Wheeze in a preschool child: is it asthma?

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Introduction

Problems with breathing are the most common reason for parents to take their child to their GP. All children cough, and by the age of six years 50% of children will wheeze (Bisgaard and Szefler, 2007). This symptom can cause great anxiety in parents who often want to know if their child has asthma. In fact, the majority of wheezy children only suffer when they have a viral respiratory tract infection (for example, the common cold) and the prognosis for most of them is good, with a high proportion growing out of it. A significant number of children under five have an 'asthma-like' condition that should not be called 'asthma'.

It is crucial for health professionals to identify those children who might benefit from regular treatment, but to remain focused on the current situation. This article will outline an approach to manage these children and help to answer common questions parents may have about their child's condition.

Diagnosing wheezing in young children

Wheeze has been defined as a 'continuous high-pitched sound, with musical quality, emitting from the chest during expiration' (Brand et al, 2008). Parents can be confused by other forms of noisy breathing in children ('snoring' or 'ruttles') and may describe this as wheezing.

Studies using a video questionnaire (Saglani et al, 2005) and objective recording of lung sounds have demonstrated the difficulty parents have correctly diagnosing wheeze. All children cough and get viral infections, which might result in a cough that lasts for up to two months. This is normal, and when you consider children can have up to 10 viral infections a year, there is the potential for children to be coughing all year round.

There is a misconception among parents and GPs that a persistent cough might be asthma – but to diagnose asthma, you should hear a wheeze and the child will be breathless, in addition to having a dry cough. It is not uncommon for children with persistent cough or noisy breathing to be wrongly labelled as asthmatic and this has consequences for the child's future as well as the risk of over treatment. It can be helpful to mimic a wheeze to parents. Advise the family to visit the GP during an attack, because if a health professional hears a wheeze on auscultation that should confirm the diagnosis.

Types of pre-school wheezing

Despite diagnostic difficulties, generally wheeze is accepted to be a common symptom. Population studies suggest that one in three children experience one or more episodes of wheezing before the age of three years; and 50% of children by the age of six years (Bisgaard and Szefler, 2007). It is helpful to distinguish between two main types of wheeze and to determine which phenotype they fall in from the child's history (Brand et al, 2008).

Viral-induced (episodic) wheezing

Viral-induced wheezing is the most common type, accounting for two-thirds of all cases of pre-school wheezing.

- Classically, these children wheeze only during discrete periods, most often associated with viral infections or colds.
- Often, there is an association with starting day care, where children can get up to 10 colds a year.
- Children have periods between attacks of no wheeze or breathlessness associated with asthma triggers like exercise, pets or pollens. Often, there is no personal or family history of allergy.

Case study questions (answers overleaf)

You are the health visitor doing a new birth visit and the mother asks you about her older child, David. He is three years old and over the past few months has had three trips to A&E with a wheezy chest. She's worried he has asthma but feels frustrated his GP can't tell her this and won't give him medication to stop this happening. She has the following questions for you:

- Does my child have asthma?
- How long will this go on for?
- Should I change his diet or re-house the dog?

- As the child gets older their attacks become less frequent and usually disappear by six years of age. Some will continue beyond six years, and a smaller proportion might go on to develop asthma.

Multiple-trigger wheezing

In multiple trigger wheezing, viruses are the most common trigger, but children also wheeze in response to allergic triggers and exercise (important to ask about this).

- Often there is a family history of allergy in parents or siblings.
- The child might have suffered from other allergic conditions, such as:
  - Food allergy (80% of children with egg allergy will develop asthma)
  - Eczema
  - Hay fever.
- It is more likely to persist beyond the pre-school years, but this is not always the case.
- Although it is like asthma, many experts choose not to call it asthma because it is a different disease and not as amenable to treatment as normal asthma.
- Families who have a smoker at home should be offered smoking cessation advice, as cigarette smoke will be an important trigger.

It is not always easy to differentiate between the two types of wheeze described above and medical advice should be sought. There is data from population studies (Taussig et al, 2003) looking at long-term outcomes for these children but it may not be very helpful for parents, as we cannot accurately predict the future for them.

Alternative diagnosis

Up to 5% of cases of wheeze will have an alternative diagnosis (Table 1). Any concerns warrant a referral to the GP and probably to a paediatrician.

Is it allergy?

Many parents worry about the possibility of allergy and ask for allergy testing. This is more likely if the wheeze is not just due to colds (multiple-trigger wheeze) and there is a family history of allergy. Risk increases the more family members have an allergic problem. The most important factor to consider is whether the child has, or has previously suffered from, eczema or food allergy. If so, the risk is greater and it might be worth looking at possible triggers in the air.

Food is rarely a trigger for wheeze if the child eats normally and has no symptoms after eating. If you suspect an aero-allergen, the next question is to ascertain what time of the year the wheeze is worse to determine what the allergen might be. If it is confined to the spring or summer, it is likely to be pollens (tree for spring, grass for summer). You should also be getting a history of hay fever – clear runny nose, itchy nose and eyes. If the problem is worse during the winter, think about pets, house dust mite and moulds. Questions to ask the family include:

- If you have a pet, does your child start wheezing or sneezing when they come into contact with it? If the child strokes the animal and then touches their face, do they get an itchy rash?
- When you go away on holiday, is your child's chest much better? If there is a consistent pattern this might indicate something in the home is acting as a trigger
- Does the child have problems at night and in the morning? House dust mite exposure is worse in bed, especially if there are fluffy toys or they sleep on the bottom bunk bed
- Is there mould/dampness in the house that coincides with a deterioration in chest symptoms? Potentially, this can lead to over-diagnosis of mould allergy, but it should be considered in persistent symptoms and strong history of allergy.

To diagnose allergy, a history of association is key; but skin prick testing or blood tests can be useful. Certainly, an allergy test should confirm pet allergy before expecting parents to remove it. All children with suspected IgE-mediated food allergy should be tested (National Institute for Health and Care Excellence (NICE), 2011), in addition to children with deteriorating chest symptoms and risk of allergy, to help with their management.

Table 1. Alternative diagnoses

Diagnosis	Key clinical features
Inhaled foreign body	Previous episode of coughing or choking. Chronic cough, sudden onset, with no cold symptoms
Immune deficiency	Infections that last a long time, always need antibiotics and associated poor growth
Cystic fibrosis	Cough early in life, poor weight gain. Screening will miss approx. 2% of babies with cystic fibrosis
Cardiac disease	Breathless with feeding, poor weight gain, episodes of central cyanosis (blue tongue/lips)
Gastro-oesophageal reflux	Vomiting or poor weight gain
Chronic lung condition	Persistent wet/moist cough lasting >2 months
Congenital airway abnormalities	Recurrent stridor – noisy breathing heard on inspiration and gets worse when crying or unwell

Case study answers

- We can't say at this age, but it seems unlikely that David will develop asthma if he only has symptoms with colds and there are no other allergic problems with him or close family members
- There is a high likelihood that David's attacks will resolve by the age of six, but this cannot be guaranteed
- There is no reason to change David's diet if his parents are not noticing any association. Ask if he has any allergic symptoms when in contact with the dog
- There is no benefit to giving David an inhaler every day, as he is well most days and this won't have any effect on changing the future outcome

Treatment

If you think the child is deteriorating, a medical review may be needed. The following points should be communicated to families as they may help with their child's treatment. There might be safeguarding concerns if parents do not attend appointments or give appropriate treatment in a timely manner.

Acute treatment

- All inhalers must be given via a spacer and in this age group, the majority will use a mask to breathe into. It is vital that families know how to use spacers, and how to keep them clean. If there is any doubt, a review should be requested for them. More information can be found on the Asthma UK website (www.asthma.org.uk).
- Children can safely have 10 puffs of salbutamol for acute wheeze, with three to five normal breaths per puff of the medicine.
- Home nebulisers are rarely prescribed as there is no evidence that they are more effective than inhalers correctly administered via a spacer.
- Parents should seek same-day medical advice if their child does not remain wheeze free for four hours after 10 puffs of salbutamol.

- Families need an 'asthma plan' so that they know how to manage acute wheezy episodes and should request one from their GP.
- Home-administered oral steroids should not be encouraged, as unwell children need to be assessed by a health professional. Inappropriate use may lead to side effects.
- Montelukast is not a steroid and can be effective in some children who suffer significant symptoms with colds.

Preventive treatment

- Most children do not need any preventive treatment and simply need salbutamol available for acute attacks.
- Children with multiple-trigger wheeze might respond to regular inhaled corticosteroid (ICS) treatment. This is standard treatment for asthma, but pre-school wheeze is different. If a child seems to improve, the most likely reason is because they have had a period of being virus-free, so after a few months children should stop ICS and look for a return of symptoms before restarting. Families should do this under medical supervision.
- Daily montelukast might be an alternative option to ICS if families want to try something different.
- Think about the possibility of allergy and minimise exposure to smoke. Tobacco smoke exposure increases the risk of chest infection in children by 70% if the mother smokes (Strachan and Cook, 1997).
- Daily non-sleepy antihistamine might be worth trying if allergy is suspected.

Key points

- Parents often misdiagnose wheeze as a cause for noisy breathing in children, especially in the younger age group. Most noise is due to secretions that are secondary to a viral infection
- Tobacco smoke exposure increases the risk of chest infection in children by 70% if the mother smokes. Parents must be discouraged to smoke and offered smoking cessation interventions
- Children under five should not be diagnosed as asthmatic unless seen by a respiratory specialist
- Consider allergy in a child with eczema/food allergy and persistent symptoms that do not respond to treatment. This is likely if the child also has allergic symptoms, such as itchy nose, eyes and a rash associated with wheezy chest
- There is no treatment available that will influence the future outcome of any child's wheeze, so one should be chosen to deal with the immediate symptoms

Summary

Pre-school wheeze is a challenging condition and can cause anxiety in many parents. Hopefully, this article will empower you to support worried families. Education is key and health professionals should support families to get the answers that deal with their worries. Advice should be reinforced or a review sought if the child's symptoms are not improving.

References

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CPD questions (please visit www.communitypractitioner.com/CPD to submit your answers)

1. By the age of six what percentage of children will suffer from wheeze?
   A. 20%
   B. 30%
   C. 40%
   D. 50%

2. Children can have up to how many viral infections a year?
   A. 7
   B. 8
   C. 9
   D. 10

3. Viral induced wheeze accounts for how many cases of pre-school wheezing?
   A. A quarter
   B. One third
   C. Two thirds
   D. Half

4. What percentage of children with egg allergy will develop asthma?
   A. 80%
   B. 70%
   C. 60%
   D. 50%

5. What is the most common type of wheeze?
   A. Viral-induced wheeze
   B. Multiple-trigger wheeze

6. Risk of allergy increases the more family members have an allergic problem. True or false?
   A. True
   B. False

7. How many puffs of salbutamol can children safely have for acute wheeze?
   A. 8
   B. 10
   C. 12
   D. 14

8. It can be helpful to mimic the sound of a wheeze to parents during diagnosis. True of false?
   A. True
   B. False

9. If the mother smokes, the risk of chest infection in children is increased by how much?
   A. 35%
   B. 50%
   C. 70%
   D. 85%

10. What percentage of cases of wheeze will have an alternative diagnosis?
    A. Up to 4%
    B. Up to 5%
    C. Up to 10%
    D. Up to 20%