A PRACTICAL APPROACH TO CHRONIC COUGH IN CHILDREN

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Chronic cough is defined as a persistent cough of more than three weeks duration which is not getting better. It is a common symptom in childhood. Data from questionnaire studies suggest that as many as 10% of preschool and early school aged children have chronic cough without wheeze at some time in their lives. Parental smoking is a known factor for chronic cough; studies have reported that if both parents smoke, up to 50% of children below 11 years of age may have chronic cough.

Parental reports of cough severity in their child are more often dependent on its effect on themselves rather than on the child. Studies using overnight audio recordings have shown that parental reports of cough do not correlate well with the frequency duration, or intensity of the actual cough. This is however the main source of information clinicians depend on when evaluating patients with chronic cough.
Chronic cough in most situations has a favourable prognosis with improvement being the rule in the majority.

Cough is a symptom and not a diagnosis. Always look for the underlying cause for the chronic cough.

**Chronic Cough Syndromes**

The two most common causes of chronic cough in childhood are asthma and chronic rhinosinusitis with post nasal drip.

**Cough Variant Asthma**

Children with cough-variant asthma have isolated cough without wheeze that responds to anti-asthma treatment.

Features suggestive of cough-variant asthma include:

- Presence of cough between episodes of upper respiratory tract infections associated with known asthma triggers
- Cough that is typically worse in the early hours of the morning when the child is asleep
- Cough that occurs after playing or exercising
- Personal atopy or strong family history of atopy
- No evidence of alternative diagnosis
- Response to a therapeutic trial of asthma medication.

In any therapeutic trial, it is important to review the diagnosis and treatment if the desired response is not achieved before increasing the dose of medication. Only the lowest dose of inhaled corticosteroid that maintains symptom control should be used.

**Rhinitis, Sinusitis and Postnasal Drip Syndrome**

Postnasal drip syndrome (PNDS) is one of the most common causes of chronic cough. Helpful findings suggesting PNDS include:

- Nasal congestion or discharge
- The sensation of “something dripping into the throat”
- Frequent throat clearing in the presence of a wet chronic cough
- Cough that is worse at nap times or at night
- Cough that typically begins soon after the child assumes the recumbent position
- Personal atopy or family history of atopy.

An examination of the nose should be performed in patients with a history of rhinitis. This should include visual examination of the nasal passages, looking for the presence
of secretions, congested and inflamed turbinates, deviation of the nasal septum, and the presence of nasal polyps.

**Respiratory Infections**

Viral upper respiratory tract infections may occur “back to back” and give the impression of a chronic persistent cough. A detailed history may however show short asymptomatic intervals between infections. Children may have up to ten upper respiratory tract infections in a year and such “back to back” viral infections are most problematic in young children attending childcare or nursery. Some lower respiratory tract infections may also cause prolong cough, including respiratory syncytial virus, pertussis, chlamydial and tuberculosis infections.

**Gastroesophageal Reflux Disease**

Gastroesophageal Reflux (GER) is a functional or physiologic process in a healthy infant with no underlying systemic abnormalities. GER is a common condition involving regurgitation, or “spitting up,” which is the passive return of gastric contents into the esophagus. The prevalence of GER peaks between one to four months of age, and usually resolves by six to 12 months of age. In contrast, gastroesophageal reflux disease (GERD) is a pathologic process in infants manifested by poor weight gain, signs of esophagitis, persistent respiratory symptoms, and changes in neurobehavior. GER occurs in up to 65% of normal babies but abnormal symptoms and signs that warrant a diagnosis of GERD occur in approximately one in 300 infants.

GERD is a cause of chronic respiratory symptoms including cough and wheeze, particularly in young infants.

Helpful findings suggesting GERD include:
- Regurgitation with poor weight gain
- Fussiness, discomfort and crying during feedings
- Apnea and cyanosis in infants
- Stridor or wheezing
- Aspiration or recurrent pneumonia
- Neck tilting or arching in infants (Sandifer’s syndrome)
- Hematemesis and iron deficiency anaemia

The presence of regurgitation of feeds is suggestive but its absence does not exclude the diagnosis.

**Psychogenic Cough**

Psychogenic cough can be defined as a chronic dry cough without evidence of underlying illness. Psychogenic cough presents as a habit “tic-like” cough (a dry
repetitive and purposeless cough that is persistent) or as a bizarre “honking” cough (the child may be indifferent to the cough but the parents are usually extremely worried about it). In both types of psychogenic cough, the symptoms typically disappear at night during sleep. The cough abates when the child is engrossed in an activity but becomes more noticeable with attention and when the child is under stress. The symptoms may sometimes be dated to a past upper respiratory infection.

The profile of children with psychogenic cough is indeed very variable but it has been described to occur in older children (> five years old), who are typically bright students, and are eager to please. Children with a “honking” psychogenic cough often suffer from other somatic symptoms and are taken from one specialist to another in search of a physical diagnosis. Family life and school attendance are often disrupted and a vicious circle is established. Approach to treatment ranges from benign neglect (shifting the focus of attention to everyday concerns and away from the symptom) to family therapy.

Other Causes

Rare but important causes of chronic cough in children include foreign body aspiration, dysfunctional swallowing, congenital anomalies, benign tumours, malignancies, immunodeficiencies and primary ciliary dyskinesia.

Diagnostic Approach

The history should establish the severity and time course of the cough. Special features including diurnal variability, fever, rhinitis, relation with meals and possible foreign body aspiration, habitual vomiting, production of sputum, risk of contact with tuberculosis, parental smoking, possible allergies, and vaccination status, should be sought.

Relevant physical signs include ear, nose and throat infections, nasal polyps, chest deformities, abnormal chest auscultation, evidence of atopic diseases including eczema, failure to thrive as evident from low weight for height and, sometimes, a low height for age. Deviation of the growth curve is a particularly important finding that may suggest a serious underlying disease.

The following features may warrant a specialist evaluation and further investigations:

- Cough with a neonatal onset:
  - This suggests
  - A congenital defect with feeding and pulmonary aspiration;
  - A problem with ciliary function and infection, including cystic fibrosis or primary ciliary abnormality;
  - An anatomical lesion in the airways, including a cyst compressing the airway; or
  - A chronic viral pneumonia, including CMV or Chlamydia acquired in-utero or during the perinatal period.
• Cough that occurs during or after feeding:
  This suggests gastro-oesophageal reflux or direct pulmonary aspiration while feeding.

• **Cough that starts and persists after a choking episode:**
  This suggests an inhaled foreign body.

• **Chronic moist or purulent cough:**
  Children (<five years old) usually swallow sputum and this may only be apparent when they vomit.

• **General ill health** with failure to thrive, finger clubbing or persistent respiratory crackles on auscultation, lung infections that will not clear up, or recur.

| The younger the child eg, infants, the lower is the threshold for referral and further investigations. |

A chest radiograph is the first line investigation for evaluating children with chronic cough. Hyperinflated lungs suggest asthma whilst air trapping in only one lung field only suggests a foreign body. A chest x-ray is also helpful to exclude rarer diagnoses like tuberculosis, lymphoma and bronchiectasis. Sinus radiographs are helpful in older children who present with nasal symptoms and wet cough, features that suggest allergic rhinosinusitis. Spirometry may be helpful in supporting the clinical diagnosis of cough-variant asthma in older children (> six years old) who are able to perform the maneuver.

The demonstration of allergen sensitisation by skin testing or serum IgE testing is important to determine whether the patient has allergic asthma and/or rhinitis and for identifying specific allergens which avoidance measures can be helpful. Proper understanding and interpretation of these tests are very important to avoid unnecessary overdiagnosis and misinformation to the child and parents.

A 24-hour esophageal pH study or flexible bronchoscopy may be required in a child with chronic cough in which the diagnosis is not clear-cut by history, physical examination or plain radiographs. Sweat testing, immune workup and ciliary studies may be needed in children with recurrent chest infections.

**Treatment**

The treatment of chronic cough in children should always be preceded by a systematic effort to exclude serious underlying illness and establish the cause of the cough.

Exposure to cigarette smoke should be removed whenever possible. Nonprescription cough remedies have not been shown to be efficacious in controlled trials, and cough suppressants may have side effects when given to young infants. The side effects of
cough suppressants include bronchospasm in asthmatic children, central nervous system suppression and even sudden infant death syndrome secondary to sleep apnea. Cough suppressants may also mask underlying lung diseases and delay treatment. In general, cough suppressants should not be used in young infants, or if lung auscultation is abnormal.

Cough suppressants such as promethazine should be used with caution in young children.

The treatment of cough variant asthma includes daily low dose inhaled corticosteroids and as needed bronchodilators. Inhaled bronchodilators with an age specific spacer device are preferred over oral bronchodilators.

The treatment of chronic rhinosinusitis with post nasal drip is aimed at reducing mucosal inflammation and swelling, controlling infection, and restoring aeration of the nasal and sinus mucosa. Parents should be instructed on measures to reduce contact with environmental allergens and irritants. Pharmacologic treatments include local corticosteroids such as fluticasone propionate, mometasone furoate or triamcinolone acetonide. Nasal steroids can be coupled with oral antihistamines. Aeration of the sinuses may temporarily be improved with local nasal decongestants such as oxymetazoline. It is important to remember that treatment of concomitant rhinosinusitis improves asthma control.