

Wheezing

Definition / Supporting Information

Wheezing is a whistling sound that occurs as a result of bronchospasm (airway constriction). It is usually more prominent during expiration but may also be present in inspiration.

Keywords / also known as: airway constriction, airway noises, asthma, breathing problems, difficulty breathing, rattling, shortness of breath

Essential History

Ask about:

- Age at onset
- Frequency of wheezing
- Intermittent or constant wheezing
- Recent upper respiratory tract illness
- Fever
- Association with vigorous activity, changing weather, exposure to allergens
- Acute onset
- Accompanying coughing, choking
- Frequent vomiting
- Positional wheezing
- Worsening with agitation or crying
- Difficulty in swallowing (see Dysphagia)
- Allergies (eg, anaphylaxis, rhinitis)
- Faltering growth (review 'Red Book' charts)
- Haemoptysis
- Recent surgical procedure / intubation
- Poor response to conventional therapy
- Family history of wheeze and / or cystic fibrosis
- Night time symptoms
- Smoking in the house and smoking in older children
- Damp and / or mould in the house

'Red Flag' Symptoms and Signs

Ask about:

- Allergies especially to food / animals and specifically about previous anaphylactic reactions
- Poor feeding and respiratory distress in acute wheeze (see [Dyspnoea](#))
- Faltering growth in chronic wheeze (relates to chronic illness and treatment)
- Breathlessness
 - Too breathless to speak full sentences?
- Panic / anxiety
 - Is the patient frightened?
- Previous admissions
- Previous admission to intensive care unit
- Previous need for intravenous therapies to support respiration
- Previous intubation, even as a neonate (think of subglottic stenosis)

Look for:

- Signs of respiratory distress
 - Tachypnoea
 - Recessions
 - Decreased or absent breath sounds – 'silent chest'
- Unilateral wheezing
 - Most often associated with aspiration of a foreign body

Differential Diagnosis / Conditions

- Viral bronchiolitis, viral lower respiratory tract infections and asthma account for most wheezing
- Wheezing (and stridor) after a recent surgical procedure or intubation suggests acquired obstruction
- Expiratory wheeze can result from:
 - Large airway obstruction (ie, trachea or mainstem bronchi) or
 - Peripheral small airway obstruction (ie, asthma)
- Presence or absence of expiratory wheeze does not reliably indicate location of obstruction
- Asthma
 - Worse with exercise or respiratory infections
 - Nocturnal cough and wheeze
 - Other triggers include:
 - Contact with animals
 - Stress or emotional disturbances

- Weather conditions
 - Responds to bronchodilators and steroids
 - Reversible obstruction on pulmonary function testing
 - Polyphonic musical expiratory wheeze
 - Family history
- Tracheomalacia
 - Worse with activity or agitation
 - Poor response to bronchodilators and steroids
 - Monophonic usually inspiratory noise (“squeek”)
 - Inspiratory airway collapse
 - Detectable by fluoroscopy
 - Collapsing trachea on inspiration
 - Detectable by bronchoscopy
- Bronchomalacia
 - Worse with activity or agitation
 - Poor response to bronchodilators and steroids
 - Monophonic usually inspiratory noise
 - Airway collapse
 - Detectable by fluoroscopy
 - Collapsing bronchus
 - Detectable by bronchoscopy
- Foreign body
 - Sudden onset
 - May be associated with history of choking
 - Many patients with foreign body aspiration do not have an obvious history of choking
 - Choking should be suspected even in a child whose wheezing has been present for days or weeks
 - Differential breath sounds
 - Differential hyperinflation or collapse on radiography
- Heart failure or pulmonary oedema
 - Poor response to salbutamol
 - Poor growth
 - Hepatomegaly
 - Radiography showing enlarged heart and / or pulmonary oedema (increased fluid)
 - Responds to diuresis
- Bronchiolitis
 - Infant
 - Upper respiratory tract infection symptoms

- Most usual pattern:
 - Expiratory wheeze
 - Inspiratory and expiratory crackles
- Positive viral studies
- Wheezing caused by viral bronchiolitis:
 - Is usually preceded by upper respiratory tract symptoms and fever
 - Worsens within the first few days of onset
 - Tends to improve slowly thereafter
- Vocal cord dysfunction (see Stridor)
 - More common in older children
 - Poor response to all bronchodilators
 - May have inspiratory as well as expiratory component
 - Distress may be severe
 - Pulmonary function tests may be normal, may have reduced peak expiratory flow rate (PEFR) and with abnormal inspiratory loop
 - Oxygen saturation in air usually normal
 - Laryngoscopy shows paradoxical vocal cord adduction during inspiration
 - Needs specialist multidisciplinary team (MDT) intervention (including speech and language therapy, physiotherapy)
- Cystic fibrosis
 - Poor growth, gastrointestinal (GI) symptoms
 - Recurrent pneumonia
 - Frequent fruity / moist cough
 - Positive sweat test
 - May be finger clubbing
- Gastro-oesophageal reflux and aspiration
 - History of frequent vomiting
 - Variable response to bronchodilators
 - Often worse after meals
 - Poor growth, GI symptoms
 - Can be positional (worse when laying flat)
 - Recurrent pneumonia
 - Confirmation of reflux by upper GI endoscopy, nuclear scan, or pH probe
- Pulmonary haemosiderosis
 - Rare disorder causing anaemia and recurrent wheezing from blood irritating the peripheral airways
 - May present with haemoptysis or in association with iron deficiency anaemia
- Vascular abnormalities or compression
 - May be inspiratory as well as expiratory noise
 - Can be unilateral or bilateral

- Often present from birth or soon after birth
- No bronchodilator response
- Oesophageal indentation on barium swallow
- Chest X-ray may show right-sided aortic arch
- Anatomy shown on thoracic magnetic resonance imaging with contrast
- Abnormality (eg, stenosis, complete rings, compression) of large airways:
 - No response to therapy
 - Worse with activity
 - Stridor noted at times
 - Flattened or square flow–volume loop
 - Obstruction visible on imaging or bronchoscopy
- Congenital airway abnormalities
 - Wheezing that appears at birth or soon afterward should prompt an evaluation for:
 - Tracheomalacia
 - Complete tracheal rings

Investigations

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team):

- Measure vital signs including oxygen saturation, PEFr
- Nasopharyngeal aspirate in younger children (below 2 years of age) for viral studies (if available)
- Chest X-ray
 - Thoracic masses
 - Foreign body aspiration

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric / Paediatric Respiratory Team(s)):

- Laboratory testing may be indicated to diagnose specific clinical entities
 - Sweat test for cystic fibrosis
 - Viral studies can identify respiratory syncytial virus or influenza
- Airway fluoroscopy
 - Can confirm diagnosis and help to quantify the severity of tracheobronchomalacia
- Barium swallow or upper GI series
 - Useful if a vascular abnormality is suspected
- Computed tomography or magnetic resonance imaging
 - Confirmation of vascular abnormality or other intrathoracic lesions

- Diagnostic procedures
 - Pulmonary function testing (spirometry) can help to:
 - Obtain objective data on wheezing in patients aged 4–5 years and older
 - Distinguish reversible airways disease from fixed obstruction
 - Distinguish small airway from large airway obstruction
 - Flexible bronchoscopy:
 - Gives visualisation of airways
 - Usually involves a general anaesthetic
 - Useful to characterise dynamic lesions (ie, tracheobronchomalacia)
 - Rigid bronchoscopy
 - Can be useful in diagnosis and treatment of:
 - Suspected inhaled foreign body
 - Rarer conditions such as tracheal stenosis

Treatment Approach

In general, when evaluating and managing the wheezy child:

- Be aware of the various clinical entities that can produce wheezing
- Be able to recognise by history or physical examination patients who require further investigation or intervention (see Anaphylaxis and Stridor)

To be undertaken by non-specialist practitioners (eg, GP Team):

- For acute management of wheeze in asthma and viral induced wheeze see British guideline on the management of asthma [[SIGN clinical guideline 158](#)].
- Asthma
 - Salbutamol 100 microgram/metered inhalation: 4–6 puffs via a spacer device, every 4 hours as needed. Give up to 10 puffs in mild to moderate acute asthma
 - Proper use of inhaler and spacer technique should be checked each visit
 - Oral prednisolone 1-2 mg/kg (max. 40 mg) once daily for three days
- Viral bronchiolitis
 - Inhaled salbutamol, ipratropium bromide, adrenaline/epinephrine, hypertonic saline are not recommended for the treatment of acute bronchiolitis in infants (Bronchiolitis in children: diagnosis and management [[NICE clinical guideline NG9, Section 1.4](#)]).
- Some children require hospital admission for:
 - Severe respiratory distress
 - Hypoxaemia
 - Poor feeding
 - Dehydration

- Discuss seasonal “flu” vaccine (See PHE Green Book Chapter 19)

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric / Paediatric Respiratory Team(s)):

- For the acute management of asthma and viral wheeze see British guideline on the management of asthma [[SIGN clinical guideline 158](#)].
 - Salbutamol via an inhaler device
 - Ipratropium bromide
 - Oral prednisolone
 - Oxygen to keep saturations > 92%

Treatment of other causes of wheeze depends on the underlying cause.

When to Refer

Refer to specialist practitioners (eg, Emergency Department / Paediatric / Paediatric Respiratory Team(s)) if:

- Acute wheeze
 - Respiratory distress unresponsive to inhaled salbutamol
 - Hypoxaemia
 - Tachypnoea interfering with ability to eat or drink
 - Altered mental status or signs of fatigue
- Refer children with unusual presentations or poor response to conventional therapies to appropriate subspecialty physicians
 - Presence of finger clubbing
 - Presence of Harrison’s sulcus (horizontal groove along lower end of rib cage):
 - May represent exaggerated suction of diaphragm on inspiration
 - Suggests longstanding problem
 - Persistent or recurrent wheezing in an infant < 1 year
 - Apparent paradoxical response to bronchodilators
 - Poor weight gain or growth associated with chronic or recurrent wheezing (see Faltering Growth)
 - Repeated hospital admission or multiple courses of oral corticosteroid
 - Persistent asymmetrical wheezing

‘Safety Netting’ Advice

See British guideline on the management of asthma [[SIGN clinical guideline 158](#)].

- Parents / carers should seek urgent medical attention:
 - If an acute asthma attack occurs in a child at home

- Symptoms are not controlled by up to 10 puffs of Salbutamol via pressurised metered dose inhaler and spacer

Patient / Carer Information

**Please note: whilst these resources have been developed to a high standard they may not be specific to children.*

- [Asthma](#) (Web page), the NHS website
- [Asthma – health advice](#) (Web page), Asthma UK
- [Bronchiolitis](#) (Web page), the NHS website
- [Wheeze](#) (Web page), Patient

Resources

National Clinical Guidance

[British guideline on the management of asthma](#) (PDF), SIGN clinical guideline 158, Scottish Intercollegiate Guidelines Network

[Bronchiolitis in children: diagnosis and management](#) (Web page), NICE clinical guideline NG9, National Institute for Health and Care Excellence

[Asthma](#) (Web page), NICE quality standard QS25, National Institute for Health and Care Excellence

[Omalizumab for treating severe persistent allergic asthma](#) (Web page), NICE technology appraisal TA278, National Institute for Health and Care Excellence

[Inhaled corticosteroids for the treatment of chronic asthma in children under the age of 12 years](#) (Web page), NICE technology appraisal TA131, National Institute for Health and Care Excellence

[Inhaled corticosteroids for the treatment of chronic asthma in children aged 12 years and over](#) (Web page), NICE technology appraisal TA138, National Institute for Health and Care Excellence

[Smoking preventing uptake in children and young people](#) (Web page), NICE public health guidance PH14, National Institute for Health and Care Excellence

Suggested Resources

****Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

[Asthma – for professionals](#) (Web page), Asthma UK

[Difficulty in Breathing](#) (Web page - log-in required), Spotting the Sick Child

[Salbutamol inhaler for asthma and wheeze](#) (Web page), Medicines for Children

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