

Evaluation of a Child with Chronic Cough

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Abstract

Childhood coughing is a common problem that can cause anxiety in parents. Chronic cough in children is generally defined as a cough lasting longer than eight weeks. Cough is a nonspecific reaction to irritation anywhere from the pharynx to the lungs. Common causes are hyperactive airway disease (Asthma), allergic rhinosinusitis, infections (TB, pertussis, Chlamydia), environmental irritants and psychogenic habit cough. A detailed history with relevant clinical examination will solve the majority of the problem. A very few may need targeted investigations. Management is addressed to specific causes. Symptomatic therapy e.g honey or demulcents (after counseling care givers) may reduce nonspecific cough to a great extent.

Keywords: Chronic cough; Cough syrups; Airway disease.

Definition

Cough in children may arise from causes anywhere along the airway, from the nose to the alveoli. Cough is a nonspecific reaction to irritation anywhere from the pharynx to the lungs. Childhood coughing is a common problem that can cause anxiety in parents. There are important differences from adult cough in terms of likely causes and management guidelines.[1,2]

Chronic cough in children is generally defined as a cough lasting longer than eight weeks. This timeframe is used because most simple infective causes of cough will resolve in 3-4 weeks, and the eight-week definition identifies those who may need further investigations.[2]

The timeframe between acute and chronic cough (3-8 weeks) is sometimes called 'subacute cough' or 'prolonged acute cough' (eg a slowly resolving post-viral cough). If a cough is starting to resolve after three weeks, further time may be allowed before investigating further. However, if the cough is not improving by the third week or is increasing in severity, earlier investigations

may be indicated[3].

A recurrent cough without a cold is taken as repeated (>2/ year) cough episodes apart from those associated with head colds that each last more than 7-14 days. If the periods of resolution are short, recurrent cough will be difficult to distinguish from persistent chronic cough.[1,3,4]

Figure I: Profile of Cough in Children[1,5]

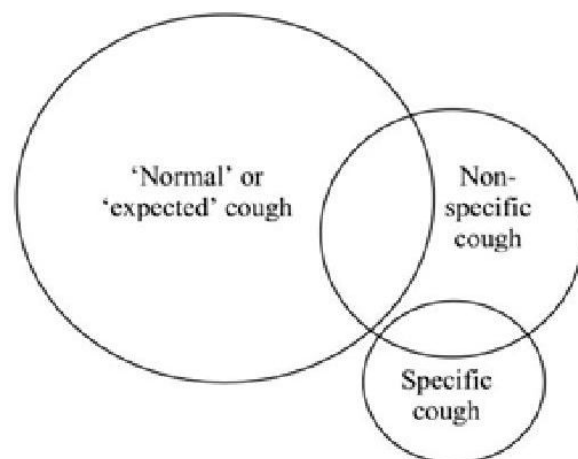


Table I: Causes of Chronic Cough[5,6,7]

Most common causes	Less common causes	Rare causes
Allergic rhinitis	Infection - Sinusitis, Chlamydia, Tuberculosis, Pertussis	Foreign body in the airway
Viral upper respiratory infection	Irritants - May be secondary to stimuli such as smoke	Abnormal mechanical clearance - Immotile ciliary syndrome, CF
Reactive airway disease (Asthma)	Habitual/Functional - Resolves completely during sleep	Immune deficiency states- Hypogammaglobulinemia/HIV
		Congenital abnormalities - TEF, GOR, vascular ring

Table II: Causes of Cough according to Age[6,7]

Infant	Underlying diseases - TEF, GOR
Young children	Viral infection HRAD (hyperreactive airway disease)
Older children	Tuberculosis Sinusitis
Adolescents	Irritants - Smoke Habitual/Functional

*Treatment of Chronic Cough**Recommendations[1,8]*

- a) An attempt should be made to remove children with chronic cough from exposure to aeroirritants such as environmental tobacco smoke.
- b) *Treatments:* cough with a specific diagnosis : Evidence-based guidelines and review articles exist for treatments of the following specific disorders associated with cough and should be referred to: asthma; cystic fibrosis; immune deficiencies; primary ciliary dyskinesia; tuberculosis.
- c) Children with protracted bacterial bronchitis should first have other underlying conditions excluded and sputum cultured before this diagnosis is made. A trial treatment of physiotherapy and a prolonged course (eg, 4–6 weeks) of appropriate antibiotics may be tried.
- d) *Treatments:* non-specific isolated cough in an otherwise well child : Parental reassurance is required and usually the cough eventually subsides with the passage of time. If the impact of the cough is mild and there are no diagnostic pointers in an otherwise well child, a period of observation with no diagnostic tests or treatments should be considered.
- e) In otherwise well children with non-specific isolated coughing with no specific disease pointers, empirical trials of anti-asthma, anti-allergic rhinitis or antigastro-oesophageal reflux therapy are unlikely to be beneficial and are generally not recommended.
- f) *Asthma Therapy:* anti-asthma therapy has not been shown to be effective for children with non-specific persistent isolated cough (either not effective or insufficient evidence). Two RCTs have compared inhaled corticosteroids (beclomethasone, fluticasone) with placebo for treating children with isolated non-specific cough. A small beneficial effect was observed only for the study using very high dose fluticasone but the author advises caution regarding the potential for side effects. If a trial of anti-asthma therapy is used to diagnose problem coughing as being caused by asthma, the treatment should be effectively delivered in adequate doses and clearcut outcomes recorded. A definite period of time should be set (eg, 8–12 weeks) after which the trial of anti-asthma

Table III: Clues in History[1,7,9,10]

Question	Examples	Diagnosis
How did the cough start?	Very acute onset	Retained inhaled foreign body
	Head cold	Post viral Cough
When did the cough start	Neonatal onset (especially if in first few days of life)	Aspiration Congenital malformation Cystic fibrosis Primary ciliary dyskinesia Lung infection in utero
What is the quality of the cough	Productive (“moist or wet”)	Chronic suppurative lung disease (bronchiectasis) eg, cystic fibrosis
	Paroxysmal spasmodic cough with or without an inspiratory “whoop” and vomit	Pertussis or pertussis-like illness
	Haemoptysis	Cystic fibrosis Other bronchiectasis Retained inhaled foreign body Tuberculosis Tumour Pulmonary haemorrhage Pulmonary arteriovenous malformation
	“Bizarre honking cough” in a child exhibiting “la belle indifference” to the cough and which increases with attention	Psychogenic cough
	Dry repetitive cough, disappears with sleep	Habit cough
	Brassy, barking or “seaHike”	Tracheal or glottic cause (eg, tracheomalacia and/ or bronchomalacia)
	Cough producing casts of the airways	Persistent bacterial bronchitis
	Staccato	Chlamydia in infants
	Copious sputum / purulent	Suppurative Lung Disease
Is the cough relentlessly progressive?		Inhaled foreign body Lobar collapse Tuberculosis Rapidly expanding intrathoracic lesion
Is the cough an isolated symptom	Isolated cough (otherwise well) / recent school entry / family contact + / parental smoking	Non-specific isolated cough Recurrent viral bronchitis Psychogenic cough
	Associated wheezing present	Asthma Retained inhaled foreign body Recurrent pulmonary aspiration Airways compression or tracheobronchomalacia Bronchiolitis obliterans or interstitial lung disease Neonatal chronic lung disease Cardiac disease with either congestive heart failure or large left to right shunts
	Associated ill health, recurrent pneumonia or pulmonary infiltrates	Cystic fibrosis Immune deficiencies Primary ciliary disorders Recurrent pulmonary aspiration Retained inhaled foreign body Tuberculosis Persistent bacterial bronchitis Anatomical disorder
	Associated shortness of breath and restrictive lung defect	Interstitial lung disease
What triggers the cough?	Exercise, cold air, early morning	Asthma
	Lying down	Postnasal drip, gastro-oesophageal reflux disease
	Feeding	Recurrent pulmonary aspiration

Table IV: Clues in Physical Examination [9,10,11]

<i>Physical Examination</i>	<i>Suggestive Diagnosis</i>
Failure to thrive	Chronic systemic illness
Halitosis in the absence of periodontitis	Sinusitis, bronchiectasis
Increased respiratory rate with retractions	Pneumonia
Clubbing	Chronic lung disease including bronchiectasis
Signs of atopy, eczema wheezing	Asthma
Subconjunctival hemorrhage	Pertussis
Oral thrush	HIV infection
Stridor, croupy cough	Upper airway obstruction
Coarse crepitation	Bronchiectasis

Table V: Potentially Serious Lung Disorders with Chronic Coughing[1,10,12]

Condition	Investigations
Cystic fibrosis	Sweat test, nasal potential difference, assessment of pancreatic function, genotyping
Immune deficiencies	Differential white cell counts, immunoglobulin levels and subsets, functional antibody responses and lymphocyte subset analysis
Primary ciliary disorders	Screening FnNO, saccharine test, ciliary ultrastructure and function, culture of ciliated epithelium
Protracted bacterial bronchitis	Chest radiography, sputum for culture, exclusion of other causes in this table. Response to 4–6 weeks antibiotic and physiotherapy / HRCT scan
Recurrent pulmonary aspiration: Laryngeal cleft or 'H' type tracheo-oesophageal fistula Post-TOF repair with swallowing incoordination Neuromuscular or neurodevelopmental disorder GOR, hiatal hernia	Barium swallow, videofluoroscopy, 24 h pH studies, milk isotope scan, fat-laden macrophage index* on bronchialveolar lavage if bronchoscopy indicated. Oesophagoscopy with biopsy may be indicated. NB. There is little evidence that GOR alone is a cause of cough in otherwise healthy children
Retained inhaled foreign body	Chest radiography and HRCT scan may show focal lung disease Rigid bronchoscopy is both diagnostic and therapeutic and is almost always indicated if the history is suggestive of inhaled retained foreign body
Tuberculosis	Chest radiography, Mantoux, early morning gastric aspirates and gamma interferon tests
Anatomical disorder (eg, bronchomalacia) or lung malformation (eg, cystic congenital thoracic malformation)	Bronchoscopy and CT scan
Interstitial lung disease	Spirometry (restrictive defect), chest radiography and HRCT scan, lung biopsy

FnNO, fractional nasal nitric oxide; HRCT, high-resolution CT; TOF, tracheoesophageal fistula; GOR, gastro-oesophageal reflux

Table VI: Patterns, Causes and Potential Investigations of Chronic or Frequently Recurrent Cough in Otherwise Healthy Children[1,8,12]

Etiology	Pattern	Cause	Potential investigation
Frequently recurring viral bronchitis	Episodic, frequent in winter, associated with "head colds", may occur "back-to-back"	Viral infections Crowded living conditions, ETS and attendance in child care nursery	None Chest radiography Examine during a period when symptom free
Postviral cough	Troublesome cough (day and night) following a respiratory infection and slowly resolving over next 2-3 months	Viral respiratory infections, Chlamydia and Mycoplasma infections	chest radiography, serology Consider trial of asthma therapy (some mild asthmatics have prolonged recovery from each viral infection)
Pertussis and pertussis-like illness	Troublesome spasmodic cough after initial respiratory infection which slowly resolves over 3-6 months. Vomiting clear tenacious mucus. Older child may complain of difficulty catching breath	Bordetella pertussis, parapertussis, adenovirus, influenza, parainfluenza	Chest radiograph, positive serology or culture may be helpful in reducing requirements for further investigation
Cough variant asthma ??	Isolated cough (no wheezing) due to asthma. Confidence in diagnosis increased when strong atopic background present and cough responds rapidly to anti-asthma medication but relapses when stopped	Asthma	None, chest radiograph. Is airways obstruction present and reversible? BHR or BDR tests, Is there eosinophilic inflammation? Induced sputum, allergy tests, FeNO, response to asthma medication
Allergic rhinitis, postnasal drip and sinusitis - cough likely due to concomitant tracheobronchial inflammation	Not fully accepted as a cause of cough. Cough when "head hits the pillow" or constant throat clearing by day. May have transverse nasal crease of "allergic salute"	Causes of allergic rhinitis	ENT examination, often no investigations needed Chest radiography, allergy tests Response to antirhinitis treatment within 2 weeks / CT scan of sinuses
Psychogenic cough	Usually an older child/adolescent (1) Tic-like "habit cough" persisting after head cold or during times of stress (2) Bizarre disruptive honking cough with child exhibiting "la belle indifférence". Cough goes away with concentration or sleep	Underlying stress Bizarre honking cough usually serving a purpose with some secondary gain	It is important to do investigations to assure the doctor and parent that no major disease is being missed. However, it is important not to keep performing futile investigations that may reinforce the underlying problem

ETS, exposure to environmental tobacco smoke; FeNO, fractional exhaled nitric oxide concentration; BDR, bronchodilator responsiveness; BHR, bronchial hyperreactivity

medication should be stopped.

- g) Postnasal drip and rhinosinusitis therapy : In children with a throat clearing type of cough and signs of allergic rhinitis, allergen avoidance and a trial of therapy is indicated. Allergen avoidance, oral antihistamines and intranasal corticosteroids are the cornerstones of management.
- h) Empirical gastro-oesophageal reflux therapy is not indicated for non-specific cough in children.
- i) In arriving at a diagnosis of psychogenic or habit cough, the physician should first be sure that organic causes are unlikely and that the suggestive features are present. Suggestive features of non-organic coughing include:
- i) bizarre honking disruptive coughing;
 - ii) cough that obviously increases with attention and decreases with involvement and concentration in some activity or sleep;
 - iii) child exhibits "la belle indifférence" to the disruptive coughing.

Habit or "tic"-like coughs are generally less disruptive.

Psychotherapy such as behaviour modification regimes may be helpful in treating psychogenic coughing

Summary of Management[5,9]

Group I

- Hyperreactive airway disease - Bronchodilators / ICS
- Persistent cough following viral URI - symptomatics/ Honey
- Irritant dry cough- Avoid exposure to smoke
- Habitual cough- resolves completely during sleep

Group II

- Sinusitis- Amoxicillin/Macrolides
- Chlamydia pneumonia- Macrolides
- Tuberculosis- Mantoux/X-ray chest/contact history - ATT
- Pertussis- Treat with Macrolides

Group III

- Foreign body obstruction in the airway
- Abnormal mechanical clearance
- Immuno-deficiency states
- Congenital abnormalities

References

1. Recommendation of diagnosis & management of cough in children. doi:10.1136/thx.2007.077370 *Thorax*. 2008; 63: 1-15. originally published online 28 Sep 2007; British Thoracic Society Cough Guideline Group MD Shields, A Bush, M L Everard, S McKenzie, R Primhak.
2. Hay AD, Heron J, Ness A. The prevalence of symptoms and consultations in preschool children in the Avon Longitudinal study of Parents and Children (ALSPAC): a prospective cohort study. *Fam Pract*. 2005; 22: 367-74.
3. Ninan T, MacDonald L, Russel G. Persistent nocturnal cough in childhood: a population based study. *Arch Dis Child*. 1995; 73: 403-7.
4. Clough JB, Williams JD, Holgate ST. Effect of atopy on the natural history of symptoms, peak expiratory flow, and bronchial responsiveness in 7- and 8-year old children with cough and wheeze. *Am Rev Respir Dis*. 1991; 43: 755-60.
5. Burr ML, Anderson HR, Austin JB, et al. Respiratory symptoms and home environment in children: a national survey. *Thorax*. 1999; 54: 27-32.
6. Thomson F, Masters IB, Chang AB. Persistent cough in children and the overuse of medications. *J Paediatr Child Health*. 2002; 38: 578-81.

7. McKenzie S. Cough – but is it asthma? *Arch Dis Child*. 1994; 70: 1–2. children are acutely ill, and why: a qualitative study. *BMJ*. 1996; 313: 983–6.
8. Falconer A, Oldman C, Helms P. Poor agreement between reported and recorded nocturnal cough in asthma. *Pediatr Pulmonol*. 1993; 15: 209–11.
9. Cornford CS, Morgan M, Ridsdale L. Why do mothers consult when their children cough? *Fam Pract*. 1993; 10: 193–6.
10. Kai J. What worries parents when their preschool
11. Archer LN, Simpson H. Night cough counts and diary cough scores in asthma. *Arch Dis Child*. 1985; 60: 473–4.
12. Shann F. How often do children cough? *Lancet*. 1996; 348: 699–700.

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