Bronchiolitis Update

Key reviewer: **Dr Philip Pattemore**, Associate Professor of Paediatrics, University of Otago, Christchurch

Key Points:

- Bronchiolitis is the most common lower respiratory tract infection seen in infants less than 12 months of age
- Most cases are caused by Respiratory Syncytial Virus (RSV) but other viruses can be involved
- Bronchiolitis is a highly infectious viral illness and measures to prevent infection and recurrence of infection are important
- Māori and Pacific infants suffer proportionally more morbidity from bronchiolitis
- Risk factors for bronchiolitis (e.g. environmental factors, exposure to others with viral illness) should be managed if possible
- Management of bronchiolitis in general practice is supportive. There is no indication for bronchodilators, inhaled or systemic corticosteroids or antibiotics

In BPJ 5 (May, 2007) we discussed the assessment and management of bronchiolitis. With the bronchiolitis season on the horizon we provide an update with emphasis on differential diagnosis, treatment options, indications for referral and preventative strategies.

Bronchiolitis is a seasonal viral disease commonly seen in infants

Bronchiolitis is the most common lower respiratory tract infection seen in infants less than 12 months of age, with a peak incidence at three to six months. Most cases are caused by Respiratory Syncytial Virus (RSV) but it can also be caused by rhinovirus and less commonly other viruses such as parainfluenza viruses, adenovirus and influenza A and B viruses. Certain adenoviruses can cause a severe bronchiolitic illness with pneumonia. This can damage small airways and lead to bronchiolitis obliterans and bronchiectasis.

The RSV season in New Zealand is from June to October with the peak for bronchiolitis admissions occurring in July and August.

Symptoms of bronchiolitis

Bronchiolitis usually starts with a two to three day prodromal phase of coryzal symptoms. Other symptoms and signs include cough, rapid respiratory rate, hyperinflation and wheeze and crackles. Fever does not always occur but if present it is usually low grade (less than 39°C). Absence of fever should not preclude a diagnosis of bronchiolitis. In the first 72 hours of the illness infants may get worse before starting to improve.[2, 3]

Increased respiratory rate can be a marker of the severity of bronchiolitis, but apnoea may be a presenting feature, especially in very young or premature infants. Many infants will have poor feeding as result of dyspnoea and feeding problems are often a reason for hospital admission. Bronchiolitis can be assessed as mild, moderate or severe (Table 1).[2] Most infants with acute bronchiolitis will have mild disease and can be managed at home with

Bronchiolitis in Māori infants

A five year bronchiolitis study at Lakes DHB from 2003-2007 found that 80% of children admitted were Māori and the majority (over 70%) were from the poorest housing deciles.[1] Bronchiolitis is easily spread in poorer, overcrowded households. Smoking is another significant factor.

Tu Kotahi Māori Asthma Trust provides a bronchiolitis service within the Hutt Valley where the majority of referrals received are young Māori whānau. The service offers home visits to assess the baby (oxygen level, chest, pulse and temperature). A key aspect of the service is the opportunity to reinforce understanding of the illness, its symptoms and the likely course it will take.

The main issues encountered by this service are a general lack of understanding of the disease and the reasons why medication is not prescribed. A clear explanation that bronchiolitis is a viral infection can help parents to understand and accept why medication is not required.

Situations frequently encountered by Tu Kotahi that increase the risk of bronchiolitis include:

- Damp housing
- Inadequate heating
- Overcrowding
- Whānau who are unable to provide adequate clothing for their children over the winter months
- Transport and access problems to health care resources

When whānau visit the GP, key questions about housing and the social environment should be asked. There are a number of options that can be investigated by community health workers regarding home insulation, possible subsidy of power bills and clothing banks.

Table 1: (adapted from New Zealand Guidelines).[2, 3]

	Assessment of severity of bronchiolitis		
	Mild	**Moderate**	**Severe**
Respiratory rate breaths/minute	< 2 months > 60/min 2–12 months >50/min	> 60/min	> 70/min
Chest wall indrawing	None/mild	Moderate	Severe
Nasal flare and/or grunting	Absent	Nasal flare possible, grunting absent	Present
Feeding	Normal	Less than usual Frequently stops Quantity > ½ normal	Not interested Choking Quantity < ½ normal
History of behaviour	Normal	Irritable	Lethargic
Cyanosis	Absent	Absent	Present

support. However, it is important to provide caregivers with information on how to recognise deterioration in the infant's condition, and what to do if this occurs.

A recent consensus guideline from the UK defined bronchiolitis as a "seasonal viral illness characterised by fever (not always present), nasal discharge and dry wheezy cough. Cough is usually dry and wheezy and along with nasal symptoms is one of the earliest symptoms to occur in bronchiolitis.[3] On examination there are fine inspiratory crackles and /or high pitched expiratory wheeze.[4]

Consider other causes of wheeze

Diagnosis is made clinically based on a typical history (e.g. wheeze with recent coryzal symptoms and/or cough) and findings on clinical examination. Wheeze is usually a prominent characteristic of bronchiolitis but can also occur in other conditions common in infants and young children, primarily, asthma, transient infant wheeze (see box) and rarely pneumonia.

The frequency of presentation of these wheezing phenotypes is influenced by age, with RSV bronchiolitis occurring almost exclusively in the first 12 months of life and peaking at six months.

Only a minority of infants who wheeze in the first year of life will have asthma. Some of these infants will have strong risk factors, such as parental asthma or eczema. A definite response to bronchodilators and asthma can be recognised from an early age. In others, the trend towards a recurrent wheezy illness responsive to bronchodilators, is only apparent after a period of months or years. Risk factors for asthma include eczema in the infant, wheeze without a cold (interval symptoms), more than two episodes of wheezing with a cold and family history of atopy.

Transient infant wheeze is thought to be due to smaller than normal airways and is associated with exposure to tobacco smoke and early viral infections. Acute attacks of wheezing tend to occur with viral upper respiratory tract infections.

Fine inspiratory crackles in all lung fields are a common finding in acute bronchiolitis but are not a characteristic of asthma. Infants with no crackles and only intermittent wheezing are unlikely to have true bronchiolitis but may have viral bronchitis with wheeze, or other acute or recurrent causes of wheeze.[3] Coarse crackles, which clear or change on coughing, indicate the presence of mucus in large airways which can occur in asthma.

The presence of wheeze, in addition to increased respiratory rate and indrawing, may indicate a diagnosis of bronchiolitis rather than pneumonia. However, it should be noted that wheeze may occasionally be seen in infants aged less than two months with pneumonia.[2]

Inhaled corticosteroids

Although bronchodilators and corticosteroids appear to be frequently used in primary care to treat acute bronchiolitis there is no evidence to support this practice. Hospital based studies have shown no benefit from inhaled corticosteroids on respiratory symptoms or length of hospital stay, and a systematic review concluded that oral prednisolone did not prevent wheeze, when given for the first seven days of acute bronchiolitis.[3] Some trials have shown short term clinical benefits of inhaled beta-2 agonists, but their use does not appear to reduce hospital admission rates or the length of hospital stay. [3]

Investigations are rarely necessary

Investigations, with the exception of oximetry, are not routinely indicated in the diagnosis or in determining the severity of bronchiolitis. If there are concerns about hypoxia, or if oxygen saturation is less than 92%, the infant should be referred.

Routine blood and urine cultures are not recommended for infants presenting with uncomplicated bronchiolitis. FBC, ESR and CRP are not reliable predictors of disease severity and are not helpful for differentiating between bacterial and viral infection. Chest X-ray is not routinely indicated and is not useful for differentiating between viral and bacterial infection.

Treatment is supportive

Bronchodilators, inhaled or systemic corticosteroids or antibiotics are not recommended for the treatment of bronchiolitis in primary care.[2, 3]

The management of bronchiolitis in primary care is focused on providing support and information. In the first 72 hours of the illness infants may get worse before starting to improve. An infant who is seen early in the course of the illness may need to be re-assessed to check for any deterioration.[2] Parents/caregivers of infants who have been assessed with mild or moderate illness, where symptoms have been present for more than 72 hours, need only reassurance.[2]

Caregivers should be given clear information about how to recognise any worsening of the infant's condition and asked to bring the infant back for reassessment if this occurs. It is also important to inform caregivers of the location of support services, such as after hours clinics or hospitals, in case the infant's condition deteriorates.

When to refer

Infants with severe symptoms or who deteriorate may require referral for consideration of oxygen, nasogastric feeding and intravenous fluids.

Refer all infants with:

- Respiratory rate > 70/min
- Nasal flare and grunting
- History of apnoea
- Poor feeding - lack of interest, choking, less than 50% of usual fluid intake in the preceding 24 hours
- Lethargy
- Severe chest wall recession
- Cyanosis

The threshold for referral to hospital should be lowered in infants less than two months of age, or those born at less than 32 weeks gestation, and infants with respiratory or cardiac comorbidity (e.g. chronic lung disease, congenital heart disease).[2]

Social factors such as the home environment, ability of caregivers to cope and distance to a hospital may also determine the need to refer.

A comprehensive fact sheet for caregivers is available from **www.kidshealth.org.nz** (keyword: bronchiolitis). A one page summary is shown on the opposite page. This can be also be downloaded from **www.bpac.org.nz** keyword: bronchiolitis.

Re-infection is common

As re-infection is common, advice should be given on how to reduce the risk of infection, and how to prevent the spread of infection to other infants in the family/whānau.

- Take time to clearly explain bronchiolitis, what is meant by a viral infection and check the parents understanding. Provide simple written information if possible
- Ask about housing conditions and find out about services in your community that may be able to assist if needed
- Encourage parents to keep rooms, where the baby lives, at a constant comfortable temperature
- Encourage and support a smokefree environment
- Encourage parents to return or seek assistance if there are concerns about baby's breathing, ability to feed or general wellbeing
- Bronchiolitis is easily spread, so encourage good hygiene practices such as hand washing before and after handling the baby. People who have a cold or flu-like illness should try and avoid contact with infants.

Post bronchiolitic wheeze

Acute bronchiolitis, especially when severe, is associated with a later risk of recurrent wheezing episodes.[3] It is not known if bronchiolitis is the cause, or whether there are prior genetic or environmental factors, that predispose to respiratory disease.

Approximately 10% of children will have wheezing episodes after age five.[2] But evidence shows that in the majority the increased risk of wheeze dissipates by the age of 13 years.[2] A recent Cochrane Review did not find any evidence that inhaled corticosteroids, given during acute bronchiolitis, are effective in the prevention of post-bronchiolitic wheezing.[5]

References

1. Lakes DHB. Five year bronchiolitis study at Lakes District Health Board. Available from https://www.asthmanz.co.nz/files/PDF-files/CREW/REC2008/Presentations/Ngaroma_Grant.pdf (Accessed February 2009).
2. Paediatric Society of New Zealand. Wheeze and chest infection in infants under one year. Best practice evidence based guideline. Available from www.nzgg.org.nz (Accessed February 2009).
3. Scottish Intercollegiate Guidelines Network. Bronchiolitis in children. SIGN Guideline 91. November, 2006.
4. Lakhanpaul M, Armon K, Eccleston P et al. An evidence based guideline for the management of children presenting with acute breathing difficulty. Nottingham University, 2002.

   Available from; http://www.nottingham.ac.uk/paediatric-guideline/breathingguideline.pdf (Accessed, March 2009).
5. Blom D, Ermers M, Bont L, van Aalderen WM, van Woensel JB. Inhaled corticosteroids during acute bronchiolitis in the prevention of post-bronchiolitic wheezing. Cochrane Database Syst Rev. 2007 Jan 24;(1):CD004881.

Caregiver advice for bronchiolitis

Your child has bronchiolitis. This is very common in children under one-year-old and is caused by a virus. Bronchiolitis can usually be managed safely at home

1. What to expect and how you can help your child

You can expect your child to get a lot better after the first three days, although their cough may linger for several weeks.

Medicines are not helpful for children with bronchiolitis but you can help keep your child comfortable by:

- Offering small feeds of breast milk or infant formula regularly
- Keeping your baby warm but not too hot
- Giving your baby as much rest as possible
- Don't smoke in the house or around your baby
- Keeping your baby's nose clear. If it is blocked or crusty you can use saline nose drops (from a pharmacy)
- Keeping your baby away from other children so as not to spread the disease

2. When should I seek help?

You can expect your child to improve so you should get urgent advice from a doctor or nurse if they get worse. Any one of the following may be a sign of the illness getting worse:

- Breathing fast, has noisy breathing and is having to use extra effort to breathe
- Looking unwell and/or very pale
- Taking less than half of their normal feeds
- Vomiting
- Has not wet a nappy for six hours

3. Danger signals

The following are danger signs. Dial 111 or contact a doctor immediately if your child has any of the following:

- Blue lips and tongue
- Severe difficulty breathing
- Is becoming less responsive
- Is pale
- Is floppy
- Periods of stopping breathing

This note tells you:

- What to expect and how you can help your child
- How to recognise when you should get urgent advice
- How to recognise danger signals

Healthline is available for free, confidential health advice 24 hours a day

Healthline nurses do not diagnose over the phone but will assess the situation and provide advice as to the best course of action.

Call 0800 611 116 from either a landline or a mobile phone.

Your child may need a further check up

Your Doctor or Nurse may want to check your child even if things appear to be going as expected. If you have been advised to have a check up, write the details here:

Check up time and date:

At the following location:

Name of person doing the check up:

Phone number:

For more information visit:

www.kidshealth.org.nz