

Wheezing in infancy: Is it asthma? Guidelines for general practitioners

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Pediatricians and general practitioners frequently deal with infants who are wheezing. The main challenge is the treatment of the acute attacks, management of recurrent attacks, and above all, how to counsel the parents regarding the prognosis of the illness.

The majority of wheezing attacks in infants are initiated by respiratory syncytial virus (RSV) infection, although factors like maternal smoking and others may predispose to the illness.¹⁻³ Up to half of those infants may continue wheezing till six years of age

and a smaller percentage continues to wheeze in their late childhood.^{1,2}

This paper gives some guidelines to the pediatrician and general practitioners for dealing with wheezing in infancy.

Key words: Wheezing, RSV, nebulizers, inhalers, aero-chambers

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Introduction

Asthma is a chronic inflammatory disorder of the airways. It is one of the common chronic diseases in infants and children, leading to death in some cases. Every pediatrician and general practitioner should be aware of the disease since they are the first to deal with patients. There should be general guidelines for the management of the acute attacks and also for dealing with long term management of the recurrent attacks.^{1,4} These guidelines should be simple to be followed by the physicians since mismanagement of asthma in children and infants may lead to high mortality.

Wheezing in Infancy: Is it Asthma?

The younger the child, the greater the chance

that an alternative diagnosis may explain recurrent wheeze.^{1,3}

There are two general patterns of wheezing in infancy:

- Infants who have recurrent wheezing precipitated by viral respiratory infection, have no family history of atopy and have no atopy themselves. These infants usually outgrow their symptoms by around 5-6 years of age and represent the majority.
- Infants with atopic familial background have atopy themselves like eczema and have symptoms without URI. These infants tend to have symptoms of asthma that persist till adult life.

Therefore, family history of asthma and other atopic manifestations in the infant are significantly associated with the presence of asthma after the age of six.^{1,3}

It is advisable to use the term asthma rather than other terminology to describe recurrent wheezing in infancy. However if the attack is the first associated with a viral respiratory illness then it should not be called asthma.^{1,3}

In general, 5-15% of infants who wheezed develop asthma in later life.^{1,2}

Differential Diagnosis

The diagnosis of asthma in infancy relies on detailed history and physical examination, which give clues to rule out other causes of cough and noisy breathing.^{1,3}

Table 1 gives the list of different diagnoses.

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Table 1. Differential diagnosis of wheezing in infancy

- Upper airway obstruction
 - Adenoidal hypertrophy
 - Croup
 - Foreign body aspiration
 - Tracheomalacia
 - Vascular ring
- Lower airway obstruction
 - Respiratory syncytial virus pneumonia
 - Asthma
 - Gastroesophageal reflux and tracheoesophageal fistula
 - Foreign body aspiration
 - Mycoplasma pneumonia
 - Bronchopulmonary dysplasia
- Chronic respiratory illnesses
 - Cystic fibrosis
 - Tuberculosis
 - Immunodeficiency

CLUES TO THE DIAGNOSIS IN THE HISTORY

1. Onset at birth indicating congenital lesions such as vascular ring or tracheomalacia.
2. Sudden onset of wheezing in a toddler suggests foreign body aspiration.
3. Family history of chronic cough and sputum production, which may suggest tuberculosis or cystic fibrosis.
4. History of prematurity suggests bronchopulmonary dysplasia.

CLUES TO THE DIAGNOSIS IN THE PHYSICAL EXAMINATION

1. Suprasternal retraction with minimal intercostal and subcostal recessions suggest upper airway obstruction like croup or vascular ring.
2. Diminished air entry on one side of the chest may suggest foreign body aspiration.
3. Presence of clubbing and failure to thrive suggest suppurative lung disease caused by cystic fibrosis or immunodeficiency.

OTHER DIAGNOSTIC CONSIDERATIONS

1. The presence of recurrent nocturnal cough in a healthy child should raise asthma as the most likely diagnosis.
2. A response to trial of inhaled asthma medication is another way of diagnosing asthma.
3. Allergy skin tests and measurement of specific IgE in serum are not very helpful in diagnosing asthma of infancy since they are not sensitive tests in this age group.

Classification of Severity

Table 2 gives the classification of asthma used by the Global Initiative for Asthma (Gina protocol).¹ The severity of asthma will deter-

Table 2. Classification of severity of asthma in infancy (Global Initiative for Asthma)

	Symptoms/Day	Symptoms/Night
Step 1 Intermittent	< once a week Asymptomatic between attacks	≤ twice a month
Step 2 Mild Persistent	> once a week but < once a day Attacks may affect activity	> twice a month
Step 3 Moderate Persistent	Daily Attacks affect activity	> once a week
Step 4 Severe Persistent	Continuous Limited physical activity	Frequent

mine the type of treatment required. Several scores have been formulated to assess the severity of any asthmatic attack in children. The most appropriate to be used by the pediatrician and general practitioner is the easiest to apply on patients, especially infants.

Table 3 shows a modified score likely to be accepted for use by the health care providers.

Table 3. Modified scoring system for asthma severity

	0	1	2
Heart rate	<100	100-120	>120
Intercostal retractions	Non	Mild	Moderate
Mentation	Alert	Restless	Agitated
Wheezing	None	Auscultated	Audible
Air entry	Normal	Mild decrease	Moderate

How to Relieve Acute Attacks

In general, local treatment by inhalers and nebulizers is the preferred treatment mode.⁵ A common, though incorrect, view held by many parents in this society is that inhalers and nebulizers are addictive, and once the infant starts to use them then he or she will be a life long asthmatic. Therefore, they prefer oral bronchodilators, and it is the responsibility of the pediatrician and the general pediatrician to educate them. The simple explanation that needs to be given is that the inhaler and nebu-

lizer are local ways of delivering the medication to the sick organ which is the lung, while the oral medication has to pass through some parts of the body before a small percentage reaches the lung, not to mention the fast action of the aerosolized medication. A mixture of β_2 agonist and anticholinergic is preferred for use in infants less than 2 years of age for the best response. The frequency of use depends on the severity of the condition. The response to the first dose will determine the next action—whether to continue to nebulize at home or refer the infant to the hospital. A short course (3 to 5 days) of oral steroids is also helpful in moderate attacks to avoid referral and admission to the hospital, especially if there is some response to the first nebulized treatment.^{1,4}

Some considerations in using nebulizers and inhalers:

1. A crying infant will not benefit fully from the nebulizer or inhaler. Therefore, the best time for it to be given is during sleep.
2. Use of inhaler in the infant requires a delivering device like spacer, aerochamber or babyhaler.
Figure 1 shows some of the delivering devices used in infants.
3. An infant who requires more frequent nebulization than at 6 hourly intervals should be referred to the hospital.



Figure 1. Delivering devices used in infants

How to Prevent Attacks

Table 4 gives the guidelines of the Global Initiative for Asthma (Gina protocol) for prophylactic treatment of asthma in infancy.¹ Some considerations in using prophylactic treatment, which is a long-term therapy are:

Table 4. Guidelines for prophylactic treatment in asthmatic infants (Global Initiative for Asthma)

Level of Severity	Daily Controller Medications	Other Treatment Options
Step 1 Intermittent	None necessary	
Step 2 Mild Persistent	Low-dose inhaled glucocorticosteroid	Sustained-release theophylline Leukotriene modifier
Step 3 Moderate Persistent	Medium-dose inhaled glucocorticosteroid	Medium-dose inhaled glucocorticosteroid plus sustained-release theophylline Medium-dose inhaled glucocorticosteroid plus long-acting inhaled β_2 agonist High-dose inhaled glucocorticosteroid Medium-dose glucocorticosteroid plus leukotriene modifier
Step 4 Severe Persistent	High-dose inhaled glucocorticosteroid plus more of the following, if needed Sustained-release theophylline Long-acting inhaled β_2 -agonist Leukotriene modifier Oral glucocorticosteroids	

1. Try to use the easiest mode of treatment for better compliance by the infant and parent since it is a long term therapy.
2. Role of inhaled or nebulized sodium chromoglycate is diminishing.
3. Use of long acting antihistamines like ketotefin may benefit few infants having allergic rhinitis and asthma at the same time.

Bronchopulmonary Dysplasia

The general practitioner and the pediatrician should have some knowledge about bronchopulmonary dysplasia (BPD) and how to deal with it. BPD is defined as the requirement of oxygen or assisted ventilation by 36 weeks post conceptional age. Infants with BPD are usually ex-premature babies who tend to have wheezing tendency after discharge from neonatal unit, especially with any viral illness they acquire at home. The management is almost the same as with asthmatic infants, and with the use of inhaled steroids as the preferred prophylactic treatment. In manage-

ment, care needs to be given for achieving weight gain since these infants tend to have some growth failure soon after discharge from the neonatal unit. Better growth will lead to better remodeling of the dysplastic lungs found in infants with BPD.⁷

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CME Questions

After you have completed reading the above article, take the test given below. Circle T (True) or F (False) in the answer sheet on page 90 to show the correct answer to each question. Questions 1 to 10 are related to the content in this article.

1. Infants acquiring wheezing attack after an RSV infection are labeled asthmatics.
2. In general, around 5-15% of infants who wheezed develop asthma later in life.
3. Infants with acute moderate to severe attack of asthma have suprasternal retraction more than subcostal one.
4. Diminished air entry on one side of the chest always suggests foreign body aspiration.
5. Allergy skin test and levels of specific IgE in serum are very helpful diagnostic tests in asthma of infancy.
6. Inhaled bronchodilators have faster action than oral preparations.
7. A crying infant will not benefit fully from the nebulizer.
8. Systemic corticosteroids can be administered orally as a home treatment in moderate attacks of asthma for three to five days.
9. The role of sodium chromoglycate as a prophylactic treatment of asthma is diminishing.
10. Bronchopulmonary dysplasia is defined as the requirement of oxygen or assisted ventilation at two weeks of age.