South Australian Paediatric Practice Guidelines

bronchiolitis in children

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

Management summary for bronchiolitis

MILD	MODERATE	SEVERE
• Can be discharged home (consider admission if <3 months) • Advise parents of expected course of illness • Smaller, more frequent feeds • GP follow up • Parent information leaflet • Return if condition deteriorates	• Admit • Administer oxygen to maintain $Sa0_2$ ≥93% • If not feeding adequately consider: - iv fluids - nasogastric feeds - comfort only feeds • Consider 3% hypertonic saline nebulisations	• Admit • Administer oxygen to maintain $Sa0_2$ ≥93% • Continuous cardio-respiratory monitoring • Seek senior help or advice (e.g. MET Call, PICU, MedStar Kids 13STAR (137827) • Cease feeds and commence IVT • Consider nasogastric tube on free drainage

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Important points

- Bronchiolitis is a clinical diagnosis
- Bronchiolitis is a self-limiting condition, but it can be life threatening in the very young, especially ex-premature babies, and those with underlying disease.
- Management is supportive only. There is no disease modifying treatment.

Introduction

- Bronchiolitis is a viral lower respiratory tract infection, generally affecting children under 12 months of age.
- It is the most frequent cause of hospitalisation in infants under 6 months of age.
- The commonest aetiological agent is respiratory syncytial virus (RSV) although other viruses may be responsible.
- Infection results in widespread small-airway obstruction due to oedema and mucous plugging. This causes air trapping and atelectasis leading to inadequate oxygenation of pulmonary blood flow through VQ mismatching
- Infants present with cough, tachypnoea, wheeze, crackles, poor feeding, hyperinflation, chest wall retraction and apnoea.
- The typical course of illness is coryzal symptoms followed by progressively worsening respiratory distress, often with deterioration overnight and mild improvement during the day. This is associated with worsening feeding and a dry cough. Following the peak of the illness, the respiratory distress resolves over several days but the cough may last for several weeks.

Assessment

History

- Include the following when taking the history for a child with suspected bronchiolitis:
  - Age - there is a higher risk of severe bronchiolitis if patient is less than 6 weeks of age.
  - Duration and progression of symptoms. Peak severity is typically day 2 - 3 from the onset of wheeze or 4-5 days from the start of the illness. This will determine whether or not the child is expected to get worse before they get better.
  - Presence of apnoeas. Describe number, frequency and duration.
  - Colour change.
  - Feeding. Is the child able to suck on bottle or breast? What is the duration and volume of feeding i.e. is the child taking longer to feed than normal? Are there fewer wet nappies?
  - Previous episodes of bronchiolitis. Frequent episodes or persistent symptoms especially from birth may suggest alternative diagnoses.
  - Family history of atopy or asthma. In an older infant this may suggest asthma and a trial of bronchodilators may be appropriate.
  - Does the child have pre-existing conditions including:
    - Premature birth
    - Chronic respiratory conditions
    - Neurological conditions
    - Congenital heart disease
    - Immunodeficiency

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Examination

- **General appearance and basic observations:**
  - Temperature, respiratory rate, heart rate, saturations, +/- blood pressure
  - Colour
- **Behavioural status**
  - Irritability
  - Exhausted infant may be hypoxic and at risk of developing respiratory failure
- **Hydration:**
  - Skin turgor, capillary refill, peripheral circulation, mucous membranes, fontanelle
- **Respiratory examination:**
  - Effort of breathing - use of accessory muscles, nasal flaring, colour, oxygen saturation
  - Recession – extent and sites of recession
  - Auscultation - typically diffuse end expiratory crackles and/or wheeze. Wheeze may be absent in young infants, especially under 4 months. In these infants prolongation of expiratory phase can be a useful sign.
    - Periodic breathing or apnoeas.
    - Oxygen saturation
- **Feeding**
  - Monitor SaO_2 while feeding, duration of feed and feed volume.

Consider pneumonia if fever present or toxic appearance.

Consider other diagnosis such as heart failure, asthma, bronchial foreign body, or pertussis.

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Assessment of Severity

	MILD	MODERATE	SEVERE
Behaviour	Normal	Some or intermittent irritability	Increasing irritability and/or lethargy
Respiratory Rate	Normal	Increased	Marked increase or decrease (in exhaustion)
Accessory Muscle Use and Recession (Chest wall retraction)	None or minimal	Mild tracheal tug Mild nasal flaring Moderate chest wall retraction	Marked tracheal tug Marked nasal flaring Marked chest wall retraction
Feeding	Normal	May have difficulty with or reduced feeding	Reluctant or unable to feed
Oxygen	No oxygen requirement **($Sa0_2$ > 93%)**	Mild hypoxia corrected by oxygen **($Sa0_2$ 90 - 93%)**	Hypoxia, may not be corrected by oxygen **($Sa0_2$ < 90%)**
Apnoeic episodes	None	May have brief apnoeas	May have increasingly frequent or prolonged apnoeas

Investigations

In most children with bronchiolitis **no investigations** are required

- Serum electrolytes
  - **Required** if child is on intravenous fluids
- Chest x-ray
  - **NOT routinely required** unless diagnostic uncertainty e.g. symptoms and signs that may suggest an alternative diagnosis such as pneumonia or congestive heart failure
  - In bronchiolitis chest x-ray typically demonstrates hyperinflation, peribronchial thickening, and often patchy areas of consolidation and collapse.

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Blood cultures

- **NOT required** unless bacterial infection suspected

- Blood gas
  - **NOT routinely required**

- Nasopharyngeal aspirate (NPA)
  - **NOT routinely required** for children with typical clinical picture of bronchiolitis as is has no diagnostic role.
  - NPA is used in hospitalised children for infection control purposes
  - Medical indications include: history of apnoeas, severe or atypical illness, clinical suspicion of pertussis or Mycoplasma infection

Management

Management summary

Link to summary at start of guideline

Discharge from emergency or primary care

- Mild degree of severity
- Patient can maintain adequate hydration on oral feeds
- Patient can maintain adequate oxygenation (Sa02 ≥ 93%) in room air
- Parents are competent to identify deterioration, to attend to the needs of the recovering infant. and are able to return if necessary
- If this is a recurrent presentation, consider admission
- Infants under 3 months are at higher risk, especially of apnoeas, and admission should be strongly considered

Inpatient management

Regular observations including:

- Behaviour - alert, lethargic, irritable
- Heart rate
- Respiratory rate
- Work of breathing
- Pulse oximetry & oxygen requirement
- Any apnoeic episodes. If present, continuous pulse oximetry monitoring is indicated.
- Temperature

- Observations should usually be done at least 4 hourly but more frequently in severely affected and younger infants.
- Cardio-respiratory and continuous oximetry monitoring should be considered in sicker and younger infants.

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Infection Control

- The viruses that cause bronchiolitis are droplet and contact spread. Appropriate infection control and isolation measures should be taken.

Fluid requirements

Some infants may be dehydrated due to poor feeding prior to presentation. Recommendations below are for maintenance fluids and additional fluid may be needed in dehydrated infants.

Oral Feeds

- Oral feeding should be continued if tolerated.
- Small frequent feeds are generally better tolerated.
- Consider using intranasal 09% sodium chloride drops (0.2-0.4ml) or nasal spray to moisten and help remove secretions and/or suctioning prior to feeding.

Note: Discontinue oral fluids in the event of significant respiratory distress, increasing tachypnoea (RR >80), apnoeic episodes, visible tiring or increased coughing or distress during feeds.

Nasogastric feeds

- Consider nasogastric feeds if infant unable to tolerate oral feeding but not severely unwell. There is a risk of aspiration in severe illness.
- Nasogastric feeds can be given as regular boluses (e.g. 2-4 hourly) or continuous feeds – there is no current evidence suggesting the benefit of continuous versus bolus feeds.
- If the child is breastfed and requires nasogastric feeding the first choice of fluid should be expressed breast milk.
- Consider limiting amount of nasogastric feeding to 2/3 maintenance

Intravenous fluids

- Intravenous therapy is required for patients with severe bronchiolitis or if not tolerating oral/NG feeds.
- Restrict fluids to 75% of maintenance due to the risk of syndrome of inappropriate antidiuretic hormone (SIADH).
- Check electrolytes when commencing IVT
- Initial fluid choice should usually be 0.45% sodium chloride + 5% glucose or 0.9% sodium chloride + 5% glucose

Comfort feeds refer to small feeds (often 10-20ml) for children on IVT which settles their hunger. They should be given with caution in severe illness.

Oxygen

Provide oxygen to maintain $Sa0_2$ ≥93% in a normally healthy infant (be mindful of infants with underlying medical conditions which may change their baseline oxygen requirements)

Deliver oxygen therapy via:
Nasal prongs

- Indicated in patients with mild to moderate work of breathing and $Sa0_2$< 93%.
- Maximum flow rate for infants and small children should be 2L/min.

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Humidified High Flow Intranasal oxygen (Optiflow)

- There may be some benefit for children with severe illness in using humidified high flow intranasal oxygen if available. Local protocols regarding its use should be followed.
- This may be used as an interim measure while awaiting retrieval

Weaning oxygen

Consider weaning oxygen if the child is:

- Clinically stable in current level of oxygen
  - Maintaining $Sa0_2$ >93%
  - Tolerating oral fluids
  - Reduce oxygen according to patient's clinical status and $Sa0_2$

Medication

Bronchodilators

- Consider trial of bronchodilators in child > 6 months age. It is more likely to succeed if:
  - History of atopy in child (e.g. eczema) or a family history of atopy.
  - Previous response to bronchodilators.
- Give 6 puffs of Salbutamol MDI (100mcg per puff) via spacer. Check response 10 - 20 minutes later. This assessment should be performed by the doctor who initially assessed the child in order to determine whether or not there is a response to salbutamol.
- **IF** there is a positive response - consider charting regular Salbutamol
- **Do NOT continue** bronchodilators if there is **no response** to initial trial.

Nebulised 3% hypertonic saline

- Hypertonic saline (3%) has been shown to decrease the length of stay in hospital in infants with bronchiolitis.
- Consider use of nebulised hypertonic saline as per attached protocol.

Steroids

- There is **no evidence** for the use of steroids in bronchiolitis.

ICU consultation/admission/retrieval is indicated for:

- Severe respiratory distress
- Frequent or prolonged apnoeic episodes
- Patient requires more than 50% O_2 to maintain SaO_2 > 93%

Discharge criteria

- Patient can maintain adequate hydration on oral feeds.
- Patient can maintain adequate oxygenation ($Sa0_2$ ≥ 93%) in room air
- No suctioning required for > 8 hours
- Minimal work of breathing/recession
- Patient should be observed for at least 4 - 6 hours following cessation of oxygen
- The patient's social circumstances need to be considered including the ability of parents to attend to the needs of the recovering infant.

Follow-up

Uncomplicated cases of bronchiolitis don't require specific follow up but parents should contact their child's General Practitioner (GP) if they have concerns.

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References

1. Zorc et al; Bronchiolitis: Recent Evidence on Diagnosis and Management: Paediatrics 2010: 125, 342-349
2. Borton; Bronchiolitis in Children: Patient Plus Article: Approved by Independent GP reviewing team – Last update – April 2010
3. Frank et al: Current Therapeutics in Bronchiolitis: Patient Emerg Care 2010: 26, 302-311
4. Zhang et al: Nebulized Hypertonic Saline Solution for acute bronchiolitis in infants: Cochrane Review: 2008, Issue 4
5. Bronchiolitis Inhalation Therapy – Hypertonic Saline Protocol – Southern Adelaide Health Service – Regional Clinical Procedure – Last reviewed 5/1/11

This guideline is based on the review of a number of current clinical guidelines including:

1. The Royal Children's Hospital Melbourne Guidelines – Bronchiolitis Guideline
2. Starship Paediatric Health Clinical Practice Guidelines – Bronchiolitis Guideline
3. NSW Health – Children and Infant's with Bronchiolitis – Acute Management – 2005
4. Sydney Children's Hospital – Viral Bronchiolitis Inpatient Guidelines

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

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Appendix 1- Use of 3% hypertonic saline in bronchiolitis

Preparation

> All final solutions must be **freshly prepared**

> To prepare a 3% solution of sodium chloride for nebulisation:

- Perform hand hygiene preferably with an alcohol based rub
- Start with **a newly opened** solution of 20% sodium chloride for injection (10ml ampoule)
- Draw up 0.6ml of sodium chloride 20% injection
- Add 3.4 ml of water from a newly opened ampoule of water for injection
- Use the 4ml of diluted sodium chloride solution as a nebuliser solution **immediately**

Frequency (suggested protocol)

- 2 hourly x 3 doses
- 4 hourly x 5 doses
- 6 hourly thereafter

NOTE: Bronchoconstriction has been reported with the use of hypertonic saline in bronchiolitis especially in older infants. CONSIDER adding bronchodilator (Ipratropium bromide [Atrovent®] 250 mcg or Salbutamol 2.5mg) staggered **30 mins prior** to each hypertonic saline nebuliser. This is recommended in all infants > 10 months.

Version control and change history

PDS reference: OCE use only

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1	August 2013	current	Original version

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