Bronchiolitis

Bronchiolitis is an acute viral infection of the lower respiratory tract that occurs primarily in the very young. It is a clinical diagnosis based upon typical symptoms and signs. Bronchiolitis is generally a self-limiting illness, and management is mostly supportive.

There is some discrepancy between the use of 'bronchiolitis' in the UK and in the USA and other parts of Europe, and no universally accepted definition for such a common condition. In the UK, the term describes an illness in infants, beginning as an upper respiratory tract infection (URTI) that evolves with signs of respiratory distress, cough, wheeze, and often bilateral crepitations. In North America, bronchiolitis is used to describe a wheezing illness associated with an URTI in children up to the age of 2 years (whilst this would be described as a 'viral-induced wheeze' in the UK). This causes difficulties in interpreting results of clinical trials, as the populations may display considerable heterogeneity. This article is based on UK guidelines.

Aetiology

Bronchiolitis is caused by a viral infection, most often respiratory syncytial virus (RSV). This is responsible for up to 80% of cases. Other possible viral causative agents include human metapneumovirus (hMPV), adenovirus, rhinovirus, and parainfluenza and influenza viruses. In some cases there may be infection with more than one virus.

Epidemiology

- Bronchiolitis occurs in infants under the age of 2 years, peaking between the ages of 3 months and 6 months.
- It is the most common lower respiratory infection in the first year of life in the UK. Around a third of babies develop bronchiolitis before the age of 1 year, and 2-3% of infants with bronchiolitis require hospitalisation.
- In 2011/12 in England, there were 30,451 admissions for bronchiolitis.
- Peak incidence is in the winter months (October to March). There tends to be an annual 6- to 8-week epidemic where incidence peaks.

Risk factors

- Environmental and social risk factors:
  - Older siblings.
  - Nursery attendance.
  - Passive smoke, particularly maternal.
  - Overcrowding.

Breastfeeding is considered protective and should be encouraged for this and other reasons.

Most admissions (85%) for bronchiolitis are in infants born at term with no risk factors. Risk factors for severe disease and/or complications include:

- Prematurity (<37 weeks).
- Low birth weight.
- Mechanical ventilation when a neonate.
- Age less than 12 weeks.
- Chronic lung disease (eg, cystic fibrosis, bronchopulmonary dysplasia).
- Congenital heart disease.
- Neurological disease with hypotonia and pharyngeal discoordination.
- Epilepsy.
- Insulin-dependent diabetes.
- Immunocompromise.
- Congenital defects of the airways.
- Down's syndrome.

Presentation

National Institute for Health and Care Excellence (NICE) guidelines advise that bronchiolitis should be considered in children under the age of 2 years who present with a 1- to 3-day history of coryzal symptoms, followed by:

- Persistent cough; and
- Either tachypnoea or chest recession (or both); and
- Either wheeze or crackles on chest auscultation (or both).
Other typical features include fever (usually of less than 39°C) and poor feeding. Consider an alternative diagnosis such as pneumonia if temperature is higher and crackles are focal. Consider viral-induced wheeze if there is wheeze without crackles, episodic symptoms and/or a family history of atopy.

Very young babies may present with apnoea alone, with no other signs.

**Assessment**

Take a history, and examine the child, making note of capillary refill time, respiratory rate, heart rate, chest signs, etc. Following examination, measure oxygen saturation in any child with suspected bronchiolitis.

Consider referral to secondary care if the respiratory rate is >60 breaths/minute, or if there is inadequate fluid intake or there are signs of dehydration; also, if the child is less than 3 months of age or was born prematurely, or there is comorbidity (particularly respiratory or heart disease, or immunodeficiency). Take into account social circumstances and the ability of the carer to assess deterioration.

Refer immediately if any of the following are present:

- Apnoea (observed or reported).
- Marked chest recession or grunting.
- Respiratory rate >70 breaths/minute.
- Central cyanosis.
- Oxygen saturation of less than 92%.
- The child looks seriously unwell to a healthcare professional.

**Differential diagnosis**

- **Viral-induced wheeze.** Consider if there is wheeze but no crackles, a history of episodic wheeze, and/or a family or personal history of atopy.
- **Pneumonia.** Consider if temperature is above 39°C and there are persistent focal crackles.
- **Asthma.**
- **Bronchitis.**
- **Pulmonary oedema.**
- **Foreign body inhalation.**
- **Oesophageal reflux.**
- **Aspiration.**
- **Cystic fibrosis.**
- **Kartagener's syndrome.**
- **Tracheomalacia/bronchomalacia.**
- **Pneumothorax.**

**Investigations**

- **Pulse oximetry.**
- **Viral throat swabs for respiratory viruses (in secondary care)**

Chest X-ray, blood tests and blood gases are not advised for the routine management of bronchiolitis, unless there is evidence of deterioration and worsening respiratory distress. As above, fever >39°C or focal chest signs would prompt investigations such as a chest X-ray to rule out alternative diagnoses such as pneumonia, or complications.

**Management**[2, 8]

**Primary care**

- Most infants with acute bronchiolitis will have mild, self-limiting illness and can be managed at home. Supportive measures are the mainstay of treatment, with attention to fluid input, nutrition and temperature control.
- Advise the parents that the illness is self-limiting and symptoms tend to peak between 3-5 days of onset.
- Anti-pyretic agents are needed only if a raised temperature is causing distress to the child.
- Within general practice, a doctor’s role is to assess current severity of illness and, for those with mild-to-moderate disease, to support and monitor. Consider whether the presentation is in the early stages of disease, when a child is more likely to become worse before improving. Careful safety netting is important, teaching parents to spot deterioration and to seek medical review should this occur.
- If referring to hospital, give supplementary oxygen whilst awaiting admission in children whose oxygen saturations are persistently below 92%.

**Secondary care**

Even amongst hospitalised children, supportive care is the mainstay of treatment, including oxygen and nasogastric feeding where necessary. Upper airway suction may be useful if there is difficulty feeding or a history of apnoea. Continuous positive airway pressure (CPAP) may be considered in those who have impending respiratory failure. High-flow nasal cannula oxygen (HFNC) is commonly used for bronchiolitis in secondary care as it is thought to reduce the need for CPAP and ventilation. Research is underway to establish the evidence for this[8, 10].
Further reading & references

- Bronchiolitis in children; NICE Quality Standard, June 2016

8. Cough - acute with chest signs in children; NICE CKS February 2017 (UK access only)

Prevention

Immunoprophylaxis
Recent years have seen the development of agents which provide passive immunity to RSV: RSV immunoglobulin (RSV-Ig) which has been superseded by palivizumab, a monoclonal antibody. It has been shown to reduce RSV-related hospitalisation and intensive care admissions significantly. The Joint Committee on Vaccination and Immunisation recommends that it should be used by those at high risk of severe RSV disease[10].

- Those with bronchopulmonary dysplasia (BPD, also known as chronic lung disease) due to prematurity or chronic lung disease.
- Those at high risk due to congenital heart disease.
- Those at high risk due to severe combined immunodeficiency syndrome.

The first dose should be administered before the start of the RSV season.

Infection control

Disease transmission may be limited by:

- Hand washing.
- Use of gloves and aprons or gowns when in direct contact with the patient.
- Isolation of infected patients in cubicles.

Further reading & references

- Bronchiolitis in children; NICE Quality Standard, June 2016

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