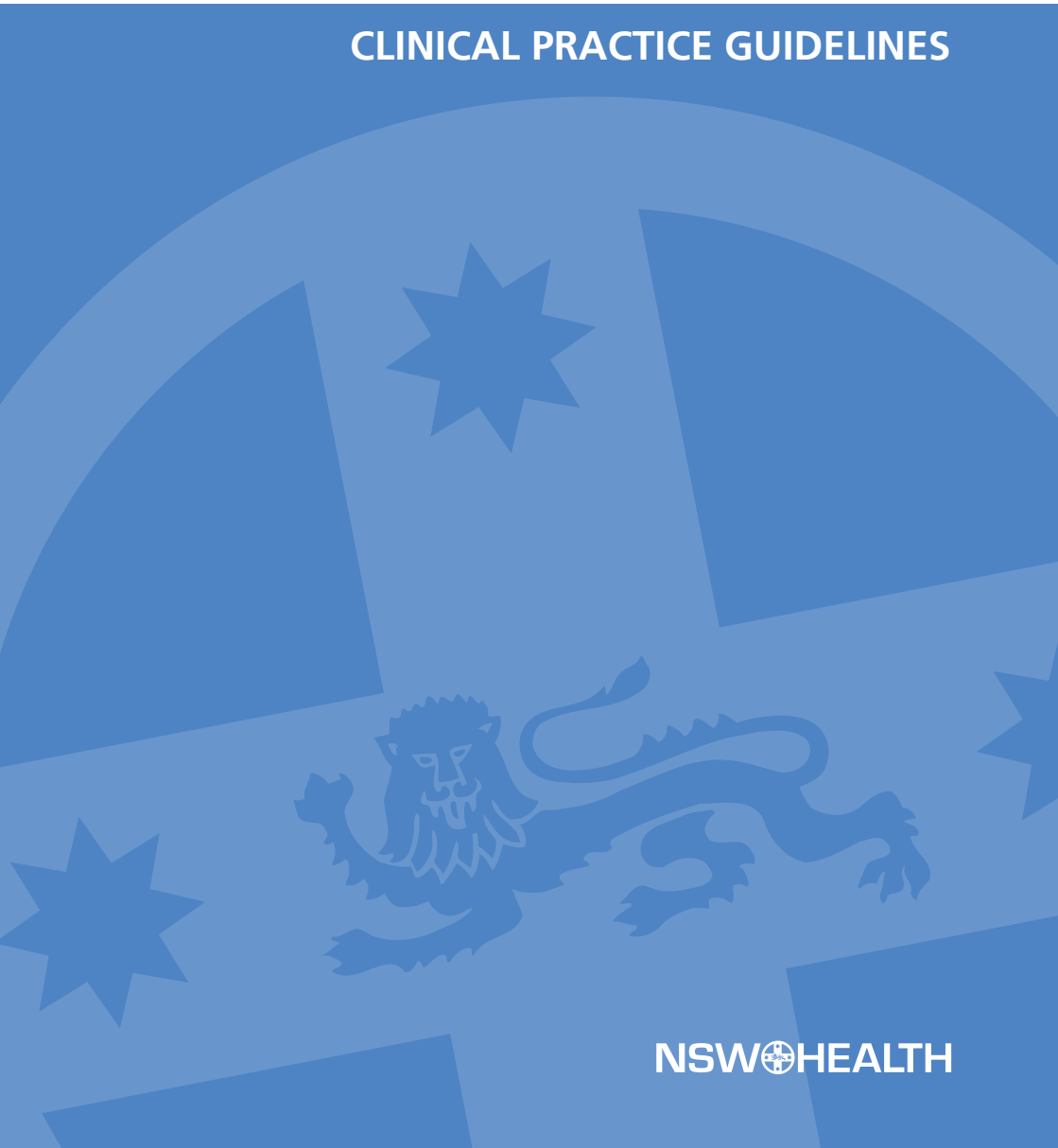
ATTACHMENT

1. Infants and Children: Acute Management of Croup – Clinical Practice Guideline.

Infants and Children: Acute Management of Croup

second edition

CLINICAL PRACTICE GUIDELINES



NSW HEALTH

NSW DEPARTMENT OF HEALTH
73 Miller Street
North Sydney NSW 2060
Tel. (02) 9391 9000
Fax. (02) 9391 9101
www.health.nsw.gov.au

This Clinical Practice Guideline booklet is extracted from the PD2010_053 and as a result, this booklet may be varied, withdrawn or replaced at any time. Compliance with the information in this booklet is mandatory for NSW Health.

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A revision of this document is due in 2012.

August 2010 - second edition

Contents

Introduction

These Guidelines are aimed at achieving the best possible paediatric care in all parts of the State. The document should not be seen as a stringent set of rules to be applied without the clinical input and discretion of the managing professionals. Each patient should be individually evaluated and a decision made as to appropriate management in order to achieve the best clinical outcome.

The formal definition of clinical practice guidelines comes from the National |Health and Medical Research Council:

> 'systematically developed statements to **assist** practitioner and patient decisions about appropriate health care for specific clinical circumstances.' *(National Health and Medical Research Council "A Guide to the Development, implementation and evaluation of Clinical Practice Guidelines", Endorsed 16 November 1998, available from www.nhmrc.gov.au/publications/synopses/cp30syn.htm)*

It should be noted that this document reflects what is currently regarded as a safe and appropriate approach to care. However, as in any clinical situation there may be factors which cannot be covered by a single set of guidelines, this document should be used as a guide, rather than as a complete authoritative statement of procedures to be followed in respect of each individual presentation. It does not replace the need for the application of clinical judgment to each individual presentation.

This document represents basic clinical practice guidelines for the acute management of croup in infants and children. Further information may be required in practice; suitable widely available resources are included as Appendix 3.

Each Area Health Service is responsible for ensuring that local protocols based on these guidelines are developed. Area Health Services are also responsible for ensuring that all staff treating paediatric patients are educated in the use of the locally developed paediatric guidelines and protocols.

In the interests of patient care it is critical that contemporaneous, accurate and complete documentation is maintained during the course of patient management from arrival to discharge.

Parental anxiety should not be discounted: it is often of significance even if the child does not appear especially unwell.

Changes from Previous Clinical Practice Guideline

Following a literature review new evidence was found which has resulted in minor changes to the document and flow chart.

The changes are outlined below.

1. Regarding the choice of corticosteroid, there are two studies comparing dexamethasone with prednisolone both have showed equivalent initial clinical response[25] but a higher representation rate with prednisolone[24]. Both studies provide level E2 evidence. From this the current recommendation of dexamethasone OR prednisolone can be left as is on the flow chart; however this information has been added to page 11 "Systemic Corticosteroids".

2. No difference was found between oral dosing versus intramuscular dosing of dexamethasone in moderate croup (Pediatrics 2000, Rittichier).[25,E2] This has been added to the last dot point page 11 regarding systemic corticosteroids

3. Subglottic haemangioma has been added to Table 1: Causes of upper airway obstruction, in the laryngeal/ subglottic column. An additional sentence has also been added: "Subglottic haemangioma should be considered as an alternative diagnosis to croup particularly in the first 6 months of life as it can also respond to corticosteroid therapy."

4. Changes have been made to the algorithm. Along the life threatening pathway "find the most experienced person to intubate child urgently" has been changed to "urgently find the most experienced person to intubate child if required". Also dot point added 'Systemic corticosteroids should be given - after assistance with airway management has arrived.' "Consider intubation" has been moved from box on using adrenaline and steroids and an arrow added to now read "? Improvement " No - "consider intubation" refer to pg 17.

5. In the Inhaled corticosteroids section on page 12 add a dot point to reflect there was "no advantage in combining inhaled budesonide with oral dexamethasone".[27,E2]

6. In the section titled Evidence base for treatment added "Heliox has no proven benefit over nebulised adrenaline".[26,E3]

Overview

- Croup is a common cause of upper airway obstruction in young children.[1] It is usually mild and self-limiting, though occasionally it may cause severe respiratory obstruction.
- Before the widespread use of corticosteroids, studies reported that as many as 31% of patients with croup required hospitalisation[2] and 1.7% required endotracheal intubation.[3]
- Acceptance of the use of corticosteroids for the treatment of croup for the last decade has dramatically reduced the number of patients requiring admission to hospital and endotracheal intubation.[4]
- The differential diagnosis of upper airway obstruction should be considered before presuming that the child has croup (Table 1).

What is Croup?

Croup, also known as "laryngotracheo-bronchitis", is the clinical syndrome of a hoarse voice, barking cough and inspiratory stridor.[1,4] It is usually caused by a viral infection of the upper airway that results in inflammation of the larynx, trachea and bronchi, thereby compromising airflow through the proximal airway. A number of viruses may cause croup, although the most common are parainfluenza 1 and 2 and respiratory syncytial viruses.[1, 3, 4] It mostly affects children between 6 and 36 months, although may occur in older children.

What is not Croup?

There are a number of structural and infective conditions that cause upper airway obstruction. These may be thought of anatomically (Table 1). There are three factors to consider when deciding whether the presence of stridor and use of accessory muscles of respiration relate to croup or an alternative diagnosis:

Age of the Child

- A child less than 3 months of age is more likely to have a structural airway problem (e.g. Laryngomalacia) with or without an intercurrent viral infection. Similarly, Tracheomalacia may present with a brassy cough and variable stridor.

- A child between 1 and 3 years with the acute onset of respiratory difficulty without fever may have an inhaled foreign body (tracheal or oesophageal). Bronchial foreign bodies will usually have an associated localised expiratory wheeze (rather than inspiratory stridor) and may have evidence of air trapping on an expiratory chest radiograph below the level of obstruction (Ball-valve effect).
- Subglottic haemangioma should be considered as an alternative diagnosis to croup particularly in the first 6 months of life as it can also respond to corticosteroid therapy.

Character of the Stridor

- The combination of **inspiratory and expiratory stridor** increases the likelihood of an underlying fixed tracheal obstruction (e.g. acquired subglottic stenosis in a preterm infant that was ventilated via an endotracheal tube for a lengthy period) which will need urgent assessment by a paediatrician.

Toxicity of the Child

- Children with croup do not appear toxic (pale, very febrile and poorly perfused). This is more commonly seen in bacterial tracheitis (usually staph aureus) or epiglottitis (HiB).

Distinguishing Viral From Spasmodic Croup

The sub classification of the aetiology of croup is of limited significance when assessing a patient with acute upper airway obstruction, as it is the degree of airway obstruction that will determine treatment.[1, 5, 6] Typically, viral croup develops over days with a concurrent typical coryzal illness and the symptoms of airway obstruction disappear over 3-5 days.[1, 3-5] Conversely, spasmodic croup is said to be more common in atopic, older children.[1, 5] Spasmodic croup comes on rapidly overnight in children who were perfectly well when they went to sleep.[1] Spasmodic croup often runs a shorter clinical course.[1, 4]

Assessment of Severity

Although infrequent, severe airway obstruction is the major clinical concern in croup. Assessment of the degree of airway obstruction is, therefore, the most important aspect of assessment. It relies almost always on clinical signs. Because airway obstruction in croup can worsen rapidly, repeated careful clinical assessment is essential.

Assessing the Need for Treatment in Croup:

1. **General appearance.** A child who is agitated appears to be tiring from the effort of breathing or has a decreasing level of consciousness needs to be closely monitored.

2. **Degree of respiratory distress.** The presence of stridor at rest, tracheal tug, chest wall retractions, changing respiratory rate and pulse rate or palpable paradox indicates treatment is necessary.

3. **Cyanosis or extreme pallor** indicates the need for immediate treatment.

4. **Oxygen desaturation** [$SaO_2 < 90\%$] as indicated by oximetry is a **LATE sign** and unreliable indication of croup severity.[7]

Factors Increasing the Likelihood of Hospital Admission

1. History of severe obstruction prior to presentation

2. History of previous severe croup or known structural airway anomaly (e.g. Subglottic stenosis)

3. Age less than 6 months

4. Degree of respiratory distress (stridor at rest is an indication for admission)

5. Fluid intake

6. Parental anxiety

7. Proximity of home to the hospital. Consideration should also be given to access to transport.

8. Representation to the Emergency Department within 24 hours

9. *Uncertain diagnosis.*

Mild Airway Obstruction

Mild airway obstruction can be assumed when the child appears to be happy and is prepared to drink, eat, play and take an interest in the surroundings. There may be mild chest wall retractions and mild tachycardia, but stridor at rest will not be present. The parent/caregiver should be reassured, given an explanation that if the signs were to progress over the next 24-48 hours then they should return to their general practitioner, paediatrician or to hospital for review.

Moderate Airway Obstruction

Moderate airway obstruction is indicated by persisting stridor at rest, chest wall retractions, use of the accessory muscles of respiration and increasing heart rate. The child can be placated and is interactive with people and surroundings. The child will need systemic corticosteroids and observation for a minimum of 4 hours.

If the child continues to have stridor at rest, then further treatment will be considered with prolonged observation in the Emergency Department or admission to hospital.

Progression From Moderate to Severe Obstruction

The child may begin to appear worried, preoccupied or tired. The child may sleep for short periods. This child will require close, continuing observation in the Emergency Department/hospital, treatment with systemic corticosteroids and nebulised adrenaline with regular (minimum every 30-60 minutes) clinical review. Progression of signs will indicate the need for medical reassessment and consideration of further treatment with systemic corticosteroids and nebulised adrenaline. The child will be admitted to hospital.

Severe Airway Obstruction

As airway obstruction increases, the appearance will be that of increasing tiredness and exhaustion. Marked tachycardia is usually present. Restlessness, agitation, irrational behaviour, decreased conscious level, hypotonia, cyanosis and marked pallor are late signs indicating that dangerous airway obstruction is now present. A soft stridor especially in the presence of lethargy or irritability/anxiety, tachycardia, hypotonia or pallor should be considered a sign of imminent airway obstruction. As air entry decreases stridor volume decreases. The child should not be unnecessarily disturbed other than the immediate application of mask oxygen with further nebulised adrenaline as preparations are made to intubate the child by someone skilled in paediatric intubation (ideally with an inhalational induction). Systemic steroids, if not previously given, will be administered once the airway is secured.

Oximetry

Oximetry is a routine tool used in the Emergency Department. Oximetry can never substitute for good clinical assessment. It has been demonstrated that oxygen saturation may be near normal in severe croup and yet significantly lowered in some children with mild to moderate croup.[7] This is presumed to relate to lower airway disease causing ventilation/perfusion mismatching.

Clinical Scoring Systems

Croup severity scores have been used in hospital based clinical research studies to assess the suitability of patients for treatment in a standardised manner.[8, 9] They give a cumulative score, grading for the degree of stridor, retractions, air entry, cyanosis, dyspnoea and level of consciousness. However, they are of limited value in ordinary clinical practice.

Lateral Airways X-ray

A lateral airways x-ray should not be undertaken as croup is a clinical diagnosis and no additional information in the management of croup can be gleaned from the x-ray. In the presence of severe obstruction, the child may become more agitated and the degree of obstruction rapidly increases in an area with limited facilities for immediate treatment.

Chest Radiograph [CXR]

A CXR is not indicated in the management of children with uncomplicated croup. However, it may be considered where there is uncertainty about the diagnosis of croup because of the presence of additional findings on auscultation of the chest (e.g. wheeze raising the possibility of croup/asthma, an inhaled foreign body or crackles raising the possibility of a chest infection).

Which Treatment is Appropriate?

The most important change in the management of croup has been the earlier and more liberal use of systemic and nebulised corticosteroids[10-14] and nebulised adrenaline[15] in the Emergency Department. Much work has focussed on steroid treatment and its utility can be seen in the levels of evidence (Table 2) available to ascertain its effectiveness.

Evidence Based Treatment Options

A flow diagram is attached as Figure 1 on page 17.

1. Non-pharmacological: Steam Inhalation

- The use of steam inhalations for the treatment of croup has been advocated since the nineteenth century to "break the coughing spasm".[5]
- The rationale of using steam from a kettle, or hot running water in a bath or shower, was that humidified air would moisten secretions and soothe the inflamed mucosal surface of the trachea. However attractive this may seem, it has not been scientifically validated.[E4]
- Two studies have attempted to evaluate the use of humidified air to treat croup and both were unable to find evidence to support the use of steam in croup. One was an underpowered randomised control trial (RCT) involving 16 subjects with croup randomised to room air or a humidified atmosphere for 12 hours in hospital.[16,E3] The second trial involved only 7 subjects who showed no improvement in respiratory resistance when measured after the administration of two mls of nebulised sterile water.[7] However, the RCT included only 16 subjects and so there remains the possibility of a type II error.[E3]

- It should be emphasised that the use of steam in this situation continues to be associated with scalds and burns in young children.[E3]

2. Oxygen

- Oxygen is the immediate treatment of choice for children with severe viral croup who have considerable upper airway obstruction with significant oxygen desaturation [SaO_2 <90%].[E4]
- This therapy has not been subjected to an RCT. It is the initial treatment prior to the administration of pharmacological treatment in the hospital setting.

3. Systemic Corticosteroids

- The precise mechanism by which corticosteroids exert their effect is not known. It is presumed to be on the basis of rapidly acting anti-inflammatory properties or vasoconstrictive actions in the upper airway. Studies have used oral dexamethasone (0.15 to 0.6 mg/kg/dose)[4,12,13] and nebulised budesonide (2mg/dose) [9, 10, 13] in demonstrating the efficacy of steroids against placebo in relieving croup symptoms in the hospital setting. A commonly used alternative to dexamethasone is the use of prednisone/prednisolone at a dose of 1-2 mg/kg/dose. Most Emergency Departments initially prescribe oral corticosteroids because they are inexpensive, easy to administer and readily available.[1, 4, 12] For simplicity, and to avoid confusion when prescribing, the recommended dose of dexamethasone is 0.3mg/kg and prednisolone is 1mg/kg.[E4]
- Two meta-analyses[3,6] have included 24 randomised controlled trials, which have shown clinically significant benefit at 6 and 12 hours but not 24 hours using the clinical croup scores.[8,9, E1] The quality of the studies was good, although the studies generally had small numbers. The possibility of a selection bias was raised as a funnel plot demonstrated few published negative studies.[4]
- The use of systemic steroids has also been associated with a significant decrease in the number of adrenaline nebuliser treatments required and the average length of stay in the Emergency Department was reduced by 11 hours.[18-20, E1]
- The need for endotracheal intubation has reduced and the duration of intubation has fallen since the earlier use of systemic corticosteroids was advocated.[1, 4, 11, 19, E2]
- The method of delivery of corticosteroid has been compared in a number of trials with oral, intravenous, intramuscular and inhaled (nebulised) all being shown to be superior to placebo.[4,6,13, E2]

- It has been suggested that the preferred delivery route for the corticosteroids should be oral or IM.[19] However, other authors would argue that the oral route should be preferred as it is inexpensive, easy to administer and kindest for the patient.[1, 4, E4]
- Dexamethasone with prednisolone has been shown to have equivalent initial clinical response[23] but there is a higher representation rate with prednisolone. [24, E2]
- No difference was found between oral dosing versus intramuscular dosing of dexamethasone in moderate croup.[25, E2]

4. Nebulised Adrenaline

- A child with persisting inspiratory stridor at rest and marked chest wall retractions has severe croup. Such a child need not be centrally cyanosed to be severely obstructed and should receive immediate treatment with nebulised adrenaline (1:1000 concentrations at a dose of 0.5 ml/kg of body weight to a maximum dose of 5 ml delivered undiluted in the nebuliser bowl). This dose should be administered as soon as the adrenaline becomes available. In addition to the adrenaline, a dose of oral corticosteroid (dexamethasone or prednisone) should be administered. The child should be reassessed regularly.
- It has been suggested that nebulised adrenaline (1:1000 concentration) reduces bronchial and tracheal epithelial vascular permeability thereby decreasing airway oedema, which results in an increase in the airway radius and improved airflow.[4,10, E4]
- The standard dose of adrenaline is 5 ml of 1:1000 adrenaline delivered undiluted in a nebuliser bowl is for a 10 kg child. Smaller children have a dose of 0.5mls of 1:1000 adrenaline per kg of body weight up to a maximum dose of 5mls.[1, 10, E1]
- The onset of action is clinically rapid with double blinded, randomised controlled trials documenting a fall in croup symptom scores within 30 minutes.[10, 21, E2]
- The duration of effect is approximately 2 hours.[1, 4, E2] However, with more severe croup, the same dose may need to be repeated.[1]
- The need for several doses of nebulised adrenaline in a short period of time highlights the need to consider urgent transfer to a paediatric centre and/or the need for intubation.[1, E4]
- Relative contraindication in children with ventricular outflow tract obstruction (e.g. Tetralogy of Fallot). Airway obstruction must take precedent over any potential detrimental effect that adrenaline may have in this condition.
- Heliox has no proven benefit over nebulised adrenaline.[26, E3]

5. Inhaled Corticosteroids

- The use of 2mg to 4mg of nebulised budesonide to treat croup attracted attention during the 1990s. It has been shown to be efficacious in treating croup.[9, 11, 12, E2]
- It has an action of onset within 30 minutes,[9] which compares favourably with systemically administered corticosteroids that have an effect within 1 hour.[1,4,12, E2]
- It has been shown that there is no advantage in combining inhaled budesonide with oral dexamethasone.[27, E2]

Summary of Evidence Based Treatment Options

Over the last decade, considerable evidence has accumulated from well-designed clinical trials to support the more liberal use of corticosteroids in the management of children with croup presenting to Emergency Departments. The main points for the management of croup in NSW currently are:

- Mild croup does not need pharmacological treatment.[E4]
- There is no RCT evidence to support the use of mist therapy.[E3]
- Children with croup who demonstrate stridor and chest wall retractions should receive corticosteroids.[E4]
- Whilst oral, intravenous, intramuscular and nebulised corticosteroids are efficacious, the use of oral corticosteroids is kindest to the patient, easy to administer and inexpensive.[E1]
- The treatment of moderately severe croup will usually involve the use of nebulised adrenaline, and systemic corticosteroids.[E2]
- The need for transfer to a paediatric centre is based upon age of the child, presence of predisposing conditions (e.g. subglottic stenosis), severity of the illness, response to treatment and level of expertise available at the hospital.[E4]
- A child with an unstable airway/severe croup will require a medical escort for transfer to a centre with paediatric supervision.
- Further advice about the management of croup is available through the emergency physician, paediatrician or ICU specialist on call for the hospital.
- If transfer to a paediatric centre is indicated, then the Neonatal and paediatric Emergency Transport service (NETS) can be contacted (1300 36 2500) to facilitate the transfer and provide liaison with expert advice in one of the three NSW paediatric teaching hospitals.

It is useful to provide the parent/ caregiver of a child with croup with a parent fact sheet (see pg 20) on discharge from the Emergency Department together with written follow-up arrangements for review by their general practitioner.

Table 1: Causes of Upper Airway Obstruction

Supraglottic	Laryngeal/ Subglottic	Tracheal
Acute tonsillar enlargement bacterial/EBV	Viral croup	Trauma (haematoma)
Epiglottitis (rare)	Spasmodic croup	Tumour (anterior mediastinal lymphoma)
Retropharyngeal abscess	Bacterial tracheitis	Foreign body (oesophageal/ tracheal)
Foreign body	Foreign body	Tracheomalacia (particularly in Trisomy[21])
Acute angioedema	Diphtheria	
	Thermal/chemical injury	
	Intubation trauma	
	Laryngospasm (neural, hypocalcaemia, associated with reflux)	
	Subglottic haemangioma	
	Laryngomalacia (particularly in Trisomy21)	

Table 2: Evidence Base of Recommendations

The recommendations are based on the following levels of evidence, simplified from the NH&MRC's "Quality of evidence ratings."[22]	
E1	Level 1: Systematic review or meta-analysis of all relevant randomised controlled trials (RCTs).
E2	Level 2: Well designed RCTs.
E3	Level 3: Well designed cohort or case-control studies.
E4	Level 4: Consensus opinion of authors.

Summary of Croup Management

Diagnosis

Croup is a clinical syndrome of hoarse voice, barking cough and inspiratory stridor in young children. It may be viral or "spasmodic" but treatment is the same. The need for treatment is determined by the severity of proximal airway obstruction.

Assessment

Croup may be classified as mild, moderate or severe depending on the presence of stridor and the degree of breathing difficulty. **Mild croup** includes patients with a barking cough without persisting stridor at rest. **Moderate croup** includes all patients with stridor at rest, tracheal tug and chest wall recession. **Severe croup** includes patients with persisting stridor at rest and marked tracheal tug and chest wall recession that may appear apathetic or restless. A soft stridor especially in the presence of lethargy or irritability/anxiety, tachycardia, hypotonia or pallor should be considered a sign of imminent airway obstruction. As air entry decreases stridor volume decreases. Oximetry is not a reliable marker of severity in croup.

Treatment

Mild Croup: Does not need pharmacological treatment,[E4] can be managed at home and does not benefit from mist therapy.[E3]

Moderate Croup: Patients should receive a single dose of oral corticosteroids.[E1] Many will be observed in the Emergency Department and discharged for follow-up by their general practitioner or paediatrician. Some may progress further and need nebulised adrenaline and a longer observation period or hospital admission.

Moderate to Severe Croup: Treatment will involve the use of nebulised adrenaline and systemic corticosteroids.[E2] Admission to hospital is likely.

Severe croup: In addition to nebulised adrenaline and systemic corticosteroids, the child may require transfer to a paediatric centre for further management or intubation and subsequent transfer. A person experienced in paediatric intubation optimally performs intubation for croup using an inhalational anaesthetic.

Table 3: Pharmacological Treatment of Croup in the Emergency Department

Medication	Croup Grade	Dose	Notes
Systemic corticosteroids	Moderate, severe	Dexamethasone 0.3 mg/kg OR prednisone/ prednisolone 1mg/kg **ORAL** /IV/IM	**Action within 1 hour.** Repeat at 12-24 hours.
Nebulised corticosteroids	Moderate, severe	Budesonide 2mg (4mls) undiluted nebulised	**Action within 30 mins** Repeat 12th hourly for 2 days. Consider if oral steroids vomited
Nebulised Adrenaline 1:1000	Moderate, severe	1:1000 Adrenaline 0.5mls/kg up to a maximum of 5 mls nebulised.	**Action within minutes** Give steroids also. May need repeat doses if severe croup.
Oxygen	Severe [SaO_2 <90%], Very severe with central cyanosis	Mask with minimum flow rate of 6L/min via a Hudson mask.	Give nebulised adrenaline and systemic corticosteroids also.

It is useful to provide the parent/caregiver of a child with croup with a parent fact sheet on discharge from the Emergency Department together with written follow-up arrangements for review by their General Practitioner.

After Initial Treatment, Factors Increasing the Likelihood of Hospital Admission:

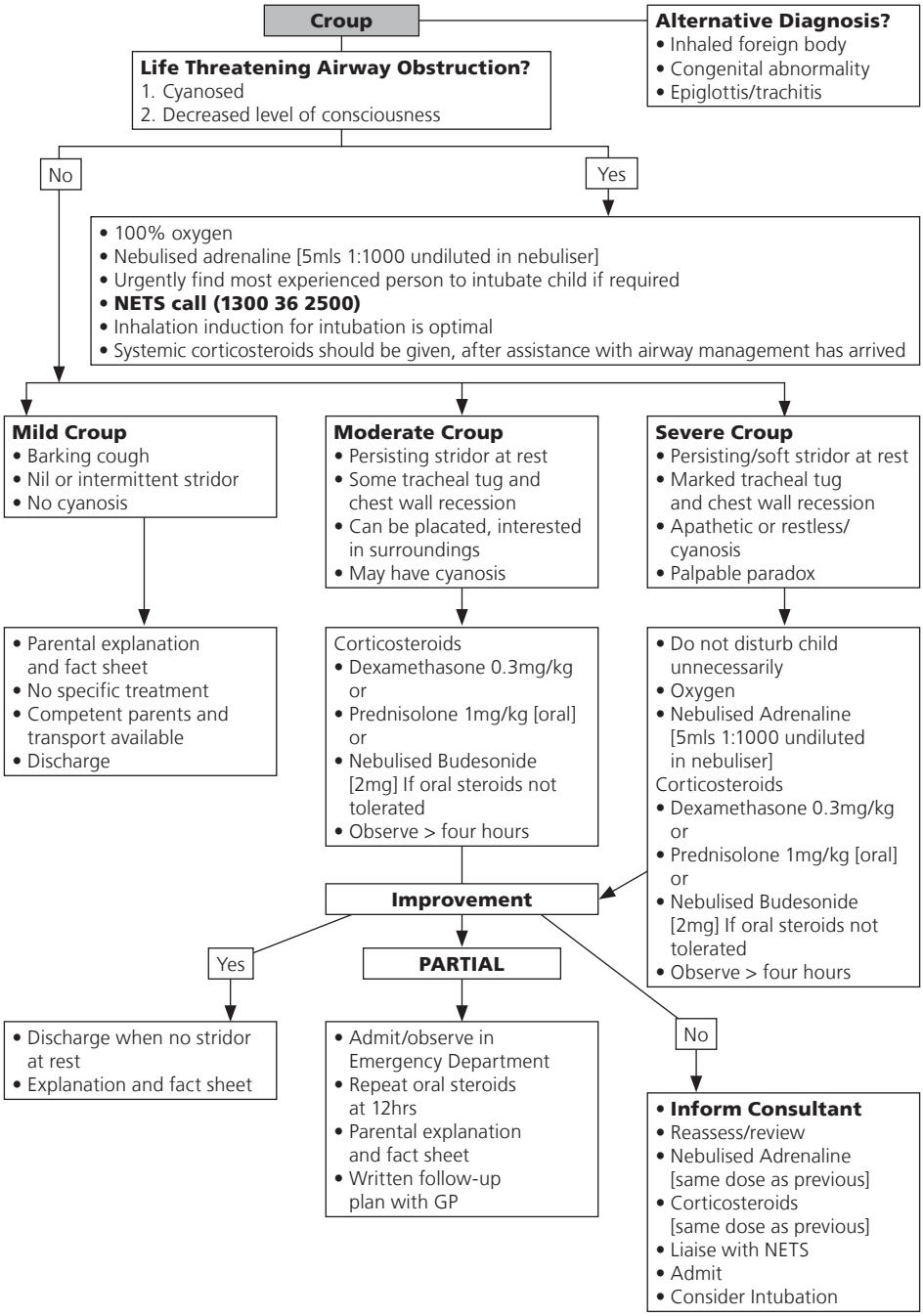
Severe obstruction prior to presentation, previous severe croup or known structural airway anomaly (e.g. subglottic stenosis), age < 6 months, stridor at rest at presentation, poor fluid intake, marked parental anxiety, home is a long distance from hospital, representation to the Emergency Department within 24 hours and uncertainty about the diagnosis.

Considerations for Transfer to a Paediatric Hospital

The need for transfer to a paediatric centre is based upon age of the child, presence of predisposing conditions (e.g. subglottic stenosis), severity of the illness, response to treatment and level of expertise available at the hospital.[E4]

- A child with an unstable airway/severe croup will require a medical escort for transfer to a centre with paediatric supervision.
- Further advice about the management of croup or whether to transfer a patient is available through the emergency physician, paediatrician, ICU specialist on call for the hospital or you may call Newborn & paediatric Emergency Transport Service (NETS NSW).
- If transfer to a paediatric centre is indicated, then **the Newborn & paediatric Emergency Transport Service NSW (NETS NSW) can be contacted by phone on 1300 36 2500** to provide liaison with expert advice in one of the three NSW paediatric teaching hospitals and to facilitate the child's transfer.

Figure 1: Clinical Assessment: Stridor/Respiratory Distress



Appendices

Appendix One – References

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Please note that an international literature search was conducted in addition to the references quotes in the previous edition.

Appendix Two – Parent Information

A croup fact sheet jointly developed by John Hunter Children's Hospital, Sydney Children's Hospital and Children's Hospital at Westmead is available at:

www.kaleidoscope.org.au/factsheets.htm

www.sch.edu.au/health/factsheets

www.chw.edu.au/parents/factsheets

Disclaimer: The fact sheet is for educational purposes only. Please consult with your doctor or other health professional to ensure this information is right for your child.

Appendix Three – Resources

Fuller details may be necessary in practice, especially for the management of children with croup. Possible sources include:

NSW Health Department CIAP web site, Managing young children and infants with croup in Hospitals at: www.ciap.health.nsw.gov.au

The Children's Hospital at Westmead Handbook 2004 available as a book from the Children's Hospital at Westmead, or at www.chw.edu.au/parents/factsheets

Appendix Four – Working Party Members

Dr Mark Lee (Chair)
Paediatrician, Emergency Physician, JHCH

Dr Peter Van Asperen
Department Head, Respiratory Medicine, CHW

Dr Peter Wyllie
Staff Specialist, Emergency Department, South East Sydney Illawarra Area Health Service

Ms Leanne Crittenden
Coordinator, Northern Child Health Network

Ms Linda Cheese
Paediatric Respiratory CNC, JHCH

Ms Sandra Babekuhl
CNC Paediatrics, Northern Child Health Network

Ms Joanne Dungery
CNC Emergency/Critical Care Southern Network, Greater Southern Area Health Service

Dr Penelope Field
Department of Respiratory Medicine, CHW

Ms Helen Gosby
Nurse Practitioner, Emergency, CHW

Dr Jodi Hilton
Paediatric Respiratory Consultant, JHCH

Dr Chris Mathews
General Practitioner, Cessnock

Ms Cheryl Nolte
NUM, Port Macquarie Base Hospital

Dr Mathew O'Meara
Director of Emergency, SCH

Dr Jessica Ryan
JMO, JHCH

Ms Narelle Stokes
Emergency, Wauchope District Memorial Hospital

Mr Bart Cavalletto
Statewide Paediatric Coordinator, NSW Health

CHW = The Children's Hospital at Westmead

JHCH = John Hunter Children's Hospital

SCH = Sydney Children's Hospital

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